

TECHNOLOGICAL DUE PROCESS

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ABSTRACT

Distinct and complementary procedures for adjudication and rulemaking lie at the heart of twentieth-century administrative law. Due process requires agencies to provide individuals notice and an opportunity to be heard. Through public rulemaking, agencies can foreclose policy issues that individuals might otherwise raise in adjudication. One system allows for focused advocacy; the other features broad participation. Each procedural regime compensates for the normative limits of the other. Both depend on clear statements of reason.

The dichotomy between these procedural regimes is rapidly becoming outmoded. This century's automated decision making systems combine individual adjudications with rulemaking while adhering to the procedural safeguards of neither. Automated systems jeopardize due process norms. Hearings are devalued by the lack of meaningful notice and by the hearing officer's tendency to presume a computer system's infallibility. The Mathews v. Eldridge cost-benefit analysis is ill-equipped to compare the high fixed cost of deciphering a computer system's logic with the accumulating variable benefit of correcting myriad inaccurate decisions made based on this logic. Automation also defeats participatory rulemaking. Code, not rules, determines the outcomes of adjudications. Programmers inevitably alter established rules when embedding them into code in ways the public, elected officials, and the courts cannot review. Last century's procedures cannot repair these accountability deficits.

A new concept of technological due process is essential to vindicate the

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norms underlying last century's procedural protections. This Article will demonstrate how a carefully structured inquisitorial model of quality control can partially replace aspects of adversarial justice that automation renders ineffectual. It also provides a framework of mechanisms capable of enhancing the transparency, accountability, and accuracy of rules embedded in automated decision-making systems.

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INTRODUCTION

The executive branch grew exponentially in size and mission in the twentieth century.¹ Administrative agencies wielded ever-increasing power, implementing comprehensive regulatory programs and distributing benefits to tens of millions of people.² Congress and the courts allowed the administrative state to expand so long as it adhered to extensive procedures designed to ensure the fairness, transparency, and accountability of agencies' decisions about particular individuals and their policymaking.³ Procedural due process protected the important interests of individuals while constraints on rulemaking served as legitimate substitutes for individual adjudications.⁴

In the twentieth century, those procedures enjoyed mixed success. The administrative state faced serious criticism, ranging from agency capture⁵ and the ossification of rulemaking⁶ to chronic backlogs⁷ and perceived

1. Richard E. Levy & Sidney A. Shapiro, *Administrative Procedure and the Decline of the Trial*, 51 U. KAN. L. REV. 473, 473–74 (2003).

2. See JAMES M. LANDIS, *THE ADMINISTRATIVE PROCESS* 6–46 (1938).

3. See CORNELIUS M. KERWIN, *RULEMAKING* 47–50 (3d ed. 2003); Levy & Shapiro, *supra* note 1, at 473.

4. See 1 KENNETH CULP DAVIS & RICHARD J. PIERCE, JR., *ADMINISTRATIVE LAW TREATISE* § 6.1 (3d ed. 1994) (explaining that guarantees of procedural due process in addition to rulemaking procedures found in administrative decisions provide basic structural protections for individuals); *see, e.g.*, *Londoner v. City of Denver*, 210 U.S. 373 (1908) (providing due process protections to individuals subject to special tax because City levied tax on the basis of facts peculiar to individuals' situations); *Bi-Metallic Inv. Co. v. State Bd. of Equalization*, 239 U.S. 441, 445 (1915) (finding no due process right to a hearing to challenge an across-the-board tax because "it is impracticable that every one should have a direct voice in [the] adoption" of a "rule of conduct" that "applies to more than a few people"); JOHN HART ELY, *DEMOCRACY AND DISTRUST* 87 (1980) "[The Constitution] is overwhelmingly concerned, on the one hand, with procedural fairness in the resolution of individual disputes (process writ small), and on the other, with what might capaciously be designated process writ large—with ensuring broad participation in the processes and distributions of government." (citation omitted).

5. See THEODORE LOWI, *THE END OF LIBERALISM: IDEOLOGY, POLICY, AND THE CRISIS OF PUBLIC AUTHORITY* 297–98 (1969) (criticizing agencies' capture by organizations).

6. See JOHN M. MENDELOFF, *THE DILEMMA OF TOXIC SUBSTANCE REGULATION* 7–16 (1988) (complaining that due to cost, agencies skirt informal rulemaking process by making policy in other ways); Jerry L. Mashaw & David L. Harfst, *Regulation and Legal Culture: The Case of Motor Vehicle Safety*, 4 YALE J. ON REG. 257, 305–06 (1987) (attributing decline in National Highway Traffic Safety Administration's rulemaking to the threat of reversal posed by judicial review).

7. See *White v. Mathews*, 434 F. Supp. 1252, 1261 (D. Conn. 1976) (finding that the delays in the Social Security Administration's (SSA's) disability benefits appeals process denied applicants procedural due process); *see also* JERRY L. MASHAW ET AL., *SOCIAL SECURITY HEARINGS AND APPEALS* (1978); Maurice E.R. Munroe, *The EEOC: Pattern and Practice Imperfect*, 13 YALE L. &

unfairness in agencies' adjudicatory arms.⁸ Through it all, however, procedural due process and formal and informal rulemaking provided a common structure for debating and addressing concerns about the propriety of administrative actions.

The twenty-first century's automated decision-making systems bring radical change to the administrative state that last century's procedural structures cannot manage. In the past, computer systems helped humans apply rules to individual cases.⁹ Now, automated systems have become the *primary* decision makers.¹⁰ These systems often take human decision making out of the process of terminating individuals' Medicaid, food stamp, and other welfare benefits.¹¹ Another of these systems targets people for exclusion from air travel.¹² Computer programs identify parents believed to owe child support and instruct state agencies to file collection proceedings against those individuals.¹³ Voters are purged from the rolls without notice,¹⁴ and small businesses are deemed ineligible for federal contracts.¹⁵

Champions of automated systems extol their cost savings.¹⁶ Because automation radically reduces the human role in executing government policy and programs, state and federal governments can cut staff and close field offices.¹⁷ Supporters also argue that automation ensures consistent

POL'Y REV. 219, 260 (1995) (describing EEOC's backlog of charges, which grew from 6,133 in 1966 to 130,000 in 1977).

8. *Barry v. Bowen*, 825 F.2d 1324 (9th Cir. 1987) (criticizing SSA's means of reviewing the decisions of ALJs); *Stieberger v. Heckler*, 615 F. Supp. 1315 (S.D.N.Y. 1985) (discussing a range of defects in SSA's procedures).

9. For instance, Florida's Department of Health and Human Services used computers to process Medicaid claims in the 1990s. David K. Rogers et al., *Computer Delays Welfare Services*, ST. PETERSBURG TIMES, June 3, 1992, at A1. Today, Florida's automated public benefits system known as ACCESS recommends eligibility and benefit determinations to eligibility workers who finalize the computer's decisions. See *infra* note 112 (discussing Florida's automated public benefits system).

10. Denise Kersten, *Bytes vs. Brains*, GOV'T EXEC., Sept. 1, 2005, at 30.

11. E.g., *Computer Glitch Drops Some Medicare Patients in 18 CA Counties*, INSIDE CMS, Mar. 8, 2007, available at 2007 WLNR 4384599.

12. U.S. GOV'T ACCOUNTABILITY OFFICE, REP. TO CONG. REQUESTERS, GAO-06-1031, TERRORIST WATCH LIST SCREENING: EFFORTS TO HELP REDUCE ADVERSE EFFECTS ON THE PUBLIC 2, 14-18 (2006), available at <http://www.gao.gov/new.items/d061031.pdf> [hereinafter U.S. GAO, TERRORIST WATCH LIST].

13. Susannah Zak Figura, *Where's Dad?*, GOVT. EXEC., Dec. 1, 1998, at 12.

14. Letter from Juliet T. Hodgkins, Gen. Counsel, U.S. Election Assistance Comm'n, to Sarah Ball Johnson, Executive Dir., Ky. State Bd. of Elections (May 11, 2006) (on file with author).

15. Kersten, *supra* note 10, at 30.

16. Kara Harris & Tiffany Dovey, *Integrating Health and Human Services Delivery*, in STATES OF TRANSITION: TACKLING GOVERNMENT'S TOUGHEST POLICY AND MANAGEMENT CHALLENGES 153-56 (William D. Eggers & Robert N. Campbell III eds., 2006).

17. Thomas H. Davenport & Jeanne G. Harris, *Automated Decision Making Comes of Age*, MIT SLOAN MGMT. REV., Summer 2005, at 83, 84; Kimberly Reeves, *Million-Hour Madness*, HOUSTON

decisions: systems interpret rules in the same way in every case.¹⁸ Computerized systems eliminate the hassle of physically visiting an agency's office.¹⁹

Automation offers all of this. But it also risks dismantling critical procedural safeguards at the foundation of administrative law. Whereas the differences between rulemaking and individual adjudications and their procedural safeguards animated twentieth-century administrative law,²⁰ today's automated systems defy such classification. Computer programs seamlessly combine rulemaking and individual adjudications without the critical procedural protections owed either of them.²¹

Automation generates unforeseen problems for the adjudication of important individual rights. Some systems adjudicate in secret, while others lack recordkeeping audit trails, making review of the law and facts supporting a system's decisions impossible.²² Inadequate notice will

PRESS, Apr. 28, 2005, at A1 (explaining Texas's projection that its automated welfare-benefits system would allow the state to cut sixty percent of its eligibility workers within two years). Florida reduced its workforce at the Department of Children and Family Services by forty-three percent after automating its administration of public benefits. Harris & Dovey, *supra* note 16, at 155.

18. WILLIAM D. EGGERS, GOVERNMENT 2.0: USING TECHNOLOGY TO IMPROVE EDUCATION, CUT RED TAPE, REDUCE GRIDLOCK, AND ENHANCE DEMOCRACY 113 (2005).

19. William D. Eggers, *Overcoming Obstacles to Technology-Enabled Transformation* 6 (Inst. for Gov't Innovation, Kennedy Sch. of Gov't, Occasional Paper Series No. OPS-05-03, 2003), available at http://www.manhattan-institute.org/pdf/overcoming_obstacles_eggers.pdf; see also Shane Peterson, *Social Services Synchronicity*, GOV'T TECH., Mar. 28, 2005, available at <http://www.govtech.net/magazine/story.print.php?id=93498> (explaining that web-based automated public benefits system in Pennsylvania offers convenience of screening applicants online but that despite the advantages of web-based services, clients still seek help by going into county assistance offices).

20. DAVIS & PIERCE, *supra* note 4, § 1.8 at 31.

21. This Article uses the terms "rulemaking," "policy-making," "rule," and "policy" to refer to agency action that affects the rights and duties of a large number of people. See sources cited *supra* note 4 (discussing procedures that apply to broad policy-making); 5 U.S.C. § 551 (2000) (defining "rule" as "agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy or describing the organization, procedure, or practice requirements of an agency"). This Article employs the term "adjudication" to signal agency action taken against people in their individual capacity. DAVIS & PIERCE, *supra* note 4, § 6.2; see sources cited *supra* note 4 (describing due process protections afforded individuals in adjudications of their important rights). Agencies can, of course, make policy in a number of ways, including through case-by-case adjudication, formal and informal rulemaking, interpretative rules, and policy statements. 5 U.S.C. §§ 551 (defining rulemaking and adjudication), 553 (2000) (explaining that rulemaking procedures do not apply to interpretative rules, general statements of policy, or rules of agency procedure); see sources cited *infra* notes 251, 257 (describing interpretative rules and policy statements). Although this Article addresses different kinds of policy throughout, its main purpose is to demonstrate how automation impairs both the procedural due process provided by individual adjudication and the procedural protections governing rulemaking (the traditional substitute for procedural due process).

22. For example, the TSA's "No Fly" program identifies individuals as terrorists without providing any notice. See *infra* notes 177-79, 196-97. The automated public benefits systems in

discourage some people from seeking hearings and severely reduce the value of hearings that are held.²³

Even if an individual seeks and receives a hearing, a hearing officer's belief that computer decisions are error-resistant increases the likelihood of inaccurate outcomes. Although expert testimony about a computer system's reasoning could combat a hearing officer's presumption that a computer decision is correct,²⁴ a *Mathews v. Eldridge*²⁵ cost-benefit analysis would likely deny such additional process due to its extreme cost. As a result, hearings may not provide individuals with opportunities to meaningfully challenge automated decisions. Changes must be made if procedural due process is to be effective in the twenty-first century.²⁶

Automation also impairs the rulemaking procedures that traditionally substituted for individualized consideration with procedural due process. Although programmers building automated systems may not intend to engage in rulemaking, they in fact do so. Programmers routinely change the substance of rules when translating them from human language into computer code.²⁷ The resulting distorted rules effectively constitute new policy that can affect large numbers of people.

The opacity of automated systems shields them from scrutiny.²⁸ Citizens cannot see or debate these new rules.²⁹ In turn, the transparency, accuracy, and political accountability of administrative rulemaking are lost.³⁰ Code writers lack the properly delegated authority and policy

Colorado and Texas lack recordkeeping audit trails that record the facts and law at the heart of each mini-decision made by the computer. *See infra* notes 191–95.

23. Indeed, the lack of meaningful notice effectively prevents some individuals from receiving hearings. *See infra* note 187 and accompanying text (discussing the lack of notice to individuals who are erroneously labeled dead-beat parents and the default judgments against innocent individuals who never received notice of their dead-beat status).

24. *See infra* notes 243, 248–49 and accompanying text (discussing the potential value of expert testimony on a system's logic at hearings to dispel automation bias).

25. 424 U.S. 319 (1976).

26. *Cf.* Danielle Keats Citron, *Minimum Contacts in a Borderless World: Voice over Internet Protocol and the Coming Implosion of Personal Jurisdiction Theory*, 39 U.C. DAVIS L. REV. 1481, 1538–42 (2006) (offering solutions to theoretical conflict in personal jurisdiction analysis created by emerging telephony technologies).

27. *See infra* notes 123–31 and accompanying text (discussing distorted policy embedded in Colorado's public benefits system known as CBMS).

28. Charles Vincent & Jean Camp, *Looking to the Internet for Models of Governance*, 6 ETHICS & INFO. TECH. 161, 161 (2004) (explaining that automated processes remove transparency).

29. James Grimmelmann, Note, *Regulation by Software*, 114 YALE L.J. 1719, 1736, 1750–55 (2005) (arguing that software's opacity is unproblematic when code regulates online markets and Digital Rights Management Systems). The programmer determines a system's responses but the user sees only the results of the software's decisions. *Id.*

30. David A. Super, *Are Rights Efficient? Challenging the Managerial Critique of Individual Rights*, 93 CAL. L. REV. 1051, 1124 & n.322 (2005) (noting that automation of eligibility

expertise that might ameliorate such unintentional policymaking. They also usurp agency expertise when they inadvertently distort established policy.

Expert agency deliberation is another casualty of the acceleration of automated decision making. Agencies may be increasingly inclined to adopt policies involving simple questions and answers that are easy to translate into code, even when strong substantive reasons favor a more nuanced approach.³¹ At the same time, agencies may forsake policies that require a human being to exercise discretion because these are more difficult to automate. A strong a priori preference for simplified policy over nuance and discretion narrows the field for the expertise model of administrative law.³²

In short, automation undermines several pivotal assumptions at the heart of twentieth-century administrative law. Under these rapidly eroding assumptions, agencies exercise broad discretion to pursue either adjudication or rulemaking,³³ although whatever path an agency ultimately chooses bears a distinct set of procedures.³⁴ These procedures, which are the essence of an individual's due process rights, begin with an agency's statement of reasons for its intended actions.³⁵ In agency adjudications, assessments of hearing officers' partiality hinge upon their connections with the parties appearing before them.³⁶ Furthermore, the traditional due

determinations for public-benefits programs risks transparency since state employees may not be aware of extent to which an automated program deviates from state or federal policy).

31. Rochelle Hahn explains that in Massachusetts, information technology specialists dissuaded agency decision makers from adopting public benefits policies that would be difficult and expensive to automate. Comments of Rochelle Hahn, Website Coordinator for Massachusetts Legal Services, Podcast, Berkman Center for Internet and Society at Harvard Law School, "Danielle Citron on *Technological Due Process*," Jan. 15, 2008, <http://blogs.law.harvard.edu/mediaberkman/2008/01/15/danielle-citron-on-technological-due-process-podcast/>.

32. Congress and the courts delegated power to agencies largely on the basis that agencies could develop the kind of expertise that legislators could not. LANDIS, *supra* note 2, at 23 ("[Expertise] springs only from that continuity of interest, that ability and desire to devote fifty-two weeks a year, year after year, to a particular problem."); *see also* Martin v. Occupational Safety & Health Review Comm'n, 499 U.S. 144, 151–53 (1991) (deferring to Secretary of Labor's interpretation of regulation because Secretary's involvement with everyday enforcement gave her expertise that explained, in part, Congress's delegation of rulemaking functions to Secretary); Danielle Keats Citron, *Open Code Governance*, 2008 U. CHI. LEGAL F. (forthcoming Sept. 2008) (discussing expert model of administrative law).

33. *See* NLRB v. Bell Aerospace Co., 416 U.S. 267, 291 (1974) (ruling that the choice between rulemaking and adjudication lies within the agency's discretion).

34. *See* sources cited *supra* note 4 (discussing different procedural regimes governing individual adjudications and rulemaking).

35. *See* Mullane v. Central Hanover Bank & Trust Co., 339 U.S. 306, 319 (1950) (ruling that fundamental requirement of due process is provision of notice reasonably calculated under the circumstances to apprise parties of nature of action).

36. *See* Fed. Trade Comm'n v. Cement Inst., 333 U.S. 683, 700–03 (1948) (finding no violation

process cost-benefit analysis is structured so that the significant costs are almost always the variable ones, and are replicated in all future adjudications.³⁷ Lastly, agencies can engage in legislative-type rulemaking only after seeking and considering the public's input.³⁸ All of these assumptions are fast becoming obsolete in this automated age.

Consider the following illustrations of failed automated systems. The Colorado Benefits Management System (CBMS) has issued hundreds of thousands of incorrect Medicaid, food stamp, and welfare eligibility determinations and benefit calculations since its launch in September 2004.³⁹ Many of these errors can be attributed to programmers' incorrect translations of hundreds of rules into computer code.⁴⁰ As a result, CBMS imposed rules that, in their translated form, distorted federal and state policy without providing required opportunities for public input.⁴¹ Even after years of efforts to correct the system, affected individuals still cannot readily determine if errors made by CBMS stem from incorrectly translated rules or from mistaken factual adjudications. Had the failure of CBMS been less catastrophic, and thus less noticeable, the system's invalid rules might well have remained hidden.

Every week, approximately 1,500 airline travelers reportedly are mislabeled as terrorists due to errors in the data-matching program known as the "No Fly" list.⁴² Innocent individuals face extensive questioning and miss flights, never knowing why the automated system has targeted them.⁴³ Individuals on the "No Fly" list have no assured means to clear

of procedural due process for administrative judge to sit on case after he expressed an opinion as to whether certain types of conduct were prohibited by law).

37. See *infra* notes 244–47 and accompanying text (discussing the high cost of providing hearings in future cases under the traditional *Mathews v. Eldridge* due process analysis).

38. See Kerwin, *supra* note 3, at 158 (“[T]he legitimacy of the rulemaking process is clearly linked to public participation.”).

39. Jerd Smith, *Audit: Costly Errors in Computer System for Benefits Had High Mistake Rate*, ROCKY MTN. NEWS, Apr. 19, 2006, at 4A. Before CBMS went live, the error rate for food stamp decisions was approximately 2.93%. *Id.* In 2005, a year after Colorado launched CBMS, the food stamp error rate stood at 7.42% whereas the national error rate was 5.48%. *Id.*

40. See *infra* notes 123 & 144.

41. See, e.g., *Boatman v. Hammons*, 164 F.3d 286, 288 (6th Cir. 1998) (enforcing requirements that states consult their medical care advisory committees before changing Medicaid policy); 7 C.F.R. § 272.3(d) (2007) (“State agencies shall solicit public input and comment on overall Program operations as State laws require or as the individual State agency believes would be useful.”).

42. Greg Gordon, ‘Data Mining’ May Implicate Innocent People in Search for Terrorists, MCCLATCHY NEWSPAPERS, Jan. 9, 2007, http://www.mcclatchydc.com/staff/greg_gordon/story/15339.html; see also Ryan Singel, *Feds’ Watch List Eats Its Own*, WIRED NEWS, May 4, 2006, <http://www.wired.com/science/discoveries/news/2006/05/70783>.

43. DANIEL J. SOLOVE, *THE DIGITAL PERSON* 182 (2004).

their names and could be detained every time they attempt to board an airplane.⁴⁴

The data-mining algorithms⁴⁵ of the Terrorist Surveillance Program (TSP) automatically search databases containing the telephone and email records of millions of Americans, creating lists of people who fit terrorist profiles.⁴⁶ Serious concerns have been raised not only about TSP's legality,⁴⁷ but also about the crudeness of the algorithms it employs and the inaccurate information upon which it relies.⁴⁸ Unsophisticated algorithms and faulty data generate high rates of false positives that might serve as a basis for baseless, stigmatizing criminal investigations.⁴⁹

The automated Federal Parent Locator Service has erroneously identified individuals as “dead-beat” parents who owe child support.⁵⁰ Some of these mistakenly identified individuals never receive notice of their alleged dead-beat status before their wages are garnished and their credit is impaired.⁵¹ These systems offend basic norms of due process by failing to provide both notice of the basis of their decisions and the means to review them.

44. *Id.*

45. In computing, the term algorithm refers to a “mechanical or recursive computational procedure.” THE AMERICAN HERITAGE DICTIONARY 93 (21st College ed. 1985).

46. Scott Shane & David Johnston, *Mining of Data Prompted Fight over U.S. Spying*, N.Y. TIMES, July 29, 2007, at 16. The TSP mines information from databases maintained by AT&T, Verizon, and BellSouth. Declan McCullagh, *FAQ: NSA's Data Mining Explained*, C/NETNEWS.COM, May 17, 2006, http://www.news.com/FAQ-NSAs-data-mining-explained/2100-1028_3-6071780.html. Those databases include information about the parties to conversations and the duration of calls. *Id.*

47. On July 6, 2007, the Sixth Circuit dismissed a case challenging the constitutionality of TSP, finding that the plaintiffs lacked standing to sue. *ACLU v. Nat'l Sec. Agency*, 493 F.3d 644, 687–88 (6th Cir. 2007). In August 2007, Congress voted to authorize warrantless surveillance and interception of phone calls and emails of American citizens with little supervision by the courts. Jim Rutenberg, *Wielding the Threat of Terrorism, Bush Outmaneuvers the Democrats*, N.Y. TIMES, Aug. 7, 2007, at A1. The bill expires within six months. *Id.*

48. Shane Harris, *NSA Program Broader than Previously Described*, GOVERNMENT EXECUTIVE.COM, Mar. 17, 2006, <http://www.govexec.com/dailyfed/0306/031706nj1.htm>; Bruce Schneier, Commentary, *Why Data Mining Won't Stop Terror*, WIRED NEWS, Mar. 9, 2006, <http://www.wired.com/politics/security/commentary/securitymatters/2006/03/70357>; *Hearing Before the H. Comm. on the Judiciary*, 108th Cong. (2003) (statement of U.S. Att'y Gen. John Ashcroft), available at http://commdocs.house.gov/committees/judiciary/hju87536.000/hju87536_0.HTM.

49. CONGRESSIONAL RESEARCH SERVICE, PUB. NO. RL31798, DATA MINING AND HOMELAND SECURITY: AN OVERVIEW 3 (2007), available at <http://www.fas.org/sgp/crs/intel/RL31798.pdf> [hereinafter CRS, DATA MINING]; Harris, *supra* note 48; Schneier, *supra* note 48.

50. Megan Garvey, *Net to Snag Deadbeats Also Snares Innocent*, L.A. TIMES, Apr. 12, 1998, at B1.

51. Stephanie Walton, *The Real Cost of Unreliable Child Support Data* 1, 2 (National Conf. of State Legislatures, Legislative Brief No. 0190001220, 2004); see Danielle Keats Citron, *Reservoirs of Danger: The Evolution of Public and Private Law at the Dawn of the Information Age*, 80 S. CAL. L. REV. 241, 295 (2007) (exploring how an individual's credit-worthiness is critical to market identity and personhood in the twenty-first century).

These examples leave no doubt that the procedural guarantees of the last century have been overmatched by the technologies of this one. Due to the public's crushing demand for services, and the increasing complexity of regulatory regimes, agencies will increasingly automate their decisions.⁵² With further automation on the horizon, the inadequacy of last century's procedural protections can no longer be ignored. Administrative law must evolve to face these changes.

This Article offers a new framework for administrative and constitutional law designed to address the challenges of the automated administrative state. Part I describes how automated systems are built and the varying ways that policy is embedded, and often distorted, in software code. It provides a typology of the automated systems that agencies use. Part I then considers the recent failures of automated systems and explains why human operators provide little protection against such failures.

Part II highlights how automation jeopardizes the procedural protections that have long been deemed foundational to the administrative state. It explores how computer systems collapse individual adjudications into rulemaking, making it difficult, if not impossible, to determine whether a decision resulted from factual errors, distorted policy, or both. Part II shows how automation erodes the due process guarantees of notice and an opportunity to be heard. It assesses the myriad ways automation strips procedural integrity from administrative rulemaking, including the elimination of notice-and-comment participation, transparency, and political accountability. Lastly, Part II highlights the difficulties involved in judicial review of automated rules and adjudications.

Part III articulates a new model of technological due process. Drawing theoretical support from the rules-versus-standards literature, it offers a systematic way for an agency to approach the threshold decision of whether to favor automation over human discretion. This technological due process provides new mechanisms to replace the procedural regimes that automation endangers. In certain instances, surrogate rules can be used to protect the transparency, accountability, and fairness of rulemaking and adjudication. In others, new standards can be implemented to prevent procedurally defective rulemaking and arbitrary government decision making.

52. See Kersten, *supra* note 10 (noting that decision automation has become increasingly indispensable to government due to computers' ability to process large volumes of information); Grimmelmann, *supra* note 29, at 1734 (explaining that software successfully applies rules whose complexity would confound human beings).

I. THE ROOTS AND NATURE OF AUTOMATED GOVERNMENT POLICY- MAKING AND ADJUDICATION

The automated administrative state took root after the convergence of a number of trends—budget shortfalls in the 1990s, the falling costs and increased performance of information systems, and the emergence of the Internet.⁵³ Government officials saw computerized automation as an efficient way to reduce operating costs.⁵⁴ Automated systems meant less paperwork and fewer staff.⁵⁵

Federal and state agencies have made significant strides in their quest to automate government policy and decision making. Today, computer systems determine whether children receive medical assistance, businesses obtain licenses and permits, and travelers board airplanes.⁵⁶ All states automate a significant portion of the administration of their public benefits programs.⁵⁷ More than fifty federal agencies execute policy with data-matching and data-mining programs.⁵⁸

Section A details the process involved in building automated systems and explains why policy so often gets distorted when programmers translate it into code. It describes how agencies use systems that exclude human operators, as well as those that mix automation with human intervention.⁵⁹ Section B considers the recent failures of automated

53. See EGGERS, *supra* note 18, at 5, 15–16 (explaining that the late 1990s witnessed productivity growth from IT investments and certain sections of government took advantage of its promise); Shane Peterson, *Squeeze Play*, GOV'T TECH., Jan. 6, 2004, available at <http://www.govtech.net/magazine/story.print.php?id=83612>.

54. Peterson, *supra* note 53.

55. EGGERS, *supra* note 18, at 29.

56. See *infra* notes 111, 112, and 117 for a discussion of automated public benefits systems, “No-Fly” data-matching program, and grant eligibility advice systems.

57. U.S. CENTERS FOR MEDICARE & MEDICAID SERVS., MMIS FISCAL AGENT CONTRACT STATUS REPORT (2007), available at <http://www.cms.hhs.gov/MMIS/Downloads/mmisfaqr.pdf> [hereinafter U.S. CMS, CONTRACT STATUS REPORT]; WILLIAM BRANCH & KATHLEEN CONNOR, CMS AND STATE MEDICAID PROGRAMS MODERNIZATION: MEDICAID INFORMATION TECHNOLOGY ARCHITECTURE (MITA) 6 (2005), available at http://www.omg.org/news/meetings/workshops/ADM_2005_Proceedings_FINAL/2-2_Branch-Connors.pdf; JACK SLOCUM ET AL., U.S. DEP'T OF AGRICULTURE, STATE AUTOMATION SYSTEMS STUDY, Vol. II, at II-12–II-16 (1995), available at <http://www.nal.usda.gov/foodstamp/FOODSTAMPREPORTS/FSP-294.PDF> (explaining that forty-one states incorporated automated systems into administration of food stamps).

58. U.S. GENERAL ACCOUNTING OFFICE, GAO-04-548, DATA MINING: FEDERAL EFFORTS COVER A WIDE RANGE OF USES 2 (2004), available at <http://www.gao.gov/new.items/d04548.pdf>; CRS, DATA MINING, *supra* note 49, at 4 (noting the use of data mining by Justice Department, Department of Veterans Affairs and Federal Aviation Administration, for example).

59. See generally Raja Parasuraman & Victor Riley, *Humans and Automation: Use, Misuse, Disuse, Abuse*, 39 HUM. FACTORS 230 (1997); see also OFFICE OF INSPECTOR GEN., U.S. DEP'T OF HEALTH & HUMAN SERVS., OEI 05-99-00071, MEDICAID: CLAIMS PROCESSING SAFEGUARDS 10

systems, including the encoding of incorrect policy, faulty notices, and mistaken identifications. It explains why human operators in mixed systems fail to provide adequate protection against such problems.

A. *Government 2.0*

1. *Designing Automated Decision Systems*

Automated decision systems have been characterized as rules-based programs, data-matching programs, or data-mining programs. First, rules-based systems apply policy to a set of facts.⁶⁰ Programmers translate policy from human language into computer code and embed it into the system's "rules base," which is often called the "decision tables."⁶¹ The "rules engine" provides the system's logic.⁶² Second, data-matching systems compare two or more databases with an algorithmic set of rules that determine the likelihood that two sets of personal identifying information represent the same individual.⁶³ Third, data mining employs algorithms and search engines to find specific patterns and correlations in information stored in large databases.⁶⁴

Private vendors typically build these systems, often with the help of government information technology personnel.⁶⁵ For example, state agency workers played a significant role in building Colorado's public benefits system. State programmers encoded policy into the system's decision tables; a private vendor, EDS, constructed the system's rules

(2000), available at <http://oig.hhs.gov/oei/reports/oei-05-99-00071.pdf> [hereinafter U.S. OIG, MEDICAID].

60. Davenport & Harris, *supra* note 17, at 85.

61. *Id.* The system presents a series of questions to a user until it believes it has all of the information required for the decision. *Id.* at 86.

62. *Id.* at 85.

63. Daniel J. Steinbock, *Data Matching, Data Mining, and Due Process*, 40 GA. L. REV. 1, 3 (2005).

64. Vagelis Papakonstantinou, *A Data Protection Approach to Data Matching Operations Among Public Bodies*, 9 INT'L J.L. INFO. TECH. 39, 47-48 (2001).

65. Ellen Perlman, *How a Promising Technology Mega-Project Went Awry*, GOVERNING, Aug. 2006, at 36 (explaining that Colorado agencies took some of CBMS software development back in-house); Andy Opsahl, *Weathering the Storm*, GOV'T TECH., Oct. 2, 2006, available at <http://www.govtech.net/magazine/story.print.php?id=101349>. For instance, thirty-eight states have hired independent contractors to build and oversee computer systems that will administer the Medicaid program. U.S. CMS, CONTRACT STATUS REPORT, *supra* note 57. Of those states, twenty have hired EDS. *Id.* EDS also designed CBMS and California's public benefits system. Judy Lin, *Computer Cost Put in Millions*, SACRAMENTO BEE, Dec. 13, 2005, at B1. SRA International, an information technology service provider, operates the Federal Parent Locator Service's database on behalf of the U.S. Department of Health and Human Services. SRA INT'L INC., 2005 ANNUAL REPORT 3 (2005), available at http://www.sra.com/uploadedFiles/sra2005_ar.pdf.

engine.⁶⁶ Although EDS currently runs the system, state programmers continue to maintain the decision tables.⁶⁷

Policy is often distorted when programmers translate it into code. Although all translations shade meaning,⁶⁸ the translation of policy from human language into code is more likely to result in a significant alteration of meaning than would the translation of policy from English into another human language.⁶⁹ This is, in part, because the artificial languages intelligible to computers have a more limited vocabulary than human languages.⁷⁰ Computer languages may be unable to capture the nuances of a particular policy.⁷¹

Code writers also interpret policy when they translate it from human language to computer code.⁷² Distortions in policy have been attributed to the fact that programmers lack “policy knowledge.”⁷³ This is neither surprising nor easily remedied. Information technology consultants cannot be expected to have specialized expertise in regulatory or public benefits programs. Finding and hiring individuals who possess both information systems proficiency and policy knowledge would undoubtedly be difficult and expensive. Many governments find it cost-effective to use the same system designers for a wide variety of programs,⁷⁴ making it even less likely that a designer will have the necessary policy expertise in each distinct program.

66. The programmers worked for Colorado’s Departments of Human Services and Health Care Policy and Financing. Karen Augé, *Blame Aplenty in Benefits Mess*, DENVER POST, May 15, 2005, at A1.

67. *Id.*

68. JACQUES DERRIDA, *OF GRAMMATOLOGY* (Gayatri Chakravorty Spivak trans., 1976); J.M. Balkin, *Deconstructive Practice and Legal Theory*, 96 YALE L.J. 743, 783–86 (1987).

69. AUSTRALIAN ADMINISTRATIVE REVIEW COUNCIL, *AUTOMATED ASSISTANCE IN ADMINISTRATIVE DECISION MAKING ISSUES PAPER 35* (2003), available at [http://www.ag.gov.au/agd/WWW/rwpattach.nsf/VAP/\(E671321254BE241EF50E9203E76822F1\)~AAADMreportPDF.PDF](http://www.ag.gov.au/agd/WWW/rwpattach.nsf/VAP/(E671321254BE241EF50E9203E76822F1)~AAADMreportPDF.PDF) [hereinafter *AUS. ADM. REV., AUTOMATED ASSISTANCE*].

70. *Id.*; Grimmelmann, *supra* note 29, at 1728.

71. See Graham Greenleaf et al., *Representing and Using Legal Knowledge in Integrated Decision Support Systems: DataLex Workstations*, 3 *ARTIFICIAL INTELLIGENCE & L.* 97, 127 (1995).

72. *AUS. ADM. REV., AUTOMATED ASSISTANCE*, *supra* note 69, at 35.

73. OFFICE OF INSPECTOR GEN., *TEX. HEALTH & HUMAN SERVS. COMM’N, TIERS/IEES REVIEW 29* (2007) (on file with author) [hereinafter *TEXAS OIG, TIERS*]; see also DELOITTE, *STATE OF COLORADO: CBMS POST-IMPLEMENTATION REVIEW 7* (May 2005) (on file with author) (explaining that incorrect rules embedded in CBMS were in part due to incorrect policy interpretation by programmers); cf. Jessica Weidling, *Housing Hopes*, *GOV’T TECH.*, June 2007, at 47, available at <http://www.govtech.com/dc/articles/123618> (noting that in an “uncharacteristic move for the public sector,” Philadelphia Housing Authority administrators spent time with software provider to carefully discuss requirements of their automated telephone system).

74. Eggers, *supra* note 19, at 14.

Changes in policy made during its translation into code may also stem from the bias of the programmer.⁷⁵ Programmers can build matching algorithms that have biased assumptions or limitations embedded in them.⁷⁶ They can unconsciously phrase a question in a biased manner.⁷⁷ The biases of individual programmers can have a larger, accumulating effect, because, in a complex software system composed of smaller subsystems, the actual bias of the system “may well be a composite of rules specified by different programmers.”⁷⁸

Policy could be distorted by a code writer’s preference for binary questions, which can be easily translated into code.⁷⁹ Government policy, however, often requires the weighing of multiple variables. For example, the Food Stamp Act and accompanying federal regulations limit unemployed, childless adults to three months of food stamps, but provide six exceptions to this rule, which then cross reference other exceptions that, in turn, refer to still other exceptions.⁸⁰ Programmers may be tempted to write code employing a simplified three-month rule, leaving out the complicated and arguably confusing exceptions.⁸¹ Thus, code writers could end up distorting complicated policy through oversimplification.⁸² Programmers might also inappropriately narrow the discretion intended to be given to administrators.⁸³

Programmers are not the only individuals to blame for distorted policy. Bureaucrats themselves might be responsible for altered rules. Professor

75. Code embeds the values and choices of the code writer. LAWRENCE LESSIG, *CODE: VERSION 2.0* 101 (2006).

76. Steinbock, *supra* note 63, at 60–61; *see* Grimmelmann, *supra* note 29, at 1733 (explaining that a software rule can be partisan as it implements programmer’s idea of right result).

77. *See* Helen Nissenbaum, *How Computer Systems Embody Values*, *COMPUTER*, Mar. 2001, at 119 (noting that systems can unfairly discriminate against specific sectors of users). Batya Friedman and Helen Nissenbaum have written about automated systems whose algorithms embody bias. Batya Friedman & Helen Nissenbaum, *Bias in Computer Systems*, 14 *ACM TRANSACTIONS ON INFO. SYSTEMS* 330, 333–35 (1996) (describing automated loan program whose system assigns negative value to applicants from certain locations, such as high-crime or low-income neighborhoods). Their study, however, does not reveal whether the bias originated from the programmer’s bias or that of a policymaker.

78. Grimmelmann, *supra* note 29, at 1737.

79. *Cf.* AUSTRALIAN GOV’T AUTOMATED ASSISTANCE IN ADMINISTRATIVE DECISION-MAKING, at 37 (Feb. 2007) (on file with author) (explaining that automated system must reflect the structural complexity of rules and accurately reflect all of the relevant factors such that the embedded business rules do not incorrectly “restrict or fetter the powers provided for under legislation or policy”).

80. 7 U.S.C. § 2015(o) (2000); 7 C.F.R. § 273.25 (2007).

81. *See* Super, *supra* note 30, at 1096 n.205 (discussing potential for eligibility workers and those designing notices to read three-month rule with regard to childless adults seeking food stamps without regard to the exceptions).

82. AUS. ADM. REV., *AUTOMATED ASSISTANCE*, *supra* note 69, at 18–20.

83. *Id.* at 21.

Evelyn Brodtkin has studied frontline bureaucratic routines that create new policy at the point of delivery.⁸⁴ Lower-level bureaucrats may make policy when established policy is ambiguous or internally contradictory.⁸⁵ Such practices produce “street-level” welfare policies that have not received rulemaking procedures.⁸⁶ Decision systems might automate such policies.

2. *Different Types of Automated Systems Used by Agencies*

Automated systems involve individuals in the administrative decision-making process in varying ways. Fully automated systems apply policy and render decisions without any human intervention.⁸⁷ For instance, computer programs identify students eligible for free or reduced-price school lunches by matching the names of enrolled students with the names of families receiving certain public benefits.⁸⁸ This data-matching program automatically registers identified children into the National School Lunch Program.⁸⁹ Computers can automatically enroll eligible senior citizens into Medicare coverage of outpatient care and prescription drug discount cards.⁹⁰ Human operators cannot interfere with the system’s enrollment decisions.⁹¹

An agency’s telephone system is an example of a fully automated system. A telephone tree presents choices to a user, closing off paths that the system’s designers deemed irrelevant. This preclusion of choices constitutes an automated decision.⁹² For example, for a period of two

84. Evelyn Z. Brodtkin, *Street-Level Research: Policy at the Front Lines*, in *POLICY INTO ACTION: IMPLEMENTATION RESEARCH AND WELFARE REFORM* 145 (Mary Clare Lennon & Thomas Corbett eds., 2003).

85. *Id.* at 149.

86. *Id.*

87. Parasuraman & Riley, *supra* note 59, at 247. Although human operators can have little impact on a completely automated system’s decision, the system’s designers play an enormous role in creating that system. *Id.*

88. U.S. DEP’T OF AGRICULTURE, *DATA MATCHING IN THE NATIONAL SCHOOL LUNCH PROGRAM* 13 (2007), available at <http://www.fns.usda.gov/oane/MENU/Published/CNP/FILES/DataMatchingGuide.pdf>.

89. *Id.*

90. STAN DORN & GENEVIEVE M. KENNEY, *AUTOMATICALLY ENROLLING ELIGIBLE CHILDREN AND FAMILIES INTO MEDICAID AND SCHIP: OPPORTUNITIES, OBSTACLES, AND OPTIONS FOR FEDERAL POLICYMAKERS* 5 (2006), available at http://www.commonwealthfund.org/usr_doc/Dorn_auto-enrollingchildren_931.pdf?section=4039.

91. *Id.*

92. See Tim Wu, *When Code Isn’t Law*, 89 VA. L. REV. 679, 707–08 (2003) (noting that code can constrain behavior by specifying what behavior is or is not possible just as a “brick wall in the middle of the road modifies behavior”); see also Lee Tien, *Architectural Regulation and the Evolution of Social Norms*, in *CYBERCRIME: DIGITAL COPS IN A NETWORKED ENVIRONMENT* 37, 43 (Jack M.

years, the CBMS website instructed individuals to call a toll-free number if they needed emergency assistance with their public benefits.⁹³ Callers reached a telephone system that provided nine choices for individuals seeking customer service.⁹⁴ None of these choices offered assistance with food stamps or Medicaid.⁹⁵ One could argue that the automated telephone system, by its design, determined that emergency help was unavailable to those receiving food stamps and Medicaid.⁹⁶

Similarly, Florida residents seeking public assistance must submit online applications to ACCESS, the state's automated benefits system.⁹⁷ These online applications require individuals to choose their status from a limited menu of options.⁹⁸ In 2005, that menu did not include an option for a relative seeking benefits on a child's behalf.⁹⁹ The mandatory nature of the online system effectively precluded such relative caregivers from applying for public benefits, a denial that directly contravened state law.¹⁰⁰ Eligibility workers were unable to overrule this decision, implicit in the code of the automated system, because the ACCESS system was the only way an individual could apply for benefits.¹⁰¹

Mixed systems, by contrast, provide a role for human operators in the execution of policy. There are three distinct types of mixed systems. The

Balkin et al. eds., 2007) (explaining that architectural choices of code writers exploit asymmetries of information because individuals do not know that the architect has constrained their actions).

93. REPORT OF THE COLO. STATE AUDITOR, ELIGIBILITY DETERMINATIONS FOR FEDERAL BENEFIT PROGRAMS: PERFORMANCE AUDIT 10–11 (Apr. 2006), *available at* [http://www.leg.state.co.us/OSA/coauditor1.nsf/All/DE8F7D03359F1A0B87257154005DE9DA/\\$FILE/1735%20CBMS%20Elig%20Deter%20Fed%20Ben%20Perf%20April%202006.pdf](http://www.leg.state.co.us/OSA/coauditor1.nsf/All/DE8F7D03359F1A0B87257154005DE9DA/$FILE/1735%20CBMS%20Elig%20Deter%20Fed%20Ben%20Perf%20April%202006.pdf) [hereinafter COLO. AUDITOR, PERFORMANCE AUDIT].

94. *Id.*

95. *Id.*

96. Federal law requires the provision of emergency help to individuals seeking or receiving food stamps. 7 C.F.R. 273.2(i) (2007).

97. Petition to Determine Invalidity of Proposed Rule 65A-1.400 and ESS Online Benefits Application Form at 6, Tamara Clark v. Dep't of Children & Family Servs., No. 05-2105RP (Fla. Div. Adm. Hrgs. June 10, 2005) [hereinafter Clark Petition] (arguing that relative caregivers could not apply for Temporary Assistance to Needy Families due to the design of the online application in violation of Florida law). Florida's Department of Children and Family Services settled the litigation, agreeing to fix the system to allow relative caregivers to apply for benefits on behalf of children as required by federal law. Telephone Interview with Valory Greenfield, staff attorney for Florida Legal Services, in Miami, Fla. (June 1, 2007) (notes on file with author). New York's automated public benefits system similarly failed to offer "battered qualifying alien" as a choice in its drop-down menu for food stamp eligibility, thus precluding such individuals from applying for food stamps. M.K.B. v. Eggleston, 445 F. Supp. 2d 400, 418 (S.D.N.Y. 2006) (granting preliminary injunction ordering New York City agencies to fix automated system to comply with established policy).

98. Clark Petition, *supra* note 97, at 6.

99. *Id.*

100. *Id.*

101. *Id.*

first type uses automation to generate an agency's decisions, but permits appeals from those decisions. For instance, a data matching program known as the Federal Parent Locator Service (FPLS) compares federal and state databases to identify parents who owe child support.¹⁰² The system notifies relevant state enforcement agencies of matches.¹⁰³ Federal law requires state agencies to take expedited action to collect child support from those individuals.¹⁰⁴ Individuals who have been mistakenly identified as delinquent parents can appeal to state officials to remove child-support orders issued against them.¹⁰⁵

Another example of this first type of mixed system are the public benefits systems that deny certain claims made by Medicaid providers without initially seeking a human operator's review, but allow for later human review.¹⁰⁶ For example, when a medical provider seeks payment for twelve services, but state policy generally only permits coverage for ten, the system automatically pays the provider for ten services without determining whether exceptional circumstances apply that would permit coverage of all twelve.¹⁰⁷ Medical providers can ask for administrative review of those decisions.

The second type of mixed system integrates human operators into the initial decision-making process. For example, Florida's ACCESS system requires eligibility workers to determine whether individuals suffer from a "hardship" that would warrant extending their cash assistance payments beyond the state's time limits.¹⁰⁸ Eligibility workers conduct telephone interviews with applicants to determine whether an individual's circumstances constitute a "hardship" within the meaning of the state's rules.¹⁰⁹ The worker then inputs that decision into the ACCESS

102. 42 U.S.C. § 653 (2000). The Federal Parent Locator Service matches state databases of child-support orders against a national database of new employees. *Id.*; see *Kansas v. United States*, 214 F.3d 1196, 1198 (10th Cir. 2000) (describing FPLS).

103. 42 U.S.C. § 666 (2000).

104. *Id.*; see also David E. Danda, *Child Support Enforcement Under the Uniform Interstate Family Support Act*, FINDLAW, May 2000, <http://library.findlaw.com/2000/May/1/128527.html>.

105. *E.g.* ARIZ. REV. STAT. ANN. § 25-517 (2007) (explaining that child-support obligor may request an administrative review to contest whether individual owes child support).

106. U.S. OIG, MEDICAID, *supra* note 59, at 10.

107. *Id.* at 10–11.

108. Telephone Interview with Jennifer Lang, Director of ACCESS Florida, in Miami, Fla. (June 8, 2007) (notes on file with author). In California, eligibility workers determine whether Medicaid applicants have a qualifying disability. Telephone Interview with Melissa Rodgers, Directing Attorney, Legal Aid Society of San Mateo County, in San Mateo, Cal. (June 4, 2007) (notes on file with author).

109. Interview with Jennifer Lang, *supra* note 108.

program.¹¹⁰ Similarly, automated public benefits systems in Colorado, Texas, California, and Florida produce recommended eligibility determinations and benefit calculations, which are then reviewed by eligibility workers who issue the final decisions.¹¹¹

The “No Fly” program is another example of a mixed system that allows human operators to exercise discretion as part of the decision-making process. In that program, a matching algorithm compares the names of air travelers with names listed in the “No Fly” database.¹¹² When the computer system generates a match, an airline employee or federal official is given discretion to determine whether or not the name should be forwarded to the Terrorist Screening Center (TSC).¹¹³ When the TSC receives information about a match, its officials use their discretion to assess whether the individual poses a terrorist threat.¹¹⁴ People who endure extensive questioning and miss flights as a result of this program can file redress claims with the Transportation Security Administration (TSA).¹¹⁵

The third type of mixed system generates automated advice for citizens and entities, who may then use the advice to make further decisions. Many states employ online portals where citizens can complete a survey to

110. *Id.* In CBMS, eligibility workers also exercise their judgment on certain issues before the system determines eligibility and calculates an individual’s benefits. Telephone Interview with Nancy Morehead, Public Relations Administrator for Colorado Department of Human Services, April 16, 2007 (notes on file with author). See Ross Wehner et al., *Blame Game in Benefits Woes*, DENVER POST, Sept. 30, 2004, at B1 (explaining that “caseworkers in 64 counties determine which of the six benefits programs a person qualifies for” and with a touch of a key the system notifies the bank to send a check).

111. Interview with Jennifer Lang, *supra* note 108; Interview with Melissa Rodgers, *supra* note 108; Terry Sapp, *Ventura County Combines Automation and Collaboration*, POL’Y & PRAC., June 1, 2006, at 40; Cynthia V. Fukami & Donald J. McCubbrey, *Colorado Benefits Management System (B): The Emperor’s New System*, 18 COMM. OF ASS’N FOR INFO. SYSTEMS 488 (2006); COLO. AUDITOR, PERFORMANCE AUDIT, *supra* note 93, at 21; Reeves, *supra* note 17.

112. U.S. GAO, TERRORIST WATCH LIST, *supra* note 12, at 7–8. Customs and Border Protection officers screen travelers entering the United States while the Transportation Security Administration prescreens air travelers flying from and throughout the United States. *Id.*

113. *Id.* at 9.

114. *Id.* at 9–11. In November 2006, the Department of Homeland Security (DHS) acknowledged the existence of the Automated Targeting System (ATS), a computer program that generates a terrorist-risk score for international travelers. U.S. DEP’T OF HOMELAND SECURITY, PRIVACY IMPACT ASSESSMENT FOR THE AUTOMATED TARGETING SYSTEM, Nov. 22, 2006, available at http://www.dhs.gov/xlibrary/assets/privacy/privacy_pia_cbp_ats.pdf. The computerized system assesses whether individuals traveling abroad pose a terrorist threat. Michael J. Sniffen, *Keeping Tabs on Travelers*, INTELLIGENCER, Sept. 10, 2007, at A1, available at 2007 WLNR 17986706. The Department of Homeland Security will keep the risk assessment for 15 years. *Id.* Nevertheless, travelers cannot see their actual assessments or the reasons for them. *Id.* Customs and Border Protection officials use the system to screen 400 million passengers a year. *Id.*

115. U.S. Dep’t of Homeland Security Website, Step 1: Should I use DHS TRIP?, Feb. 21, 2007, http://www.dhs.gov/xtrvlsec/programs/gc_1169699418061.shtm [hereinafter DHS TRIP].

determine which public services they may be eligible to receive.¹¹⁶ Other systems advise individuals and entities on the likelihood that the government will approve their grant requests.¹¹⁷ In these examples, automated systems provide advice to citizens, but do not render final decisions on behalf of agencies.

The next section provides examples of recent failures of today's automated decision-making systems and explores how regardless of whether the system is fully automated or mixed, the problems are the same.

B. Failure of Government 2.0

Federal and state agencies began using computer systems to assist human decision makers in the 1970s.¹¹⁸ Problems plagued these systems from the outset. Computers storing welfare benefits information routinely crashed.¹¹⁹ Glitches in computer programs delayed the delivery of Medicaid benefits and food stamps.¹²⁰ Inaccurate information in databases resulted in the overpayment and underpayment of public benefits.¹²¹

Undeterred by these initial problems, agencies today increasingly use computer systems to make decisions. The recent failures of these systems have had wide-sweeping consequences.¹²² Hundreds of thousands of individuals have lost public benefits, missed airplanes, and faced erroneous child support delinquency charges.

116. Harris & Dovey, *supra* note 16, at 153.

117. *Id.*

118. Don Bacon, *Mess in Welfare: The Inside Story*, U.S. NEWS & WORLD REP., Feb. 20, 1978, at 21.

119. *E.g.*, David K. Rogers et al., *Computer Delays Welfare Services*, ST. PETERSBURG TIMES, June 3, 1992, at A1 (explaining that computer system maintaining Florida's public benefits services crashed, hobbling state's ability to distribute food stamps, Medicaid, and other public benefits).

120. *E.g.*, Steven Erlanger, *Computers Continue to Delay Welfare Payments in New York*, N.Y. TIMES, Dec. 26, 1987, § 1, at 25; Jean Dietz, *A Glitch in State Medicaid System*, BOSTON GLOBE, Jan. 19, 1984, available at 1984 WLNR 63032.

121. Associated Press, *Computer Error Hits Human Services*, N.J. RECORD, Aug. 2, 1997, at A9.

122. CELIA HAGERT, SENIOR POLICY ANALYST, CENTER FOR PUBLIC POLICY PRIORITIES, TESTIMONY ON THE INTEGRATED ELIGIBILITY SYSTEM 33 (2007), http://www.cppp.org/files/3/House%20HHS%202_07.ppt [hereinafter Hagert Testimony] (testimony before the Texas House Human Services Committee, 80th Legislature, Session 33) (describing 6.82% food stamps error rate in Texas vis-à-vis 2.96% error rate in Pennsylvania since TIERS went live). Failures of Texas's TIERS system also caused children's Medicaid enrollment to drop 29,000 individuals and the Children's Healthcare Initiative Program renewal rate to fall from 84% to 52%. CENTER FOR PUBLIC POLICY PRIORITIES, PUB. NO. 267, ROCKY ROAD FOR CHILDREN'S HEALTH CARE 2 (2006), available at <http://www.cppp.org/files/3/IEE%20Impact%20on%20child%20Medicaid%20and%20CHIP.pdf>. See generally HENRY PETROSKI, SUCCESS THROUGH FAILURE: THE PARADOX OF DESIGN (2006) (explaining that a system fails when it does not meet its stated goals).

Some of these problems can be attributed to programmers' failure to properly translate policy into code. These failures inadvertently altered established policy and consequently violated federal and state law. For example, from September 2004 to April 2007, code writers embedded over nine hundred incorrect rules into Colorado's public benefits system.¹²³ With one such incorrect rule, CBMS denied Medicaid to patients with breast and cervical cancer based on income and asset limits that were not authorized by federal or state law.¹²⁴ Another rule led CBMS to exclude a child's relatives from Medicaid benefits on the legally baseless grounds that the child received Medicaid.¹²⁵ Yet another caused CBMS to deny pregnant women Medicaid in contravention of federal law.¹²⁶

CBMS's problems were not limited to Medicaid. CBMS incorporated an incorrect rule that discontinued food stamps to individuals with past drug problems in violation of Colorado law.¹²⁷ Incorrect rules also caused the system to fail to offer food stamps to individuals with "permanent disabilities"¹²⁸ and to incorrectly refuse to recognize phone bills as a valid expense for households seeking food stamps.¹²⁹ Contrary to federal law,

123. See COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES (2004–2007) (on file with author); DELOITTE, *supra* note 73 (explaining that there were 175 distinct defects in the Medicaid rules table in 2005). For other incorrect rules encoded in the system, see, for example, COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, FEBRUARY 24–25, 2007, at 19 (Feb. 26, 2007) (issuing correction of code that exempted a child's earnings in calculating food stamps where the child was the head of the household in contravention of federal regulations); COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES (FOOD STAMPS), AUGUST 12–13, 2006, at 10 (Aug. 11, 2006) (correcting embedded rule that did not allow Medicare premium as an expense for disabled individual in contravention of federal regulations).

124. COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, MARCH 10–11, 2007, at 10 (Mar. 7, 2007) (fixing rule that improperly imposed income limits on women with breast or cervical cancer in violation of federal law); see 42 U.S.C. § 1396r-1b (2000); COLO. REV. STAT. ANN. § 25.5-5-308 (2007).

125. COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, DECEMBER 9–10, 2006, at 16 (Dec. 7, 2006) (fixing code that violated 42 C.F.R. § 435.119).

126. COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, FEBRUARY 12, 2005, at 1 (Feb. 12, 2005) (fixing code that deemed pregnant women ineligible for Medicaid due to fact that they were "not in an approved facility," contrary to 42 C.F.R. § 435.116).

127. COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, FEBRUARY 3–4, 2007, at 24 (Feb. 1, 2007) (correcting rule embedded in system that contravened COLO. STAT. § 26-2-305, which mandates that individuals "shall not be ineligible [for food stamps] due to a drug conviction unless misuse of food stamp benefits is part of the court findings").

128. COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, FEBRUARY 25, 2005, at 10 (Feb. 25, 2005) (noting fix to code that had contravened 7 C.F.R. § 273.9 by refusing to grant food stamps to individuals with a "Permanent Disability").

129. COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, APRIL 30, 2005, at 10 (Apr. 30, 2005) (fixing rule that contravened 7 C.F.R. § 273.9(d)(7), which makes telephone charges a deductible expense); e.g., COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, SEPTEMBER 8, 2005, at 2 (Sept. 8, 2005) (making a change so that

CBMS provided food stamps to college students who did not work the required twenty hours a week.¹³⁰

CBMS rendered hundreds of thousands of erroneous eligibility decisions and benefits calculations during this period.¹³¹ The enormity of the system's failure, and the litigation that followed, forced state agency officials to spend significant resources to find and fix the system's defective rules.¹³² Despite significant pressure to resolve these problems quickly, computer programmers delayed fixing incorrect rules for extended periods of time.¹³³ During that period eligibility workers had to use fictitious data to work around the system's errors.¹³⁴

"child support-not court ordered" would not be allowed as an expense as required by 7 C.F.R. § 253.7).

130. COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, JULY 22, 2005, at 2 (July 23, 2005) (fixing rule contravening 7 U.S.C. § 2015(e) and 7 C.F.R. § 273.5, which excluded students not working over twenty hours per week from eligibility for food stamps); *see generally* David A. Super, *The Quiet "Welfare" Revolution: Resurrecting the Food Stamp Program in the Wake of the 1996 Welfare Law*, 79 N.Y.U. L. REV. 1271, 1358 (2004) (discussing changes to Food Stamp program).

131. David Migoya, *Feds Give Colorado a Big Bill*, DENVER POST, Apr. 12, 2007, at B1 (explaining that CBMS made up to 11,000 errors per month).

132. Fukami & McCubbrey, *supra* note 111, at 491-92; Bill Scanlon, *Millions Spent on Welfare Fix: A Year Later, State Benefits System Still Fighting Kinks*, ROCKY MTN. NEWS, Sept. 3, 2005, at 6A; COLO. AUDITOR, PERFORMANCE AUDIT, *supra* note 93, at 22 (explaining that seventy-two percent of sample food stamp applications and forty-one percent of a sample of Medicaid cases had at least one error). The federal government sued Colorado for CBMS's overpayment of over ten million dollars of food stamps. Letter from Dennis Kaplan, Chairman, State Food Stamp Appeals Board, to Wade S. Livingston, First Assistant Attorney General, Human Services Section (Apr. 5, 2007) (on file with author) (decision of the Colorado Food Stamp Appeals Board, Administrative review No. 02-2006, amending decision of the Food and Nutrition Services against Colorado for improper issuance of duplicate or restored Food Stamps benefits from \$11,162,598 to \$10,864,345 owed federal government). The Colorado Center on Law and Policy filed a class-action lawsuit against the Colorado Department of Health and Human Services on behalf of Colorado residents whose public-benefits applications were delayed, incorrectly reduced or terminated, or who received insufficient notice. Fourth Amended Complaint, *Davis v. Tool*, No. 04-CV-7059 (Denver D. Ct. May 25, 2006). That litigation is ongoing. Telephone Interview with Ed Kahn, Counsel, Center on Policy Priorities, in Denver, Colo. (Apr. 10, 2007) (notes on file with author).

133. Fukami & McCubbrey, *supra* note 111, at 493. *E.g.* COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, MARCH 10-11, 2007, *supra* note 124, at 10 (Mar. 7, 2007) (fixing rule that improperly imposed income limits on women with breast or cervical cancer in violation of 42 U.S.C. § 1396r-1b, COLO. STAT. § 25.5-5-308). Despite newspaper accounts of this illicit policy, Colorado administrators delayed fixing it for years. Karen Augé, *Computer Benefits System Ticks off Cancer Survivor*, DENVER POST, May 16, 2005, at A1 (explaining that CBMS failed to recognize that women with breast or cervical could retain Medicaid despite an increase in their cost of living); COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, MARCH 10-11, 2007, *supra* note 124, at 10 (Mar. 7, 2007) (CMBS took two years to fix the problem).

134. Interview with Nancy Morehead, *supra* note 110 (explaining that workers used fake data to work around the system); Fukami & McCubbrey, *supra* note 111, at 493 (noting that officials have published 5,943 pages of workarounds). Although CBMS exemplifies a worst-case scenario, this level of policy distortion could be replicated in another case. Distortions in policy changes in systems with less dramatic or obvious results would be more likely to remain hidden. This may even be more

Code writers incorrectly translated policy into California's automated public benefits system known as CalWIN, causing overpayments, underpayments, and improper terminations of public benefits.¹³⁵ For instance, CalWIN denied Medicaid to foster children in contravention of federal law.¹³⁶ According to a class action filed in April 2007, CalWIN canceled Medicaid for over five thousand "Qualified Medicare Beneficiaries" because they failed to obtain annual redeterminations.¹³⁷ Neither federal nor state law requires annual redeterminations for such individuals.¹³⁸ There, an incorrectly coded rule had disastrous results.¹³⁹

Texas's automated public benefits system, known as Texas Integrated Eligibility Redesign System (TIERS),¹⁴⁰ also altered established policy.¹⁴¹ For example, TIERS granted benefits to individuals whose Social Security number, citizenship, or residency had not been verified in violation of federal and state policy.¹⁴² A 2007 audit found that TIERS made incorrect

dangerous than catastrophes such as CBMS because, in such cases, illegal rules would not necessarily be caught and fixed.

135. See Pamela Martineau, *With Lessons Learned, Yolo Launches CalWIN Program*, SACRAMENTO BEE, May 3, 2005, at B1 (noting that CalWIN's programming errors caused overpayments or delays in payment of public benefits in Placer and Sacramento counties); Evelyn Larrubia & Caitlin Liu, *County's Computer System is Botching Medical Benefits Aid*, L.A. TIMES, Feb. 17, 2002, at H1 (explaining that computer errors resulted in denial of prenatal care).

136. Clea Benson, *Foster Child's Benefits Denied*, SACRAMENTO BEE, Aug. 11, 2005, at B1.

137. *Computer Glitch Drops Some Medicare Patients in 18 California Counties*, INSIDE CMS, Mar. 8, 2007, available at 2007 WLNR 4384599.

138. *Id.*

139. Interview with Melissa Rodgers, *supra* note 108 (explaining that thousands of elderly California citizens could not pick up prescriptions or receive care due to software flaws).

140. TEXAS OIG, TIERS, *supra* note 73, at 6. TIERS currently administers enrollment for CHIP, Medicaid, Food Stamps, and Temporary Assistance for Needy Families in two Texas counties. *Id.* at 3.

141. TEXAS OIG, TIERS, *supra* note 73. Florida's automated system ACCESS also promulgated incorrect rules. For instance, Florida law permits caretaker relatives to apply for TANF benefits on a child's behalf. FLA. STAT. ANN. § 20.506(1) (West Supp. 2007) (creating Welfare Transaction Trust Fund for purposes of receiving funds under TANF); 414.0252(5),(12) (WEST 2005) (defining family eligible for TANF as including caretaker relatives who live in same house as child, who has assumed responsibility for the child, and who is related to the child by blood or marriage). Contrary to state law, ACCESS did not allow relative caregivers to apply for TANF funds for children. See Clark Petition, *supra* note 97, at 2 ("Although the online Application Form purports to allow applicants to make a uniform application for public assistance, the URL Application Form does not allow applicants to apply for either child-only Welfare Transition or Relative Caregiver benefits.").

142. TEXAS OIG, TIERS, *supra* note 73, at App. 2, 126-27, available at <https://oig.hhsc.state.tx.us/Reports/1-Appendices/Appendix2.pdf> (explaining that TIERS granted Medicaid, food stamps, and TANF benefits without verifying Social Security numbers in violation of 42 C.F.R. § 435.910(g), 7 C.F.R. § 273.2(f)(1)(v), and state policy). In March 2007, the Texas Department of Human Services ended its contract with the Texas Access Alliance, a private consortium headed by Accenture that designed and operated TIERS. TEXAS HEALTH & HUMAN SERVICES COMM'N, TIERS/IEES REVIEW, Apr. 18, 2007, at 1, 37 (on file with author) [hereinafter TIERS/IEES REVIEW] (explaining that Texas suspended pilot of TIERS and ended contract with Accenture). In March 2007, the federal Food & Nutrition Service reprimanded the Texas Health & Human Services Commission (THHSC) for

eligibility determinations for food stamp applicants in four out of six test cases.¹⁴³ On May 25, 2007, the Texas legislature passed a bill to demand that TIERS comply with applicable federal law and regulations.¹⁴⁴

The mixed systems of CBMS, CalWIN, and TIERS rendered vast numbers of incorrect decisions despite the fact that eligibility workers reviewed and finalized the computer's decisions.¹⁴⁵ These failures of mixed systems strongly suggest that the practical distinction between fully automated systems and mixed ones should not be overstated. Eligibility workers' intuitive trust in computer systems tends to reduce the value of human participation in mixed systems.¹⁴⁶ The cognitive system's engineering literature has found that human beings view automated systems as error-resistant.¹⁴⁷ Operators of automated systems tend to trust a computer's answers.¹⁴⁸

As a result, operators of government decision systems are less likely to search for information that would contradict a computer-generated solution.¹⁴⁹ Studies show that human beings rely on automated decisions even when they suspect system malfunction.¹⁵⁰ The impulse to follow a computer's recommendation flows from human "automation bias"—the "use of automation as a heuristic replacement for vigilant information

moving ahead with the rollout of TIERS despite its problematic software. Dave Mann, *Trail of TIERS*, TEXAS OBSERVER, Apr. 20, 2007, at 12. That month, THHSC terminated its contract with Accenture and delayed its roll out of TIERS. Stephanie Goodman, HHSC, *Texas Access Alliance Agree to End Contract Early* (Mar. 13, 2007), http://www.hhs.state.tx.us/news/release/031307_AccessAlliance.shtml.

143. TIERS/IEES REVIEW, *supra* note 142, at 3.

144. H.B. 3575, 80th Leg., Reg. Sess. (Tex. 2007) (passed by House on May 11, 2007 and Senate on May 25, 2007, signed by Governor on June 15, 2007); 2007 Tex. Gen. Laws ch. 1110.

145. See Clark Petition, *supra* note 97 (describing how eligibility workers in mixed systems such as CBMS, TIERS, CalWIN, and ACCESS reviewed and finalized program's decisions).

146. Kersten, *supra* note 10, at 38 (explaining that people tend to rely on and trust "less-than-perfect systems"—a kind of laziness that means people do not check information and computer findings).

147. M.L. Cummings, *The Social and Ethical Impact of Decision Support Interface Design*, in INT'L ENCYCLOPEDIA OF ERGONOMICS AND HUMAN FACTORS (Waldemar Karwowski ed., 2d ed. 2006); Thomas B. Sheridan, *Speculations on Future Relations Between Humans and Automation*, in AUTOMATION AND HUMAN PERFORMANCE: THEORY AND APPLICATIONS 449, 458 (Raja Parasuraman & Mustapha Mouloua eds., 1996) ("It is so tempting to trust to the magic of computers and automation . . . if a computer program compiles, we often believe, the software is valid and the intention will be achieved.").

148. Prof. John McMillan, Commonwealth Ombudsman, Automated Assistance to Administrative Decision-Making: Launch of the Better Practice Guide, Remarks at the Institute of Public Administration of Australia (Apr. 23, 2007), available at http://www.ombudsman.gov.au/commonwealth/publish.nsf/Content/speeches_2007_01.

149. Cummings, *supra* note 147, at 5.

150. Raja Parasuraman & Christopher A. Miller, *Trust and Etiquette in High-Criticality Automated Systems*, 47 COMM. OF THE ACM 51, 52 (Apr. 2004).

seeking and processing.”¹⁵¹ Automation bias effectively turns a computer program’s suggested answer into a trusted final decision.¹⁵²

Under the influence of automation bias, workers will likely adopt a computer’s suggested eligibility determinations and benefit calculations.¹⁵³ Members of the public, desiring public benefits but lacking sophisticated knowledge of federal and state rules, would rely upon an agency’s automated recommendations about their likely ineligibility. In this respect, little meaningful difference exists between a mixed system and its fully automated counterpart.

Automation bias may become increasingly acute in the twenty-first century as our regulatory rules become increasingly intricate. As a general matter, those who view themselves simply as data processors will lose their motivation to learn the rules applied by computers.¹⁵⁴ This may be especially true where human operators believe that an automated system is better equipped than they are to master a wide swath of complicated rules. Over time, human operators may lose the skills that would allow them to check a computer’s recommendations. As the public’s demand for government services grows, and as policy becomes more complicated, human operators may be increasingly forced to trust automated systems.¹⁵⁵ The distinction between mixed and fully automated systems has the potential to disappear as the twenty-first century progresses.¹⁵⁶

Agencies also fail to test automated public benefits systems in a way that would ensure that the embedded rules accurately reflect policy.¹⁵⁷ For instance, programmers at EDS failed to test CBMS for mistakes in the embedded policy.¹⁵⁸ According to a 2005 auditor’s report, EDS did not

151. Linda J. Skitka et al., *Automation Bias and Errors: Are Crews Better Than Individuals?*, 10 INT’L J. AVIATION PSYCHOLOGY 85, 86 (2000).

152. Cummings, *supra* note 147, at 7.

153. *See id.* (noting that where automated system gives advice to human operator, that advice turns into a de facto decision due to human tendency to trust automated systems).

154. AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 29; Sheridan, *supra* note 147, at 459 (“[S]ophisticated automation technology will alienate workers—where alienation means losing their identity as skilled manual craftspeople to become button pushers, understanding less and less of how the technology works as it becomes more sophisticated and requires white-coated high priests to program it . . . blissfully trusting the technology and abandoning responsibility for one’s own actions.”).

155. Kersten, *supra* note 10.

156. This may not be true in instances where computer programs do not suggest answers or recommendations to human operators. But even those systems may provide misleading cues to operators based on the system’s design or the questions asked operators.

157. Texas’s independent contractor also inadequately tested TIERS. Hagert Testimony, *supra* note 122, at 14.

158. OFFICE OF CBMS, CO. DEP’T OF HEALTH CARE POLICY & FINANCING & DEP’T OF HUMAN SERVS., REPORT ON CONTROLS PLACED IN OPERATION AND TESTS OF OPERATING EFFECTIVENESS

perform risk assessments for “regulatory compliance, legal compliance, technical reliability, or information integrity.”¹⁵⁹ After only twenty days of piloting the program in a few counties, Colorado rolled out CBMS across the state.¹⁶⁰

Agencies routinely delay the implementation of new federal and state law into automated systems.¹⁶¹ For instance, CBMS programmers belatedly incorporated changes to cost-of-living adjustments into the system.¹⁶² During the period between the adoption of a rule change and the programmer’s correction of the rule, automated systems will render inaccurate decisions.¹⁶³

Automated systems misidentify individuals.¹⁶⁴ The FPLS has incorrectly classified individuals as dead-beat parents because they share the same or similar names as individuals properly designated as dead-beats.¹⁶⁵ These erroneously labeled individuals must undergo lengthy proceedings to prove their innocence.¹⁶⁶ For example, the FPLS identified the wrong man in a case involving a \$206,000 child-support debt.¹⁶⁷ It took the accused man and his attorney over two months to convince the California district attorney’s office that the system had made a mistake.¹⁶⁸ The difficulties individuals must endure to clear their names may be the result of an agency worker’s intuition that the computer system is infallible.

(2006) (on file with author) [hereinafter COLO. HEALTH CARE, REPORT ON CONTROLS]; see DELOITTE, *supra* note 73, at 7 (urging EDS to conduct comprehensive regression testing on CBMS to check rules already encoded in system for accuracy and to test modifications made to rules).

159. Glen Emerson Morris, *Lessons from the Colorado Benefits Management System Disaster*, ADVERTISING & MARKETING REVIEW, Oct. 2004, available at http://www.ad-mkt-review.com/public_html/air/ai200411.html; see COLO. HEALTH CARE, REPORT ON CONTROLS, *supra* note 158, at 4–5 (noting that CBMS was not programmed to automatically provide accessible case histories for recipients, trace eligibility determinations, or to verify applicants’ income); James Bieman, Editorial, *Is Anyone Listening?*, 13 SOFTWARE QUALITY J. 225, 225 (2005) (explaining that CBMS disaster could have been prevented if proper software assurance practices had been applied).

160. Opsahl, *supra* note 65.

161. Kersten, *supra* note 10 (explaining that federal agencies such as Centers for Medicare and Medicaid Services and Social Security Administration have difficulty updating rules embedded in automated systems in a timely manner); U.S. DEP’T OF AGRICULTURE, STATE AUTOMATION SYSTEMS STUDY: VOL. II, at VI-6 (1995).

162. Perlman, *supra* note 65.

163. AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 45.

164. U.S. GAO, TERRORIST WATCH LIST, *supra* note 12, at 4 (discussing misidentifications in airline security context).

165. Garvey, *supra* note 50.

166. *Id.*

167. *Id.*; Nancy Lloyd Barrett, Editorial, *Paternity*, PRESS-ENTERPRISE (Riverside, Cal.), Aug. 25, 2002, at D3 (arguing that many “dead beat dads” are being arrested for children who are not theirs).

168. Garvey, *supra* note 50.

The “No Fly” computer matching system routinely targets innocent individuals as terrorists.¹⁶⁹ Over half of the tens of thousands of matches sent to TSC between 2003 and January 2006 were misidentifications.¹⁷⁰ These mistakes stem from faulty information stored in “No Fly” databases and from unsophisticated matching algorithms that fail to “distinguish between similar names.”¹⁷¹ Airline and TSC officials reviewing the computer’s identification of a “No Fly” match might be more inclined to endorse the computer’s decision due to the influence of automation bias.

Individuals who are mistakenly included on watch lists or who are misidentified as someone on these lists “face consequences ranging from inconvenience and delay to loss of liberty.”¹⁷² The automated “No Fly” system works to exclude numerous innocent individuals from air travel.¹⁷³ For example, since 2005, the “No Fly” system has prevented two U.S. senators, a State Department diplomat, a Continental Airlines crew member, and a four-year-old boy from boarding their scheduled flights.¹⁷⁴ An American Airlines pilot, testifying before the Senate Judiciary Committee, explained that he was detained approximately eighty times in

169. U.S. GAO, TERRORIST WATCH LIST, *supra* note 12, at 4.

170. *Id.*

171. Eric Lipton, *U.S. Official Admits to Big Delay in Revamping No-Fly Program*, N.Y. TIMES, Feb. 21, 2007, at A17.

172. U.S. DEP’T OF HOMELAND SECURITY, PRIVACY OFFICE REPORT ON EFFECTS ON PRIVACY & CIVIL LIBERTIES 7 (2006), available at http://www.dhs.gov/xlibrary/assets/privacy/privacy_rpt_nofly.pdf.

173. Gordon, *supra* note 42 (according to TSA spokeswoman, “an average of 1,500 airline travelers applied each week for redress on the grounds that they’d been mistakenly included on terrorist watch lists” and were denied the right to fly).

174. Singel, *supra* note 42 (quoting State Department diplomat and Continental Airlines flight-crew member held up at airports); *60 Minutes: Unlikely Terrorists on No Fly List* (CBS television broadcast Oct. 8, 2006) [hereinafter *60 Minutes*], available at <http://www.cbsnews.com/stories/2006/10/05/60minutes/main2066624.shtml> (interviewing twelve innocent travelers who all share the same name as someone on the “No Fly” list and who have faced interrogations every time they fly); *Local Nightly News: Boy, 4, has Name Show Up on TSA Watch List* (ABC television broadcast Dec. 31, 2005), available at <http://abclocal.go.com/ktrk/story?section=local&id=3771743> (reporting that a commercial airline refused to allow a four-year-old child to travel based on “No Fly” recommendation); Marc Rotenberg, Executive director, Electronic Privacy Information Center, Prepared Testimony and Statement for the Record, *Hearing on “The Future of Registered Traveler” Before the H. Subcomm. on Economic Security, Infrastructure Protection, and Cybersecurity of the H. Comm. on Homeland Security* (Nov. 3, 2005), available at http://www.epic.org/privacy/airtravel/rt_test_110305.pdf [hereinafter Rotenberg Testimony] (explaining that Senators Ted Kennedy and Don Young were both improperly placed on watch lists). *Cf. Ian McEwan Will Now Take Your Questions*, TIME, June 18, 2007, at 6 (explaining that award-winning British novelist was detained for twenty-four hours by U.S. immigration officials).

a single year.¹⁷⁵ Individuals mistakenly identified as terrorists face intensive questioning that can last for several hours.¹⁷⁶

Individuals have no way of knowing if they are in the “No Fly” database.¹⁷⁷ As the Department of Homeland Security’s website explains, the United States government will not reveal whether a particular person is on the terrorist watch list so as to prevent those on the list from circumventing the system.¹⁷⁸ The only information the agency will release to aggrieved individuals is information they themselves have provided in their redress applications as well as TSC’s decision resolving their claims.¹⁷⁹ At present, there is no assured way to get removed from the “No Fly” list.¹⁸⁰ An Army major has been “pulled aside and interrogated” over fifteen different times despite having repeatedly filed redress claims with the TSA.¹⁸¹

Automated systems routinely send faulty notices. For example, CBMS sent denial notices for cases that, in fact, were pending verification.¹⁸²

175. Gordon, *supra* note 42.

176. U.S. GAO, TERRORIST WATCH LIST, *supra* note 12, at 16 (recounting interviews with Customs and Border Protection officers who noted that individuals can spend several hours in secondary screening).

177. DHS TRIP, *supra* note 115; Ronald D. Lee & Paul M. Schwartz, *Beyond the “War” on Terrorism: Towards the New Intelligence Network*, in *EVOLVING LAWS AND PRACTICES IN A SECURITY-DRIVEN WORLD* 455, 485 (PLI Patents, Copyrights, Trademarks, and Literary Property Course Handbook Series No. 8966, 2006).

178. DHS TRIP, *supra* note 115.

179. U.S. DEP’T OF HOMELAND SECURITY, PRIVACY IMPACT ASSESSMENT FOR THE DHS TRAVELER REDRESS INQUIRY PROGRAM (DHS TRIP) 12 (2007), available at http://www.dhs.gov/xlibrary/assets/privacy/privacy_pia_dhstrip.pdf. The Department of Homeland Security (DHS) allows those who feel that they were wrongly detained or delayed to file redress complaints. DHS TRIP, *supra* note 115. DHS explains that its redress process is intended “to help travelers improve their travel experience and correct inaccuracies.” U.S. Dep’t of Homeland Security Website, Step 3: After Your Inquiry, August 2, 2007, http://www.dhs.gov/xtrvlsec/programs/gc_1169827489374.shtm. DHS notes because travelers may be selected for enhanced screening due to a variety of reasons or at random, a redress resolution “may not resolve all of your travel-related concerns in the future.” *Id.*

180. SECURITY ROUNDUP, AIRPORT SECURITY REPORT, Feb. 13, 2008, 2008 WLNR 2881025 (explaining that measures taken to ameliorate the process for innocent individuals getting off the “No-Fly” list provide little help as the lists are fluid and regularly updated); Editorial, *No-Fly List Belongs in the Wastebasket*, ST. PETERSBURG TIMES, Nov. 11, 2007, at 2P, 2007 WLNR 22305650 (although procedures exist to get off the “No-Fly” list, they are lengthy, bureaucratic, and not always successful); see SOLOVE, *supra* note 43, at 182 (explaining that twenty-nine-year-old member of the U.S. national rowing team with a Muslim last name was repeatedly detained by officials at the airport, causing him to miss flights). Senator Kennedy was only able to remove himself from the “No Fly” list after appealing to then-Homeland Security Secretary Tom Ridge. Rotenberg Testimony, *supra* note 174, at 2. The ordinary citizen affected by watch list errors could not invoke this option. *Id.*

181. *60 Minutes*, *supra* note 174. An Army major, Robert Johnson, shares the same name as a sixty-two-year-old man convicted of plotting to bomb a Hindu temple in Toronto who was subsequently deported to Trinidad. *Id.* Because the “No Fly” list apparently only provides a name to operators, individuals with the same name face extensive screening, no matter the circumstances. *Id.*

182. COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, MAY 7,

These and other notices failed to explain the grounds for the agency's termination of benefits.¹⁸³ Furthermore, individuals have reported that they received multiple, inconsistent messages within the same month.¹⁸⁴ In 2005, one Colorado family received seventy-one conflicting notices regarding their Medicaid benefits in a six-month period.¹⁸⁵

Automated public benefits systems have changed or terminated benefits without providing any warning at all.¹⁸⁶ Similarly, some individuals never received notice of their erroneous dead-beat status or of the state's intent to collect the allegedly unpaid child-support debt from them.¹⁸⁷ As a result, states can obtain default judgments against innocent individuals, garnishing their wages, intercepting federal and state tax refunds, and revoking driver's and professional licenses.¹⁸⁸ States can also notify credit agencies of these unpaid default judgments.¹⁸⁹ In the wake of a default judgment, an individual wrongfully labeled a dead-beat parent will find it difficult to prove his innocence and restore his credit.¹⁹⁰

Automated systems often fail to maintain audit trails of their decisions, further compounding the problems caused by automation.¹⁹¹ Audit trails

2005, at 2 (May 7, 2005).

183. DELOITTE, *supra* note 73, at 21 (explaining that the system does not tell the user whether they fail due to income limits, inadequate relationship, living arrangements and instead simply says "Eligibility Denied"); COLORADO BENEFITS MANAGEMENT SYSTEM, DECISION TABLE RELEASE NOTES, JANUARY 29, 2005, at 2 (Jan. 29, 2005) ("client was getting wrong notice" for not signing a form but should have been notified that the problem was ineligibility for SSI due to income); *see also* April M. Washington, *Hearing Eyes Benefits Woes: Counties' Concerns About Overpayments to Needy at Issue*, ROCKY MTN. NEWS, Jan. 18, 2007, at 6A (explaining that CBMS system has generated 11,000 notices of overpayment that fail to tell clients what to do).

184. Karen Augé, *Contempt Orders Sought Over Benefits Backlog*, DENVER POST, Apr. 7, 2005, at B1 (explaining that CBMS participants receive dozens of contradictory notices about eligibility); *see also* Dick Foster, *System Bugs Still Plaguing Welfare Offices*, ROCKY MTN. NEWS, Dec. 17, 2005, at 29A (explaining that CBMS paid individuals benefits one month and the next sent a faulty notice saying the individuals were over paid and were required to pay back benefits).

185. Fukami & McCubbrey, *supra* note 111, at 488.

186. Plaintiffs' First Amended Complaint at 8, Christina DeLeon et al. v. Jim Hine, Civ. No. A03CA816LY, (W.D. Tex. Jan. 5, 2004); Class Petition for Writ of Mandamus and Administrative Mandamus, Juan Ledezma et al. v. Sandra Shewry, Civ. 07-507057 (Cal. Super. Ct. filed Feb. 26, 2007) (alleging that automatic termination of Medicare benefits without notice violates CAL. WELF. & INST. CODE § 14005.37).

187. DELAWARE JOINT SUNSET COMMITTEE, DRAFT REPORT OF THE DIVISION OF CHILD SUPPORT ENFORCEMENT, NO. 1441430001, at 10 (Jan. 2005) (on file with author) (finding difficulties with paternity establishment data).

188. *Id.*; Garvey, *supra* note 50, at B7 (explaining that over seventy percent of paternity establishments in Los Angeles County were by default and over twenty percent of those defaults involved innocent individuals).

189. Garvey, *supra* note 50, at B7.

190. *See* Citron, *supra* note 51, at 253 (describing difficulties that individuals face in repairing mistakes on credit reports).

191. COLO. AUDITOR, PERFORMANCE AUDIT, *supra* note 93, at 41.

record the facts and rules supporting a computer program's decision.¹⁹² Although the system designers of TIERS and CBMS could have included audit trails, they chose not to do so. These systems are unable to generate transaction histories showing the "decisions with respect to each eligibility criterion for each type of assistance" in individual cases.¹⁹³ This leaves "no way to determine . . . what information was used to determine benefits."¹⁹⁴ As a result, workers cannot check for errors in an individual's case.¹⁹⁵

The "No Fly" computer system similarly fails to provide a way to trace the basis of the system's decisions.¹⁹⁶ The underlying information and data matching techniques are not made available to those affected by the program. Even the system's administrators are unable to understand the logical and factual bases for the inferences made by the program.¹⁹⁷ Without access to the logic of a "No Fly" determination, an individual cannot meaningfully challenge it. Moreover, the system's lack of statements of reasons inevitably strengthens the already formidable automation bias, effectively rendering human oversight ineffective.

Notwithstanding all of these problems, agencies plan to increase automation in an attempt to satisfy the public's demand for services, to decrease costs, and to ensure consistent decisions. As the next Part explores, agencies must recognize and address the ways in which automation undermines the procedural safeguards typically attached to individual adjudications and rulemaking under the Due Process Clauses of the Constitution and federal and state law.¹⁹⁸

192. AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 79, at 23.

193. TEXAS OIG, TIERS, *supra* note 73, at 13; *see* COLO. AUDITOR, PERFORMANCE AUDIT, *supra* note 93, at 4, 41 (explaining that EDS did not program CBMS to automatically provide a case history for each benefits recipient that would track changes made to an individual's file). CBMS also cannot produce lists of individuals who the system deemed ineligible or whose benefits were terminated. *Id.* at 4.

194. TEXAS OIG, TIERS, *supra* note 73, at App. 6; *see* COLO. AUDITOR, PERFORMANCE AUDIT, *supra* note 93, at 4.

195. COLO. AUDITOR, PERFORMANCE AUDIT, *supra* note 93, at 4.

196. DHS TRIP, *supra* note 115.

197. DANIEL J. WEITZNER ET AL., MIT COMPUTER SCI. & ARTIFICIAL INTELLIGENCE LABORATORY TECHNICAL REPORT, NO. MIT-CSAIL-TR-2006-007, TRANSPARENT ACCOUNTABLE DATA MINING: NEW STRATEGIES FOR PRIVACY PROTECTION 3 (2006), available at <http://www.w3.org/2006/01/tami-privacy-strategies-aaai.pdf>.

198. This Article focuses on the impact that automation has on the procedural protections afforded individuals. The use of the Internet to enhance public participation in rulemaking is beyond the scope of this Article. For more on this topic, see Beth Simone Noveck, *The Electronic Revolution in Rulemaking*, 53 EMORY L.J. 433, 435-36 (2004) (discussing e-rulemaking as a way to reform the administrative process by encouraging widespread public participation).

II. PROCEDURAL PROTECTIONS IMPERILED BY AUTOMATION

This Part considers the procedural costs that automated systems impose. Section A demonstrates how automation can blur the line between adjudication and rulemaking, confounding the procedural protections governing both systems. Section B shows the many ways in which the combination of adjudication and rulemaking in automated systems comes at the expense of individual rights. Section C assesses the difficulties that courts will likely face when reviewing rules embedded in, and adjudications performed by, automated systems.

A. Combining Adjudication and Rulemaking in Automated Systems

In the twentieth century, agency decisions typically came in the form of either adjudications or policy-making.¹⁹⁹ In adjudications, procedural due process safeguards the important interests of individuals when an agency acts against a person or a small group of people on the basis of their particular circumstances.²⁰⁰ *Londoner v. City of Denver*²⁰¹ epitomizes this approach. *Londoner* held that due process protected property owners who had been subjected to a special tax as a result of the owners' specific situations.²⁰²

When agencies adopt policies that affect a large number of people, by contrast, no individualized due process protections apply.²⁰³ As Justice Oliver Wendell Holmes explained in *Bi-Metallic Investment Co. v. State Board of Equalization*,²⁰⁴ "[w]here a rule of conduct applies to more than a few people it is impracticable that every one should have a direct voice in its adoption."²⁰⁵ Instead, as the twentieth century progressed, Congress established rulemaking procedures intended to enlighten agencies' policymaking with public input.²⁰⁶ The opportunity to participate in rulemaking was seen as a substitute for individualized due process.²⁰⁷

The archetypal *Londoner/Bi-Metallic* distinction has long animated the separate, yet parallel, procedural regimes that govern individual

199. 1 DAVIS & PIERCE, *supra* note 4, § 1.8.

200. *Id.*

201. 210 U.S. 373 (1908).

202. *Id.* at 386.

203. *See Atkins v. Parker*, 472 U.S. 115, 131 (1985).

204. 239 U.S. 441 (1915).

205. *Id.* at 445.

206. *See Heckler v. Campbell*, 461 U.S. 458, 470 (1983).

207. *Id.*

adjudications and rulemaking.²⁰⁸ Today's automated systems, however, resist this traditional classification.²⁰⁹ Now, computers both render decisions about important individual rights *and* engage in rulemaking.²¹⁰

Colorado's public benefits system, CBMS, captures this point well. CBMS adjudicates individuals' property interests in Medicaid benefits based on their unique circumstances, adjudications that would typically fall within the meaning of *Londoner*. Because the programmers changed hundreds of established rules when encoding them into the system, CBMS also articulates new rules in the spirit of *Bi-Metallic*.²¹¹ Although these changes may have been caused by programming problems, rather than an agency's deliberate decision to make new rules, the improperly encoded policies nonetheless affect a significant number of Colorado residents. The computer programmers made new policy by encoding rules that distorted or violated established policy.

Significant problems result when individual adjudications and rulemaking are combined in computer systems. An inaccurate decision could result from incorrect factual adjudications, invalid policy, or both. The opacity of automated systems prevents an easy determination of the source of the error. This creates confusion about the procedures owed individuals, interfering with both due process guarantees and rulemaking procedures.

Consider this example. In Colorado, a sixty-year-old food stamp recipient informs an eligibility worker that she lost her apartment. The recipient explains that she initially stayed at her sister's house for two weeks, but that she now lives on the streets. Under federal law, those considered "homeless" receive certain accommodations, such as income deductions, which can result in higher food stamp allotments.²¹²

208. RICHARD J. PIERCE, JR. ET AL., *ADMINISTRATIVE LAW AND PROCESS* 279 (4th ed. 2004) (positing that *Londoner/Bi-Metallic* distinction should be interpreted broadly to mean that due process safeguards do not apply to agency policymaking that deprives large number of people of protected interest because political process provides them adequate safeguards); *Minnesota State Bd. for Comm. Colleges v. Knight*, 465 U.S. 271, 285 (1984) (explaining that considerations identified in *Bi-Metallic* were "as weighty [in 1984] as they were in 1915").

209. Of course, even in the twentieth century, the distinctions between individual adjudications and rulemaking, so central to the Administrative Procedure Act, were not perfectly conceived. Some agency action fell within a grey area between them.

210. See Joel R. Reidenberg, *Lex Informatica: The Formulation of Information Policy Rules Through Technology*, 76 TEX. L. REV. 553 (1998) (explaining that code can regulate through rules embedded in system's architecture).

211. See *supra* note 123 and accompanying text (noting that CBMS programmers changed over nine hundred rules).

212. 7 U.S.C. § 2014(e)(6)(D) (2000 & Supp. IV 2004).

Individuals can be considered homeless even if they reside somewhere temporarily, so long as their stay lasts less than ninety days.²¹³

The worker enters the recipient's information into CBMS. The computer program asks the worker to identify the woman's living situation from a list of options that includes homelessness.²¹⁴ The system also requires the worker to enter whether or not the recipient is a "beggar."²¹⁵ The system decides that the recipient should not be recognized as homeless under federal law and determines the amount of her food stamps. The worker adopts the decision.

The recipient will be unable to determine exactly why the system declined to categorize her as homeless because CBMS is a black box.²¹⁶ The system's finding could be based on the worker's erroneous interpretation of the facts regarding the recipient's stay with her sister. It could be the result of an incorrect rule encoded in the system. For instance, it could be that CBMS was programmed to exclude individuals from homeless status if they temporarily stayed with relatives, in contravention of established policy.

The denial could also stem from the answer the worker gave to the question about whether the recipient was a "beggar." That answer involved a factual adjudication about the manner in which the recipient receives income, but it also may have articulated a new rule. Neither federal nor state policy requires administrators to ask if individuals receiving food stamps are "beggars."²¹⁷

Due to the system's opacity, the process owed the recipient is unclear. Procedural due process is certainly implicated if the system deprived the recipient of her property interest in food stamps based on inaccurate facts. If the system's error involved the creation of a new rule, the recipient should have been given the opportunity to comment on it. And if the decision's inaccuracy resulted from both factual errors and illicit rules,

213. 7 U.S.C. § 2015(c)(1)(A)(ii) (2000); 7 U.S.C. § 2012(s)(2)(c) (2000 & Supp. IV 2004) ("[A] homeless individual . . . [is] an individual who has a primary nighttime residence that is a temporary accommodation for not more than 90 days in the residence of another individual.").

214. Bill Scanlon, *Pressure to Go Online*, ROCKY MTN. NEWS, Oct. 1, 2004, at 5A.

215. *See id.* (explaining that CBMS asked workers if participants were homeless and if that answer was yes, then the system asked if the person was a "beggar").

216. Bill Scanlon, *Welfare Computer System Faces Review*, ROCKY MTN. NEWS, Mar. 17, 2005, at 4A.

217. Scanlon, *supra* note 214, at 5A. Many eligibility workers expressed dismay that CBMS asked them to assess whether a claimant was a "beggar" as no federal or state policy warranted such a patently offensive inquiry. *Id.* Indeed, the system's demand that workers ask such a crude and insulting question may anger and humiliate the claimant and cause her to drop off the program. This would constitute another form of automation-induced error.

both due process and rulemaking procedures would presumably protect the recipient's interests.

As the next section explains, in the automated administrative state, neither due process nor policymaking procedures adequately protect individuals like the Coloradan food stamps recipient. Automation jeopardizes the due process safeguards owed individuals and destroys the twentieth-century assumption that policymaking will be channeled through participatory procedures that significantly reduce the risk that an arbitrary rule will be adopted.

B. Procedures Protecting Individuals in Jeopardy

1. Threats to Due Process

Automated decisions often deprive individuals of their liberty and property, triggering the safeguards of the Due Process Clauses of the Fifth and Fourteenth Amendments.²¹⁸ For example, computers can terminate individuals' Medicaid benefits, impairing a statutorily-granted property interest.²¹⁹ The FPLS can designate innocent individuals as dead-beat parents, resulting in lost property, revoked driver's and professional licenses, and injury to their reputations.²²⁰ The federal government's "No Fly" data matching program labels some individuals as potential terrorists, resulting in the postponement or denial of air travel, both significant impairments of liberty rights.²²¹

a. Notice

Automated decision systems endanger the basic right to be given notice of an agency's intended actions. This right requires that notice be

218. U.S. CONST. amends. V, XIV.

219. Provision of Hearing System, 42 C.F.R. § 431.205 (2006) (requiring Medicaid agencies to provide evidentiary hearing that comports with due process standards set forth in *Goldberg v. Kelly*, 397 U.S. 254 (1970)).

220. *E.g.*, *Paul v. Davis*, 424 U.S. 693, 701–03 (1976) (refusing to find due process rights implicated based on reputational harms without evidence of property or liberty harm); *Wisconsin v. Constantineau*, 400 U.S. 433, 437 (1971) (finding due process right implicated in case involving harm to liberty and reputation).

221. *Cafeteria & Rest. Workers Union v. McElroy*, 367 U.S. 886, 894 (1961) ("One may not have a constitutional right to go to Baghdad, but the Government may not prohibit one from going there unless by means consonant with due process of law.") (quoting *Homer v. Richmond*, 292 F.2d 719, 722 (D.C. Cir. 1961)); Steinbock, *supra* note 76, at 52 (explaining that "No Fly" list can impinge on liberty and property interests of individuals whose travel documents are held while a match is confirmed and who are denied air travel).

“reasonably calculated” to inform individuals of the government’s claims.²²² The sufficiency of notice depends upon its ability to inform affected individuals about the issues to be decided, the evidence supporting the government’s position, and the agency’s decisional process.²²³ Clear notice decreases the likelihood that agency action will rest upon “incorrect or misleading factual premises or on the misapplication of rules.”²²⁴

Some decision systems fail to provide any pre-deprivation notice of agency actions. For instance, CalWIN and TIERS have terminated public benefits without prior notification.²²⁵ Some individuals erroneously labeled dead-beats never received notice of their purported debts.²²⁶ The “No Fly” program provides no notice of its decisions, much less of the evidence supporting them.²²⁷

Even when systems provide notice, it is often inadequate. Recipients of public benefits receive termination notices that provide little information about the reasons supporting an automated system’s decisions.²²⁸ Inadequate notices are particularly common in systems that do not maintain audit trails, such as CBMS and TIERS.²²⁹ As a result, affected individuals lack the information they would need to effectively respond to an agency’s claims.²³⁰ Without sufficient warning of the government’s position, resulting administrative hearings resemble a “scene from Kafka.”²³¹

222. See *Dusenbery v. United States*, 534 U.S. 161, 168 (2002) (assessing notice provided inmate under the *Mullane* reasonableness standard and finding certified mail to prison reasonably calculated to reach inmate); *Mullane v. Cent. Hanover Bank & Trust Co.*, 339 U.S. 306, 319 (1950).

223. JERRY L. MASHAW, *DUE PROCESS IN THE ADMINISTRATIVE STATE* 176 (1985); see, e.g., *Vargas v. Trainor*, 508 F.2d 485, 489–90 (7th Cir. 1974) (ruling that notice violated due process because it failed to inform public benefits recipients why their benefits were reduced, compounding problems created by human tendency to assume action taken by government agency is correct).

224. *Goldberg v. Kelly*, 397 U.S. 254, 268 (1970); see also *Hamby v. Neel*, 368 F.3d 549 (6th Cir. 2004); *Ortiz v. Eichler*, 794 F.2d 889 (3d Cir. 1986).

225. See *supra* note 186 and accompanying text.

226. See *supra* note 187.

227. Steinbock, *supra* note 76, at 64–65.

228. See *supra* text accompanying note 183.

229. See *supra* text accompanying notes 191–95.

230. *Cosby v. Ward*, 843 F.2d 967, 984 (7th Cir. 1988) (finding computer-generated notices deficient because they failed to tell claimants that they violated a rule of thumb); see also *Screws v. United States*, 325 U.S. 91, 96 (1945) (finding that enforcement of laws that fail to adequately convey their terms “would be like sanctioning the practice of Caligula who ‘published the law, but it was written in a very small hand, and posted up in a corner, so that no one could make a copy of it.’”) (citation omitted).

231. *Cosby*, 843 F.2d at 982 (citation omitted); see MASHAW, *supra* note 223, at 175–76 (“Kafkaesque procedures take away the participants’ ability to engage in rational planning about their situation, to make informed choices among their options.”).

b. Opportunity to be Heard

Automation presents novel problems for a standard *Mathews v. Eldridge*²³² cost-benefit analysis. A *Mathews* analysis is used to determine the nature of due process hearings owed individuals whose life, liberty, or property is threatened by agency action.²³³ Under *Mathews*, courts weigh the value of the person's threatened interest, the probable benefit of additional or substitute procedures, and the government's asserted interests, including the cost of additional safeguards.²³⁴ *Mathews* balances the value of enhanced accuracy against the cost of obtaining it, while aspiring to provide individuals with an opportunity to be heard "at a meaningful time and in a meaningful manner."²³⁵

In agency actions involving Medicaid, courts have held that due process requires a pre-termination *Goldberg v. Kelly*²³⁶ evidentiary hearing, where individuals can present evidence and cross-examine adverse witnesses before an impartial decision maker.²³⁷ Despite these safeguards, an agency might still erroneously deprive a recipient of important benefits. A hearing officer may be influenced by automation bias, and thus be less inclined to entertain an individual's arguments, especially if the individual lacks the ability to reconstruct the entire eligibility determination as it should have occurred. Although hearing officers may be impartial among human witnesses, they likely have a bias for computer systems.²³⁸

Such bias, however, would not disqualify hearing officers, diminishing the value of a hearing. Courts typically limit findings of prejudice to adjudicators who have some personal connection with the individuals appearing before them.²³⁹ Officers who have no disqualifying personal

232. 424 U.S. 319 (1976).

233. *Id.* at 334–35.

234. *Id.* at 335. Judge Richard Posner describes the utilitarian balancing test in *Mathews* as minimizing the sum of the cost of erroneous judicial decisions and the cost of operating the procedural system. RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 563 (6th ed. 2003).

235. *Mathews*, 424 U.S. at 333 (citations omitted); *id.* at 347–49.

236. *Goldberg v. Kelly*, 397 U.S. 254 (1970).

237. *E.g. Id.* at 269–71; 42 C.F.R. §§ 431.205, 431.220(a)(2) (2006) (requiring *Goldberg*-type evidentiary hearings for decisions under Medicaid Act); *see, e.g.*, Hamby v. Neel, 368 F.3d 549, 559 (6th Cir. 2004) (finding property interest protected by procedural due process for applicants who had hoped to qualify for Medicaid benefits but were denied); *see* Henry J. Friendly, "Some Kind of Hearing," 123 U. PA. L. REV. 1267, 1279–81 (1975) (highlighting importance of an unbiased tribunal, clear notice of grounds for agency action, and a chance to present reasons why agency should not take action).

238. *See* text accompanying notes 146–53 (discussing automation bias).

239. *See* Schweiker v. McClure, 456 U.S. 188, 195–97 (1982) (holding that the prescription that

connection with individuals but who are influenced by automation bias might endorse inaccurate computer decisions even in the face of contrary evidence. Under present conditions, the guarantee of an impartial reviewer may be illusory.

Access to an automated program's source code—the programmer's instructions to the computer—might provide a meaningful way for individuals to challenge an agency's claims and dispel the influence of automation bias.²⁴⁰ Hearings about the logic of a computer program's decision would require experts to decipher and explain the code and its operation.²⁴¹ Unfortunately, the *Mathews* calculus likely would not provide such additional process. Courts would likely find that the cost of this expert testimony would outweigh both the individual interest involved and the reduction in the risk of erroneous deprivation.²⁴²

Whatever the merits of this sort of cost-benefit calculation in twentieth-century hearings, it cannot respond effectively to automated decision making. Computer systems fundamentally change the costs and benefits of additional process in ways *Mathews* could not have anticipated. Expert testimony unraveling a computer's decision would be expensive. But it

hearing officers are unbiased can only be overcome by a showing of a conflict of interest such as financial interest at stake); see also 2 DAVIS & PIERCE, *supra* note 4, § 9.8 (discussing the neutral decision maker); 28 U.S.C. §§ 144, 455 (2000) (describing disqualification grounds for judges). An officer's views about law or policy do not constitute grounds for disqualification. *NLRB v. Pittsburgh S.S. Co.*, 337 U.S. 656, 659 (1949) (“[T]otal rejection of an opposed view cannot of itself impugn the integrity or competence of a trier of fact.”); *United States v. Morgan*, 313 U.S. 409, 416 (1941) (finding that expression of strong views did not disqualify decision maker).

240. See Christopher W. Clifton et al., *Data Mining and Privacy: An Overview*, in *PRIVACY AND TECHNOLOGIES OF IDENTITY* 191, 203 (Katherine J. Strandburg & Daniela Stan Raicu eds., 2006) (explaining that, without access to the underlying data and logic of the “No Fly” program, individual's ability to challenge inclusion on list is impaired).

241. Telephone Interview with Andy Bardwell, Systems Analyst, in Denver, Colo. (Apr. 9, 2007) (notes on file with author) (explaining that even if Colorado's Department of Health and Human Services had published the code of CBMS, it would be an expensive and time-consuming task to decipher); Grimmelmann, *supra* note 29, at 1745 (“[Examining software] is not a hunt for a needle in a haystack. It is a hunt for the broken needle in a field covered two feet deep in other needles.”).

242. The standard *Mathews v. Eldridge* analysis typically involves requests for additional process that would enhance the accuracy of factual determinations. Ascertaining the law that an automated system applied arguably constitutes a factual issue. In the automated administrative state, the de facto rules are hidden from hearing officers who may be inclined to adopt a computer's finding without checking the accuracy of a computer-generated decision. Determining the de facto rules constitutes a factual question that must be resolved to achieve more accurate results. Moreover, the Court applied a *Mathews v. Eldridge* analysis in a child custody case where the proposed additional process—appointed counsel—might have enhanced the legal and factual accuracy of an agency's decision to terminate parental rights in a neglect case. *Lassiter v. Dep't of Soc. Servs.*, 452 U.S. 18, 27–31 (1981). Although the *Lassiter* majority refused to appoint counsel because the issues were not sufficiently complex, the Court noted that another case might present sufficiently complicated issues to warrant such additional process. *Id.* at 31–32. *Mathews v. Eldridge* arguably extends to additional process that would enhance the accuracy of factual and legal issues.

may also facilitate corrections of the system's code by identifying software flaws or invalid rules embedded in the system. When programmers remedy software errors, there are virtually no costs to replicate that improvement in future cases.²⁴³ Thus, any *Mathews* analysis that focuses on a single adjudication will capture all of the costs of improved process but only a tiny fraction of its benefits.

This differs from the typical due process case of last century involving relatively inexpensive fixed costs but burdensome variable ones.²⁴⁴ In *Goss v. Lopez*,²⁴⁵ for instance, the Supreme Court found no due process right to full-blown evidentiary hearings for nine students facing temporary suspensions from school.²⁴⁶ The Court reasoned that even though the added procedure for the nine students would not be expensive, the value of the individual interests at stake did not warrant the additional process given the significant expense of providing such process in all future cases.²⁴⁷

The *Mathews* calculus implicitly assumes that the significant costs will be repeated in all future cases. In the twentieth century, that was certainly true. Providing improvements for future cases necessarily imposed burdensome expenditures. For instance, if the *Goss* Court had upheld the students' right to a full-blown hearing, the cost of such a hearing would have been incurred in all future cases where students faced temporary suspensions.

With automated systems, however, future cases will benefit from the additional process almost without charge. Once experts correct a problem in a system's software, that cost never needs to be replicated. Every future use of the improved system is practically free.²⁴⁸ As a result, unless calculated with the entire run of cases that a software program will decide in mind, the *Mathews* calculus will overstate the burden of introducing experts to explain the code. The *Mathews* analysis fails to spread the fixed

243. See Grimmelmann, *supra* note 29, at 1729 (explaining that once a piece of software is written, the marginal cost of using the program is low).

244. This Article uses the term "fixed costs" to refer to the expense of the additional process—the expert testimony—in the case before the court. It uses the term "variable costs" to refer to the accumulating cost of that additional process in all future cases.

245. 419 U.S. 565 (1975).

246. *Id.* at 582–84.

247. *Id.* at 583–84; *Ingraham v. Wright*, 430 U.S. 651, 680–82 (1977) (finding no due process right to a hearing owed school children facing punishment by "paddling" because incremental benefit of hearing would not justify the cost as hearings require time, personnel, and diversion of school resources and because the risk of error would be low).

248. See Grimmelmann, *supra* note 29, at 1729 (explaining that software is an inexpensive way to solve problems because once written, marginal cost of running a program to handle other cases is vanishingly small).

costs across the variable benefits of achieving a more accurate outcome in each future case. The due process analysis should be recalibrated to compare fixed costs with the significant benefit of avoiding errors in countless future cases.²⁴⁹

“No Fly” adjudications raise different *Mathews* issues. The government refuses to produce the matching algorithms and the information contained in the “No Fly” databases on national security grounds. The additional process necessary to decipher the algorithms and the information, if released by the government, would also be expensive. As a result, the *Mathews* calculus would likely deny hearings on the “No Fly” matching system because the government’s anti-terror interests and the high fixed cost of expert testimony would likely outweigh the individual’s liberty and property interests and the value of added procedures.²⁵⁰

Some have suggested that a *Mathews* analysis might contemplate the creation of an independent advisory board with security clearance to review the outcomes of the “No Fly” data matching program and to make recommendations for its revision.²⁵¹ Such a board could examine the number of false positives and false negatives produced by the program.²⁵² Although an expert board might provide a balanced assessment of the program’s computerized reasoning,²⁵³ an extensive review of the program’s algorithms would be costly. The current due process analysis thus might find that such a searching review outweighs any benefits.

More generally, secret algorithms raise serious concerns.²⁵⁴ In certain

249. Such aggregated future benefits should, of course, be discounted to their present value. Some due process scholars argue that *Mathews* should not just look at individual costs and benefits but should also consider society’s interest in added procedures. See Lawrence B. Solum, *Procedural Justice*, 78 S. CAL. L. REV. 181, 306 (2004) (providing a theoretical account of due process that would “maximize systemic accuracy where the arrangement will not result in inaccuracy in particular cases”); Jane Rutherford, *The Myth of Due Process*, 72 B.U. L. REV. 1, 79–80 (1992) (offering “communitarian” view of due process that would assess benefits of additional procedures by looking at individuals or groups directly affected by decision).

250. To be sure, such a determination involves a subjective assessment of the decision maker. See Jerry L. Mashaw, *The Supreme Court’s Due Process Calculus for Administrative Adjudication in Mathews v. Eldridge: Three Factors in Search of Value*, 44 U. CHI. L. REV. 28, 39 (1976). But most would agree that anti-terrorism concerns are sufficiently weighty so as to tilt the scales against the individual’s interest in additional process.

251. Steinbock, *supra* note 76, at 79.

252. *Id.*

253. *Id.*

254. Frank Pasquale and Oren Bracha have raised important concerns about the opacity and lack of accountability in the algorithms running search engines. Oren Bracha and Frank Pasquale, *Federal Search Commission? Access, Fairness, and Accountability in the Law of Search*, CORNELL L. REV. (forthcoming 2008); Frank Pasquale, *Taking on the Unknowns*, CONCURRING OPINIONS (Aug. 12, 2007), available at http://www.concurringopinions.com/archives/2007/08/taking_on_the_k.html (last visited Jan. 23, 2008).

instances, algorithms must prove themselves in practice. For example, an algorithm for picking stocks that leads to losses would likely be adjusted or dropped. If the computerized logic used to predict credit card fraud regularly errs, it would likely be discarded. Yet algorithms in public automated systems are not necessarily subject to revision and review based on their performance in practice. At best, they may be tested for false negatives. For instance, if a terrorist slips through the system and is allowed to fly, the algorithms designed to prevent terrorists from flying might indeed be studied and fixed. But if an algorithm mistakenly identifies a four-year-old child as a potential terrorist, the algorithm will probably not be probed for over-inclusiveness. Correcting only one type of error in an algorithm or encoded rule tends to systematize bias.

One could argue that, under *Parratt v. Taylor*²⁵⁵ and its progeny, deprivations arising from programming mistakes warrant only tort remedies, not procedural due process. In *Parratt*, a state prisoner sued prison officials under 42 U.S.C. § 1983 for failing to provide him due process in a case where prison guards negligently lost materials that he ordered by mail.²⁵⁶ The Court found no procedural due process violation because pre-deprivation process would be “impossible” to provide, and because the prisoner had a meaningful post-deprivation tort remedy.²⁵⁷ The Court explained that because the state could not foresee an employee’s “random and unauthorized act,” it could not provide process in advance of the prison guards’ negligence.²⁵⁸

The Court has limited *Parratt*’s application to cases where “no matter how significant the private interest at stake and the risk of its erroneous deprivation,” pre-deprivation process would be impossible to provide.²⁵⁹ In *Zinermon v. Burch*,²⁶⁰ the plaintiff sued officials of a mental hospital for admitting him as a voluntary patient without a hearing when they knew or should have known that he could not make an informed decision about his own admission.²⁶¹ The *Zinermon* Court upheld the plaintiff’s procedural

255. 451 U.S. 527 (1981).

256. *Id.* at 529.

257. *Id.* at 541.

258. *Id.* The Court extended the *Parratt* holding to cases involving the random, intentional acts of state prison guards whose abuse of position could not be predicted. *Hudson v. Palmer*, 468 U.S. 517, 533 (1984) (finding it impossible for state to provide pre-deprivation process in case where prison guard destroyed property of inmate to avenge a personal vendetta).

259. *Zinermon v. Burch*, 494 U.S. 113, 130 (1990).

260. *Id.*

261. *Id.* at 123–24.

due process claim because pre-deprivation process was not impossible to provide.²⁶²

At the outset, the Court made clear that the mere availability of tort remedies did not extinguish the plaintiff's due process right to a pre-deprivation hearing.²⁶³ The Court distinguished *Parratt* because, unlike the prison officials who could not possibly predict when guards might negligently lose a prisoner's mail, the hospital officials could foresee that individuals seeking treatment for mental illness might be incapable of informed consent.²⁶⁴ The Court concluded that the state should have held a hearing before admitting the plaintiff as a voluntary patient.²⁶⁵

Parratt has no application here. Unlike the unpredictable conduct of the prison guard in *Parratt*, programming mistakes happen all the time. As the problems with CBMS and the "No Fly" program make clear, agency officials can reasonably expect that software flaws or crude algorithms will produce erroneous decisions that impair the important rights of individuals. In that regard, our case is akin to *Zinermon*. Because agency officials ultimately control the administration of automated decision systems, pre-deprivation process is surely possible.

Administrative law has long presumed that rulemaking procedures help protect against arbitrariness when due process does not apply. The next section explores how that presumption fails in an age of automation.

2. *Avoiding Participation and Transparency in Rulemaking*

Computer programmers inevitably engage in rulemaking when they construct an automated system's code. Whether or not the distortion in policy was intentional, the encoding process lacks procedural safeguards mandated by the Administrative Procedure Act (APA), the Freedom of Information Act (FOIA), and similar state laws. Such inadvertent rulemaking by programmers constitutes a troubling delegation of legislative power.

a. Notice and Comment

Automated systems establish new policy when they embed distorted or simplified rules. Section 551 of the APA defines a "rule" as an "agency

262. *Id.* at 136.

263. *Id.*

264. *Id.* at 136-37.

265. *Id.*

statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy.”²⁶⁶ Automated policy falls within the APA’s definition of a rule, as it articulates general policy that prospectively affects a large number of individuals.

Some might argue that a rule is “new” only if an agency actually intends to set forth new policy. Automated rules that reflect “street-level” welfare policy fall under this conception of a rule.²⁶⁷ A strong argument also exists that policy changes caused by programming mistakes constitute new rules, regardless of the agency’s specific motive. Courts, interpreting Section 551 of the APA, look to an agency’s actions to determine if an agency has adopted a new rule.²⁶⁸ For instance, the D.C. Circuit found that an agency’s practice of adhering to a policy statement in approximately 292 out of 300 cases illustrated that the agency had, in fact, adopted a new rule.²⁶⁹ An automated system’s application of distorted policy in hundreds of thousands of cases similarly can be seen as establishing a new rule.

Whether accomplished overtly through informal rulemaking or covertly through programming, new rules must be issued in accordance with the APA and its state analogues.²⁷⁰ Although section 553(a)(2) of the APA exempts agency actions relating to “public property, loans, grants, benefits, or contracts” from notice-and-comment rulemaking, Congress and federal agencies have overridden that exemption for public benefits programs such as Medicaid and food stamps.²⁷¹ State administrative procedure acts, in turn, govern the state’s administration of public benefits programs.²⁷² When a state agency interprets an existing rule in a

266. 5 U.S.C. § 551(4) (2000); 1 DAVIS & PIERCE, *supra* note 4, § 7.2 (explaining that agencies adopt general laws or rules where “facts do not usually concern the immediate parties but are general facts which help the tribunal decide questions of law and policy and discretion”); *see also* *Bi-Metallic Inv. Co. v. State Bd. of Equalization*, 239 U.S. 441, 442 (1915).

267. *See supra* notes 84–86 and accompanying text (discussing “street-level” welfare policy studied by Professor Evelyn Brodtkin of the University of Chicago).

268. *See* U.S. Tel. Ass’n v. FCC, 28 F.3d 1232, 1234 (D.C. Cir. 1994).

269. *Id.*

270. For discussion of state APAs and open-government laws, *see generally* ARTHUR EARL BONFIELD, *STATE ADMINISTRATIVE RULE MAKING* (1986); Arthur Earl Bonfield, *The Federal APA and State Administrative Law*, 72 VA. L. REV. 297 (1986). The APAs of over half of the states are based on the Model State APA. MICHAEL ASIMOW ET AL., *STATE AND FEDERAL ADMINISTRATIVE LAW* 5 (2d ed. 1998).

271. 5 U.S.C. § 553 (a)(2) (2000); *see, e.g.*, 7 U.S.C. § 2014(b) (2000) (requiring USDA to control food stamp program through “uniform national standards” promulgated through informal rulemaking); *Hosp. Ass’n v. Bowen*, 834 F.2d 1037, 1047 (D.C. Cir. 1987) (finding that HHS’s waiver of APA exemption remains in effect until HHS says otherwise). Federal regulations require that changes in state Medicaid policy be discussed in advance with the state Medical Care Advisory Committee. *See supra* note 41.

272. *See, e.g.*, 42 C.F.R. § 430.0 (2006) (“Within broad Federal rules, each State decides eligible

substantially different manner from a prior interpretation of that rule, or creates a new rule, the agency usually must provide notice-and-comment participation.²⁷³ Notice-and-comment rulemaking requires agencies to publish the rule, solicit the public's comments, and issue a final rule that responds to those comments and articulates the basis for the rule.²⁷⁴

Rulemaking by code fails to satisfy the notice-and-comment requirement.²⁷⁵ Agencies have not published the source code or data model of automated public benefits systems such as CBMS or TIERS. Because vendors typically build these systems, the source code is proprietary and closed.²⁷⁶ The public has no opportunity to review new rules embedded in closed source code. Individuals lack notice of the new rules that will bind them.²⁷⁷

Without notice of a change in the rules, citizens lack the information they need to respond to such changes. The public cannot provide feedback on rules it cannot see.²⁷⁸ The value of participation by interested citizens and entities is lost.²⁷⁹ In turn, computer programmers inadvertently create rules that cannot be critiqued or improved.²⁸⁰

Embedding new rules in code undermines the democratic process.²⁸¹ Because the public has no opportunity to identify problems with troubled

groups, types and range of services, payment levels for services, and administrative and operating procedures [for Medicaid program]."); *Orthopaedic Hosp. v. Belshe*, 103 F.3d 1491, 1493 (9th Cir. 1997) (explaining that state administrative procedure governs state's operation of Medicaid program).

273. *E.g.*, COLO. REV. STAT. ANN. § 24-4-103 (West 2006). The particular contours of public participation would naturally depend upon the particular state's administrative procedure law. States, in general, require some form of public participation. BONFIELD, *supra* note 270, § 6.4.1.

274. KERWIN, *supra* note 3, at 52-57.

275. *See* Clark Petition, *supra* note 97, at 7-8 (arguing that Florida's Department of Children and Families failed to follow applicable rulemaking procedures for change in rule embedded in design of Florida ACCESS online application that precluded relative caregivers from applying for TANF benefits in violation of state law).

276. *See* Citron, *supra* note 32.

277. *See* Robert A. Anthony, *Interpretive Rules, Policy Statements, Guidances, Manuals, and the Like—Should Federal Agencies Use Them to Bind the Public?*, 41 DUKE L.J. 1311, 1373 (1992).

278. Lee Tien notes that if no one perceives something as a regulation, "no one will complain that the government acted unwisely." Tien, *supra* note 92, at 43.

279. *See* JERRY L. MASHAW, BUREAUCRATIC JUSTICE: MANAGING SOCIAL SECURITY DISABILITY CLAIMS 140 (1983); Levy & Shapiro, *supra* note 3, at 480; Rossi, *infra* note 282, at 186 (noting that "[p]articipation begets better information for the agency decisionmaking process" and encourages decision makers to closely scrutinize evidence and arguments).

280. The fact that the official rules received notice-and-comment participation is of no consequence. When rules are changed, the letter and the spirit of administrative procedure demands the transparency, accountability, and expertise that rulemaking provides.

281. *Cf.* Jack M. Balkin & Sanford Levinson, *The Process of Constitutional Change: From Partisan Entrenchment to the National Surveillance State*, 75 FORDHAM L. REV. 489 (2006) (describing danger of executive branch's informational insularity in which the executive is unable or unwilling to acknowledge new information that requires public to reshape its plans).

systems, it cannot present those complaints to elected officials. In turn, government actors are unable to influence policy when it is shrouded in closed code.²⁸²

Some scholars argue in favor of granting agencies more deference because they are increasingly creatures of a democratically elected President and hence are more accountable to the public than has been generally assumed.²⁸³ Whatever force the executive model of administrative law has generally, it has none here. Even the most aggressive President will be unable to exercise meaningful oversight over opaque code.²⁸⁴

Altered rules would arguably be exempt from notice-and-comment requirements if they constituted interpretative rules or changed other interpretative rules.²⁸⁵ Interpretative rules are rules that clarify existing norms without constraining agencies' discretion, whereas rules subject to section 553 of the APA and analogous state requirements are rules that create binding norms.²⁸⁶ Unfortunately, the opacity of code makes it difficult to determine if a change has imposed a "new rule" requiring rulemaking procedures or an "interpretative rule" arguably demanding less process.

b. FOIA and Open-Records Laws

The hidden nature of encoded rules violates open-government laws and regulations that are intended to provide the public access to basic information about the conduct of agencies.²⁸⁷ FOIA and similar state laws

282. KERWIN, *supra* note 3, at 263 (explaining that rulemaking is "peculiarly susceptible to presidential scrutiny and influence"); Jim Rossi, *Participation Run Amok: The Costs of Mass Participation for Deliberative Agency Decisionmaking*, 92 NW. U. L. REV. 173, 182 (1997) ("Oversight and accountability rationale is paramount to the legitimacy of agency decisions.").

283. See also Elena Kagan, *Presidential Administration*, 114 HARV. L. REV. 2245 (2001).

284. See Citron, *supra* note 32 (exploring how closed code systems interfere with Presidential model of administrative law).

285. 5 U.S.C. § 553(b)(A) (2000) (explaining that rulemaking procedures do not apply to interpretative rules and policy statements); Richard J. Pierce, Jr., *Distinguishing Legislative Rules From Interpretative Rules*, 52 ADMIN. L. REV. 547, 547 (2000) ("[A]n agency can issue an interpretative rule at any time without using the notice-and-comment procedure."). Some courts, however, have noted that when an agency changes its interpretative rules, the new interpretative rules require notice-and-comment participation. *Paralyzed Veterans of Am. v. D.C. Arena L.P.*, 117 F.3d 579, 586 (D.C. Cir. 1997) ("To allow an agency to make a fundamental change in its interpretation of a substantive regulation without notice-and-comment requirements would undermine the APA.").

286. M. Elizabeth Magill, *Agency Choice of Policymaking Form*, 71 U. CHI. L. REV. 1383, 1434 (2004); see also *Am. Mining Cong. v. Mine Safety & Health Admin.*, 995 F.2d 1106, 1111 (D.C. Cir. 1993) (explaining that interpretative rules are those that lack the force of law).

287. See 5 U.S.C. § 552(a)-(b) (2000 & Supp. IV 2004).

apply to federal benefits programs.²⁸⁸ Federal rules also contain numerous provisions allowing the public to receive information about the operation of such programs.²⁸⁹

Under FOIA and state open-record laws, agencies must publish “substantive rules of general applicability,” policy statements,²⁹⁰ and interpretative rules, even if some of those rules are not published for notice-and-comment.²⁹¹ Agencies must also make records available to the public for inspection.²⁹² Records subject to inspection include electronic and digital materials compiled by the government.²⁹³ These public-access requirements guard against the dangers of secret and unchecked government.²⁹⁴

Automated public benefits systems arguably flout these transparency mandates. For instance, the source code of CBMS has not been published for review.²⁹⁵ Although FOIA exempts “trade secrets” from its disclosure

288. 5 U.S.C. § 552 (a)(2), (b) (2000 & Supp. IV 2004) (requiring every agency to make available for public inspection and copying, inter alia, statements of policy, interpretations not published in Federal Registry, and administrative staff manuals with narrow exceptions that do not include benefits information).

289. 7 C.F.R. §§ 271.3, 271.4, 272.4(c), 273.15(p) (2007).

290. “Policy statements” announce an agency’s tentative intentions for the future without binding the agency. *Am. Hosp. Ass’n v. Bowen*, 834 F.2d 1037, 1046 (D.C. Cir. 1987). They are not supposed to establish binding norms. *Id.*; see Anthony, *supra* note 277, at 1372–73 (raising concerns that policy statements do, in fact, create norms).

291. 5 U.S.C. § 552(a)(1)(D) (2000 & Supp. IV 2004); see e.g., TEX. GOV’T CODE ANN. §552.022(a)(10) (Vernon 2004); REVISED MODEL STATE ADMIN. PROCEDURE ACT §§ 201(d), 801 (Annual Meeting Draft 2006) (proposed electronic publication rule). All fifty states currently have open-records laws. Michael Hoefges, Martin E. Halstuk & Bill F. Chamberlin, *Privacy Rights Versus FOIA Disclosure Policy: The “Uses and Effects” Double Standard in Access to Personally-Identifiable Information in Government Records*, 12 WM. & MARY BILL RTS. J. 1, 2 n.3 (2003).

292. 5 U.S.C. § 552(a)(3) (2000 & Supp. IV 2004); see REVISED MODEL STATE ADMIN. PROCEDURE ACT § 201(f) (Annual Meeting Draft July 2006) (proposing a requirement that agencies make available for public inspection and copying portions of administrative bulletin and code used in discharge of agency functions). Congress included nine exemptions to FOIA, two of which allow agencies to withhold information to protect the personal privacy of individuals identified in records and databases. 5 U.S.C. §§ 552(b)(6)–(7) (2000 & Supp. IV 2004); see also U.S. DEP’T OF JUSTICE, FREEDOM OF INFORMATION ACT GUIDE 540 (2007) available at http://www.usdoj.gov/oip/foia_guide07.htm (describing exemptions 6 and 7(c)).

293. Electronic Freedom of Information Act Amendments of 1996, Pub. L. No. 104-231, § 3, 110 Stat. 3048, 3049 (1996) (amending 42 U.S.C. § 552(f)).

294. Matthew Diller, *The Revolution in Welfare Administration: Rules, Discretion, and Entrepreneurial Government*, 75 N.Y.U. L. REV. 1121 (2000).

295. Interview with Andy Bardwell, *supra* note 241. Although the artificial language of computer code may be incomprehensible to the average person, interested groups could hire experts who would be able to read a system’s “rules base” and “rules engine.” See text accompanying notes 61–64 (describing “rules-based” systems).

requirements,²⁹⁶ that exception is inapplicable to CBMS's decision tables because agency personnel built this portion of the source code.²⁹⁷

The source codes for systems built exclusively by private vendors, such as TIERS and CalWIN, might qualify for FOIA's "trade secret" exemption.²⁹⁸ Interestingly, state agencies have refused FOIA requests for the source code of privately built benefits systems on different, and less persuasive, grounds. For instance, the Texas Health and Human Services Commission (HHSC) rejected a FOIA request to produce the "logical data model" for TIERS on the grounds that computer source code did not constitute public information.²⁹⁹ HHSC argued that the TIERS code had no significance other than as a tool to maintain, manipulate, or protect client data.³⁰⁰ The Office of the Texas Attorney General agreed, finding that producing the code would divulge "confidential client information."³⁰¹

Contrary to the Texas Attorney General's position, no sensitive personal information would be revealed in the release of the source code of the system's rules base, which embeds policy, or of its rules engine, which provides the system's logic. Although the trade secrets exception to FOIA might exempt the disclosure of an automated system's source code, concerns about the release of sensitive client information should not. Moreover, even if the trade secrets exemption applies here, the refusal to produce the code of automated decision-making systems allows agencies to enforce laws that no one can see or monitor, which is the very antithesis of open government.³⁰²

296. 5 U.S.C. § 552(b)(4) (2000 & Supp. IV 2004).

297. See *supra* notes 65–67 and accompanying text.

298. See *supra* notes 135–43 and accompanying text (describing TIERS and CalWIN).

299. Tex. Att'y Gen., Open Records Ltr. Rul., OR2004-8070 (Sept. 21, 2004), available at <http://www.oag.state.tx.us/opinions/openrecords/50abbott/orl/2004/hm/or200408070.htm>. The information technology companies that design and maintain the vast majority of the automated public benefit systems would likely refuse to release the code. Their refusal might stem from a fear that competitors might use the data models and source codes to provide more improved systems. Cf. David A. Super, *Privatization, Policy Paralysis, and the Poor: The Third Wave of Challenges to Public Benefit Programs*, CAL. L. REV. (forthcoming 2008).

300. Tex. Att'y Gen., Open Records Ltr. Rul., *supra* note 299.

301. *Id.* (ruling that TIERS data model is not subject to TEX. GOV'T CODE ANN. § 552.002).

302. Computer programmers also arguably comprise advisory committees subject to the transparency requirements of the Federal Advisory Committee Act (FACA). FACA requires advisory committees—those "established or utilized" by the President or an agency for advisory purposes—to open their meetings, minutes, reports, and records to the public. 5 U.S.C. app. §§ 3(2), 10(a), 10(b) (2000). Courts exempt government contractors from FACA's mandates because procurement regulations impose transparency requirements on contractors in order to prevent the misuse of government resources. *Food Chem. News v. Young*, 900 F.2d 328, 331 (D.C. Cir. 1990) (citing H.R. REP. NO. 1403-92, at 2 (1972) (Conf. Rep.)). An argument can be made that the contractors here—computer programmers—should not fall within that exemption. Unlike the transparency provided by the contracting process that the FACA exemption addresses, here, the key issue is the opaque nature of

c. Questionable Delegations of Power

Automated systems can be conceptualized as de facto delegations of rulemaking power. Congress has vested in state officials the power to implement and enforce federal programs providing Medicaid, food stamps, and other public benefits.³⁰³ State agencies, in turn, have enlisted information technology consultants to encode policy into decision-making programs. Agencies inadvertently give rulemaking power to computer programmers who can, and do, alter established policy when embedding it into code.

Automation raises a unique but parallel set of issues to those that the courts addressed in another era involving delegations to administrative agencies. In the 1930s, the Supreme Court raised concerns about the lack of political accountability in Congress's sweeping delegations to the executive branch. In two 1935 cases, the Court required Congress to set meaningful limits on the discretion afforded agencies.³⁰⁴ The Court has since set the bar very low for what constitutes a sufficient limitation,³⁰⁵

the advice that software engineers provide in embedding new rules into an automated system's code. Such programmers do not solely execute policy. Instead, they effectively provide advice to the agency by changing established policy in the course of translating it into computer language and encoding it. That advice is, in turn, adopted by the agency through its automated decision system. Because FACA aims to secure transparency in the policy advice given to agencies, the spirit of the statute counsels its applicability to the consultants that design automated systems like the Federal Parent Locator Service. See A. Michael Froomkin, *Wrong Turn in Cyberspace: Using ICANN to Route Around the APA and the Constitution*, 50 DUKE L.J. 17, 139 (2000) (questioning whether private company running ICANN on behalf of Department of Commerce should be covered by FACA's mandates).

303. For instance, Congress has delegated substantial authority to the states to administer Medicaid. 42 U.S.C. §§ 1396–1396s (2000). Although the Medicaid statute establishes binding policy, 42 U.S.C. § 1396a(a) (2000), and the Secretary of Health and Human Services issues regulations expanding them, 42 C.F.R. pt. 430–56 (2006), participating states must design programs that lay out the conditions of eligibility and covered services. 42 C.F.R. § 430.0 (2006).

304. *Panama Refining Co. v. Ryan*, 293 U.S. 388 (1935) (invalidating a section of National Industrial Recovery Act that delegated power to prohibit shipment of “hot oil” in interstate commerce to President because the statute failed to provide standard governing when the President could exercise that power); *A.L.A. Schechter Poultry Corp. v. United States*, 295 U.S. 495, 541–42 (1935) (striking down delegation to President and groups of private citizens the power to prescribe codes governing businesses subject to federal authority because statute “does not undertake to prescribe rules of conduct to be applied to particular states of fact determined by appropriate administrative procedure”). As John Hart Ely explains, the fundamental principle of nondelegation is the accountability of government decision making. ELY, *supra* note 4, at 132–33; see also Froomkin, *supra* note 302, at 146 (exploring how nondelegation doctrine aims to ensure that “public power is exercised in a manner that makes it both formally and, insofar as possible, actually accountable to elected officials, and through them—we hope—to the electorate”); Cass R. Sunstein, *Is the Clean Air Act Unconstitutional?*, 98 MICH. L. REV. 303, 335–37 (1999) (contending that constitutional goal of ensuring an accountable deliberative democracy and concern for the rule of law animate nondelegation theory).

305. *Yakus v. United States*, 321 U.S. 414, 424–26 (1944) (“Only if we could say that there is an absence of standards for the guidance of the Administrator’s action, so that it would be impossible in a

and the APA's procedural constraints on the exercise of delegated discretion have effectively replaced the nondelegation doctrine.³⁰⁶ The Court, however, has never abandoned the nondelegation doctrine, and some state courts have enforced more robust versions of it.³⁰⁷

Automated systems impose accountability deficits that administrative procedures cannot remedy. Because the policies embedded in code are invisible, administrators cannot detect when the rules in an automated system depart from formal policy.³⁰⁸ As a result, presidentially or gubernatorially appointed agency heads cannot meaningfully review programmers' actions.³⁰⁹ Not surprisingly, administrators fail to provide the procedural safeguards that are typically applied to rulemaking.³¹⁰ Although administrators are politically accountable due to their relationships with elected officials, administrators cannot meaningfully review or provide political legitimacy to changes in rules that they cannot see and did not propose.³¹¹

proper proceeding to ascertain whether the will of Congress has been obeyed, would we be justified in overriding its choices of means for effecting its declared purpose[s] . . ."). Since 1935, as part of a shift supporting the developing welfare state, courts have tolerated broad delegations to coequal branches and to private parties so long as Congress articulated sufficiently "intelligible principles" to guide them. Jody Freeman, *The Private Role in Public Governance*, 75 N.Y.U. L. REV. 543, 580 (2000); e.g., *Whitman v. Am. Trucking Ass'n*, 531 U.S. 457, 472–75 (2001) (upholding § 109(b)(1) of the Clean Air Act that required EPA to set air pollution standards to levels "requisite" to protect public health as sufficiently "intelligible principle" so as not to offend nondelegation doctrine).

306. E.g., *Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 850 (D.C. Cir. 1970) (emphasizing importance of rule of law in administrative process); *Amalgamated Meat Cutters v. Connally*, 337 F. Supp. 737, 759–63 (D.D.C. 1971) (upholding broad delegation of authority to President because, in part, administrative procedures would provide check on executive action); see also KENNETH CULP DAVIS, *DISCRETIONARY JUSTICE: A PRELIMINARY INQUIRY* 50 (2d ed. 1977) (explaining that any "hope" to address dangers of delegation should be directed to ensuring that administrators clarify standards they use).

307. See, e.g., *Boreali v. Axelrod*, 517 N.E.2d 1350, 1356 (N.Y. 1987) (finding Public Health Council exceeded scope of authority delegated to it by legislature).

308. See *Froomkin*, *supra* note 302, at 142–43 (arguing that Department of Commerce's handing over power to ICANN to regulate Internet violates private nondelegation doctrine because Department of Commerce did not retain right to review ICANN's decisions and because Congress did not clearly authorize handing over policymaking to private group but instead agency did so via contract); see also *FM Props. Operating Co. v. City of Austin*, 22 S.W.3d 868, 875–80 (Tex. 2000) (ruling that private delegations deserve more searching scrutiny under eight-part test).

309. See *Texas Boll Weevil Eradication Found., Inc. v. Lewellen*, 952 S.W.2d 454, 473–77 (Tex. 1997) (striking down delegation to private group because private delegate's actions were not subject to meaningful review by state agency and delegate had personal interest which might be inconsistent with public interest). Concerns about accountability would also be true if an agency's information technology specialists, who wrote the code, had no policy experience.

310. See *supra* notes 270–85 (discussing lack of notice-and-comment participation and FOIA compliance).

311. See *Chevron U.S.A., Inc. v. Natural Res. Def. Council, Inc.* 467 U.S. 837, 865 (1984) ("While agencies are not directly accountable to the people, the Chief Executive is, and it is entirely appropriate for this political branch of the Government to make such policy choices . . ."); JERRY L.

Jody Freeman, Gillian Metzger, David Super, and others are engaged in a parallel enterprise to identify appropriate standards for delegations of public power to private contractors.³¹² Conventionally, the nondelegation doctrine has been understood as having two components—one limiting delegations to public entities, and the other limiting delegations to private parties.³¹³ Today, the nondelegation doctrine should be viewed as having three parts. Automation produces a new delegation of legislative power to automated systems and their designers—a delegation that needs to be addressed.

This third component of the nondelegation doctrine borrows from each of the other two, as code is often created by a mix of public and private programmers. Delegations to computer systems and their programmers, however, are more troubling than delegations to private contractors. The type of private delegation addressed by scholars often involves individuals or entities that arguably can be viewed as having some expertise in carrying out policy objectives, such as doctors in hospitals interpreting Medicaid regulations.³¹⁴ By contrast, code writers lack policy expertise.

Today's society requires expertise on technical matters, an expertise that agencies can provide and that the public does not possess.³¹⁵ As Justice Stephen Breyer explains, a workable democracy requires "striking a balance—some delegation, but not too much . . . [thereby] avoid[ing] conflict between democracy and administration."³¹⁶ But programmers who build code and design algorithms have no authority to engage in policymaking. In fact, their mistakes work to essentially, albeit unintentionally, usurp an agency's own expertise and delegated

MASHAW, GREED, CHAOS, AND GOVERNANCE: USING PUBLIC CHOICE TO IMPROVE PUBLIC LAW 145–57 (1997) (arguing that agency heads are accountable to elected President); *see also* Jerry L. Mashaw, *Accountability and Institutional Design: Some Thoughts on the Grammar of Governance*, in PUBLIC ACCOUNTABILITY: DESIGNS, DILEMMAS AND EXPERIENCES 115, 136–37 (Michael W. Dowdle ed., 2006) (discussing impact of opacity on accountability).

312. *See* Freeman, *supra* note 305, at 664–65 (proposing a mix of formal and informal mechanisms to ensure accountability, transparency, and rationality of private actors involved in governance and policy interpretation); Gillian E. Metzger, *Privatization As Delegation*, 103 COLUM. L. REV. 1367 (2003); Super, *supra* note 299 (arguing that dismantling agencies that deliver public benefits in favor of privatization is ill-advised under the theory of the firm); Harold J. Krent, *Fragmenting the Unitary Executive: Congressional Delegations of Administrative Authority Outside the Federal Government*, 85 NW. U. L. REV. 62 (1990).

313. Froomkin, *supra* note 302, at 143–44.

314. Freeman, *supra* note 305, at 614, 643.

315. STEPHEN BREYER, *ACTIVE LIBERTY: INTERPRETING OUR DEMOCRATIC CONSTITUTION* 102 (2005).

316. *Id.*

authority.³¹⁷ The rulemaking power that programmers inadvertently wield thus defies the democratic origins and purposes of delegation.

More generally, the delegation of public power to code writers offends rule-of-law principles.³¹⁸ The rule of law requires that legal directives be “duly authorized.”³¹⁹ Laws should be clear and accessible so that those subject to them can know and understand their content.³²⁰ But neither concern is met here. When computer programmers establish new rules, it is often by accident or convenience, not as the result of a thoughtful delegation of public power. Encoded rules that change established policy cannot be understood by affected individuals or reviewed by more democratically accountable superiors.³²¹ In that regard, rulemaking by code writers is *ultra vires* even as it is inevitable.

d. Expertise and Discretion

Even if computer programmers minimized, or somehow even eliminated, code’s deviation from established policy in a manner that dispels accountability and transparency concerns, the automation of administrative law poses other problems. Automation encourages agencies to adopt overly simplified policy, which can more easily be translated into code.³²² This forfeits much of the policy expertise that agencies offer.³²³

Automation, in time, will be a driving force in the retreat from the discretionary model of administrative law.³²⁴ Although automation may be a superior alternative to discretion in many instances, it would be a

317. See Citron, *supra* note 32.

318. See Richard B. Stewart, *Administrative Law in the Twenty-First Century*, 78 N.Y.U. L. REV. 437, 438 (2003) (“The traditional core of administrative law has focused on securing the rule of law and protecting liberty by ensuring that agencies follow . . . decisional procedures, act within bounds of statutory authority delegated by legislature, and respect private rights.”).

319. Robert S. Summers, *The Principles of the Rule of Law*, 74 NOTRE DAME L. REV. 1691, 1693 (1999).

320. See LON L. FULLER, *THE MORALITY OF LAW* 98 (rev. ed. 1969).

321. H.L.A. HART, *THE CONCEPT OF LAW* 124 (2d ed. 1994) (speaking of rules “which multitudes of individuals could understand” and without which law could not exist); FULLER, *supra* note 320, at 63 (discussing law’s clarity).

322. Cf. Henry H. Perritt, Jr., *The Electronic Agency and the Traditional Paradigms of Administrative Law*, 44 ADMIN. L. REV. 79, 96–98 (1992) (predicting that because automation hardens rules, automation of administrative law would make rules difficult to apply flexibly).

323. FRANCIS E. ROURKE, *BUREAUCRACY, POLITICS, AND PUBLIC POLICY* 15 (2d ed. 1976) (“[D]ealing day in and day out with the same tasks gives public agencies an invaluable kind of practical knowledge that comes from experience.”); BREYER, *supra* note 315, at 102–03.

324. See Diller, *supra* note 294, at 1125; David A. Super, *Offering an Invisible Hand: The Rise of the Personal Choice Model for Rationing Public Benefits*, 113 YALE L.J. 815 (2004).

mistake to completely eradicate all discretion.³²⁵ Kenneth Culp Davis's declaration that discretion is a "principal source of creativeness" in government remains true.³²⁶ Automation should be pursued only after a careful assessment of all risks. Part III provides a framework to assess the risks that may result from choosing complete automation over human discretion.

C. Meaningful Judicial Review in Jeopardy

For the reasons articulated above, code alters policy without transparency or participation. The process by which programmers produce those changes, in turn, may be so divorced from reasoned policy analysis that it amounts to "arbitrary and capricious" action or an "abuse of discretion." Policy, as embedded in code, could do a number of things. It could violate federal law. It could alter established rules. It could change existing interpretative rules. It could embed distorted policy statements. The opacity of software, however, makes it impossible to tell exactly what the code has accomplished. Because courts cannot see the rules that were actually applied in a given case, meaningful judicial review is impaired.

Even if the court could somehow discover that code has effectively established a new rule, there would be no record supporting the policy change. The Supreme Court has long required contemporaneous records of agency decision making to facilitate judicial review.³²⁷ Without such a record, courts cannot determine if an agency has abused its discretion in its interpretation of policy or if it based the rule on inappropriate factors.³²⁸

Courts certainly could find encoded policy to be an abuse of discretion without knowing the agency's reasons behind it. Indeed, a court can find an agency's decision arbitrary and capricious precisely because the agency has offered little or no reason for its rule.³²⁹ Under conventional doctrine, a

325. Diller, *supra* note 294, at 1126 (discussing problems with new discretionary model for administration of public benefits as eligibility workers lack professional norms they once possessed).

326. DAVIS, *supra* note 306, at 15 (explaining that discretion has significant value as well as perils, and thus key task is to figure out discretion we ought to discard or that we should impose).

327. Perritt, Jr., *supra* note 322, at 89 ("Judicial review necessitates a 'record' of agency decisionmaking."); Verkuil, *supra* note 282, at 790. *See also* Gordon G. Young, *Judicial Review of Informal Agency Action on the Fiftieth Anniversary of the APA: The Alleged Demise and Actual Status of Overton Park's Requirement of Judicial Review "On the Record,"* 10 ADMIN. L.J. AM. U. 179 (1996).

328. 5 U.S.C. § 706 (2000); 2 DAVIS & PIERCE, *supra* note 4, § 11.5, at 204 ("An agency action that constitutes an unexplained departure from precedent must be reversed as arbitrary and capricious . . .").

329. *Motor Vehicles Mfrs. Ass'n v. State Farm Mutual Auto. Ins. Co.*, 463 U.S. 29, 46-48 (1983) (deeming agency rescission of rule arbitrary and capricious on the grounds that agency failed to

computerized system would fail this test automatically if contemporaneous explanations for changed rules are absent.

After an automated system has failed, and aggrieved individuals have filed lawsuits, agency heads could consult with programmers and bureaucrats to ascertain why a certain rule was encoded. But administrative law does not recognize post-hoc rationalizations of agency actions.³³⁰ As the Court has held since the first *Chenery*³³¹ case, the “grounds upon which an administrative action must be judged are those upon which the record discloses that its action was based.”³³² Precluding such after-the-fact explanations ensures that agencies carefully weigh policies before imposing them on the public.

If the court finds that code has effectively created new policy, no deference should be accorded the agency’s action. In *United States v. Mead Corp.*, the Supreme Court denied *Chevron* deference to the voluminous work of low-level functionaries whose work Congress could not plausibly have intended to have the “force of law.”³³³ *Mead* suggested that formal adjudication, formal or informal rulemaking, or some indication in the particular statutory scheme that the agency could make legally binding policy through other means was necessary to receive deference.³³⁴ None of these indications are typically present when programmers change policy in building code. Absent *Chevron* deference, courts afford the less-powerful *Skidmore* deference to the extent that agency policy has the “power to persuade.”³³⁵ Yet code writers typically leave no contemporaneous explanation of their actions that might have the potential to persuade under *Skidmore*.

Normatively, then, policy changes accomplished through code should be reviewed with no deference at all. In practice, however, the reverse is true. Because code is hard to unearth, and because of automation bias, encoded policy tends to receive even more powerful deference than that provided under *Chevron*.

provide factual or evidentiary support for rule); *cf.* *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402, 419–20 (1971) (finding agency’s decision to build highway through park arbitrary and capricious after hearing because agency failed to explain its decision).

330. *Camp v. Pitts*, 411 U.S. 138, 142 (1973) (“[T]he focal point for judicial review should be the administrative record already in existence, not some new record made initially in the reviewing court.”).

331. *SEC v. Chenery Corp.*, 318 U.S. 80 (1943).

332. *Id.* at 94; *Dia v. Ashcroft*, 353 F.3d 228, 242 (3d Cir. 2003).

333. *United States v. Mead Corp.*, 533 U.S. 218, 233–34 (2001).

334. *Id.* at 230–32.

335. *Christensen v. Harris County*, 529 U.S. 576, 587 (2000) (internal citations omitted).

Automated systems also generate erroneous adjudications that escape judicial review. An automated decision about an individual's Medicaid benefits is an amalgam of different factual determinations. Claimants and others report critical information to eligibility workers. Oftentimes, a claimant tells information to a variety of workers at different times. Those workers interpret that information and enter conclusions into systems that do not record the specifics of the information or the identity of those who assessed and entered it. Because the system does not retain the individual's data, and because the system does not record the worker's impressions, that information is effectively lost. Although hearing officers are typically tasked with reviewing automated decisions regarding public benefits *de novo*,³³⁶ the factual predicates for those decisions cannot be reviewed.³³⁷

Similarly, an automated system offering finite choices to users effectively forces its users to guess the category under which their information falls. A poorly expressed question presents the risk that a decision will be made without sufficient information and without awareness that further information is needed for the decision-making process.³³⁸ Errors that occur when an individual fails to submit certain information will be almost impossible to review administratively or judicially because no record exists of the information that an individual attempted to communicate or was not prompted to communicate.³³⁹ As a result, a system's design may create unreviewable problems for individuals.

Automation jeopardizes due process values, falsifies the central assumptions of administrative law, and subverts much of the social contract underlying the expansion of the administrative state. The loss of such procedural safeguards cannot stand. The next Part lays out a new framework to secure technological due process for the automated administrative state.

336. 5 U.S.C. § 706 (2000).

337. *Universal Camera Corp. v. NLRB*, 340 U.S. 474 (1951).

338. *AUS. ADM. REV.*, *AUTOMATED ASSISTANCE*, *supra* note 69, at 26.

339. *Cf. Diller*, *supra* note 294, at 1201 (noting that techniques that case workers use to dissuade applicants from pursuing benefits are insulated from review as agency never denied applicants benefits and thus no decisions exist from which the applicants could appeal).

III. THE CASE FOR TECHNOLOGICAL DUE PROCESS

Legal scholars and systems experts must work together to shape the contours of due process in this automated age. This Part contributes to that effort. At the threshold, it draws upon the rules-versus-standards literature to provide a systematic approach to deciding between automation and human discretion. It reconceives procedural guarantees for the automated age by providing mechanisms to vindicate the norms of due process and rulemaking.

A. Rules and Standards

Law can take the form of rules, standards, or combinations of each.³⁴⁰ A rule prescribes *ex ante* an outcome for a particular fact scenario.³⁴¹ A fifty-mile-per-hour speed limit, for instance, operates as a rule that a police officer or clerk cannot change.³⁴² On the other hand, a standard requires decision makers to exercise discretion, applying *ex post* policies to events.³⁴³ A standard might ask a decision maker to assess whether a person drove at a speed that was reasonable under the circumstances.³⁴⁴

340. HENRY M. HART, JR. & ALBERT M. SACKS, *THE LEGAL PROCESS: BASIC PROBLEMS IN THE MAKING AND APPLICATION OF LAW* (William N. Eskridge, Jr. & Philip P. Frickey eds., 1994). Theorists express dissatisfaction with the rules/standards nomenclature. See RONALD DWORKIN, *TAKING RIGHTS SERIOUSLY* 22–28, 72–80 (1978) (calling rules “rules” and standards “principles”); FREDERICK SCHAUER, *PLAYING BY THE RULES: A PHILOSOPHICAL EXAMINATION OF RULE-BASED DECISION-MAKING IN LAW AND IN LIFE* 12–15 (1991); Duncan Kennedy, *Form and Substance in Private Law Adjudication*, 89 HARV. L. REV. 1685, 1687–1713 (1976). Given the purposes at hand, this Article recognizes, but declines to join, this discussion.

341. See DWORKIN, *supra* note 340, at 24; Kathleen M. Sullivan, *The Supreme Court, 1991 Term—Foreword: The Justices of Rules and Standards*, 106 HARV. L. REV. 22, 58 (1992).

342. HART & SACKS, *supra* note 340, at 139; Sullivan, *supra* note 341, at 57–58. Interpretive practices turn a rule-like provision into something that affords discretion to decision makers. Cass R. Sunstein, *Problems with Rules*, 83 CAL. L. REV. 953, 960–65 (1995) (explaining that police officers exercise independent judgment in determining whether individuals have transgressed the speed limit).

343. Sunstein, *supra* note 342, at 964–65.

344. HART & SACKS, *supra* note 340, at 140. Administrative and constitutional law often combine rules and standards. For instance, procedural due process mandates notice and an opportunity to be heard. Although notice and hearings constitute rules, courts determine the contours of such requirements through standards. Those standards, in turn, may include subsidiary rules. For example, the Court in *Withrow v. Larkin*, 421 U.S. 35, 49 (1975), provided a *per se* rule for the impartiality of decision makers.

Rules and standards have different goals.³⁴⁵ Rules establish basic instructions for behavior.³⁴⁶ They facilitate predictability.³⁴⁷ Because rules provide notice of the consequences attached to an activity, the public can order its affairs accordingly.³⁴⁸ Rules promote fairness by requiring consistent treatment of similar cases.³⁴⁹ They prevent decision makers from basing decisions on parties' perceived attractive qualities.³⁵⁰ Rules cut the costs of decision making by eliminating the need to reconsider recurring issues.³⁵¹

Standards, on the other hand, permit decision makers to tailor an outcome to the facts, increasing the likelihood of an "ideal" ruling.³⁵² They can account for changing circumstances brought about by technology.³⁵³ Standards also force decision makers to articulate their choices, increasing the chance that they will "make visible and accountable the inevitable weighing process that rules obscure."³⁵⁴

345. *E.g.*, DAVIS, *supra* note 306, at 35; DWORKIN, *supra* note 340, at 17–39 (outlining theory of law based on rules, principles, policies, and standards); SCHAUER, *supra* note 340, at xv. This Article does not provide an exhaustive account of this important debate. Instead, it aims to capture certain features of rules and standards that will be helpful in directing an agency's choice between rules and standards in automation decisions and in finding surrogate mechanisms for the automated administrative state.

346. Edward Lee, *Rules and Standards for Cyberspace*, 77 NOTRE DAME L. REV. 1275, 1313 (2002) ("Rules can serve a useful purpose in establishing stability and basic 'ground rules' for the Internet.")

347. *E.g.*, Antonin Scalia, *The Rule of Law as a Law of Rules*, 56 U. CHI. L. REV. 1175, 1177 (1989); Kennedy, *supra* note 340, at 1688–89.

348. FRIEDRICH A. HAYEK, *THE ROAD TO SERFDOM* 72–73 (1944).

349. Scalia, *supra* note 347, at 1178 ("When a case is accorded a different disposition from an earlier one, it is important, if the system of justice is to be respected, not only that the later case *be* different, but that it *be seen to be so.*"); FULLER, *supra* note 320, at 39.

350. Sullivan, *supra* note 341, at 62; Sunstein, *supra* note 342, at 974 (explaining that rules can counteract bias, favoritism, and discrimination by decision maker).

351. SCHAUER, *supra* note 340, at 147; Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557, 621 (1992).

352. SCHAUER, *supra* note 340, at 98. Frederick Schauer explains that unlike standards, a literal application of rules runs the risk of "causing the rule to collapse into its underlying justification." *Id.* at 63; Kennedy, *supra* note 340, at 377–91 (arguing that rule application can produce arbitrary or irrational results given substantive ends sought to be realized). For instance, a rigid rule may not fit a particular scenario but a bureaucrat may be forced to enforce it without the power to make its application sensible. DAVIS, *supra* note 306, at 52.

353. Lawrence Lessig, *The Path of Cyberlaw*, 104 YALE L.J. 1743, 1744–45 (1995).

354. Davis, *supra* note 306, at 67; Wallace Mendelson, *On the Meaning of the First Amendment: Absolutes in the Balance*, 50 CAL. L. REV. 821, 825 (1962) ("Open balancing compels a judge to take full responsibility for his decisions, and promises a particularized, rational account of how he arrives at them—more particularized and more rational at least than the familiar parade of . . . elastic absolutes . . .").

The proper division of law's work between rules and standards has been one of the most hotly debated topics in jurisprudence.³⁵⁵ The emergence of automation threatens to overwhelm this debate by giving rules a huge, and often decisive, advantage on the basis of cost and convenience rather than the desirability of the substantive results they produce.³⁵⁶

The next section provides a framework to navigate between automation and discretion in order to avoid the loss of human discretion simply for efficiency's sake.

B. Automation and Discretion

Agencies may be inclined to automate many of their policies and to adopt policies that can be easily automated. Certainly those who trumpet automation's cost savings, responsiveness, and consistency urge this result.³⁵⁷ But agencies should follow a more systematic approach to pursuing automation at the expense of human discretion. The rules-versus-standards literature can help guide an agency's initial decisions with regard to automation.

Automated systems inherently apply rules because software predetermines an outcome for a set of facts.³⁵⁸ Thus, an agency's choice to automate current policies or to adopt new ones that can be automated constitutes a decision to govern through rules. As the rules-versus-standards literature implies, well-implemented automation is preferable to human discretion where the need for consistency outweighs the value of human discretion. Automation is more attractive where the risks associated with human bias outweigh that of automation bias. It is advantageous when an issue does not require the exercise of situation-specific discretion.³⁵⁹

355. See, e.g., Lessig, *supra* note 353, at 1744–45 (arguing that cyberspace should not be governed by rules due to rapid changes in the Internet); Jerry Kang, *Cyber-Race*, 113 HARV. L. REV. 1130, 1188 (2000) (“Cyberspace is too novel and dynamic a medium for anyone to be confident that she has gotten policy just right.”).

356. As Professors Lawrence Lessig and Jerry Kang note, the digital age may be far better suited to governance by standards in situations where rapidly changing technologies will render rules obsolete. See *supra* note 355. This concern certainly applies for any solutions suggested to address the automated administrative state where best practices may be subject to change. This Part addresses this concern where it is relevant.

357. See EGGERS, *supra* note 18, at 22–27, 118.

358. Grimmelmann, *supra* note 29, at 1732 (“Because software is automated, it operates without human discretion.”).

359. *Id.*; see JAMES Q. WILSON, BUREAUCRACY: WHAT GOVERNMENT AGENCIES DO AND WHY THEY DO IT 54 (rev. ed. 2000) (explaining that operators who enter data on social security earnings

Decisions best addressed with standards should not be automated.³⁶⁰ Policies that explicitly or implicitly require the exercise of human discretion cannot be automated.³⁶¹ For instance, agencies should not automate policies that allow individuals to plead extenuating circumstances that software cannot anticipate.³⁶² Legal materials providing that a “decision maker may” take a given action explicitly signal that automation is inappropriate.³⁶³ Others implicitly do so by including indeterminate terms that require decision makers to consider conflicting norms that resist precise weighting.³⁶⁴

Some may suggest that a preservation of discretion in decision-making systems merely substitutes a programmer’s policy distortions with a human operator’s prejudice or whim. Indeed, policy distortions in code would be more likely to contain a mix of positive and negative impacts on individuals than would human operators harboring discriminatory motives, who would more consistently harm one group and favor another. Computer systems, however, can be designed to alleviate some of these concerns. Decision systems can outline the factors that operators should consider when making judgments.³⁶⁵ Fields can be created to require operators to enter the reasons for their decisions and to detail the different weight they attached to relevant factors.³⁶⁶ So constructed, decision systems would give operators the opportunity to craft “ideal” rulings while obtaining a degree of transparency about the basis of the operator’s decision.

The next section lays out legal principles for today’s automated systems intended to replace the procedures that automation jeopardizes.

into computers are performing mechanical task that can be replaced by machines).

360. Grimmelmann, *supra* note 29, at 1732. Another consideration should be a rule’s complexity. AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 46. Although “[s]oftware rules can become almost unimaginably complex without their hard edges blurring,” Grimmelmann, *supra*, at 1733, the constrained nature of computer languages may limit a programmer’s ability to accurately capture a rule’s nuances. *See supra* notes 61–62.

361. *See* AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 46.

362. Grimmelmann, *supra* note 29, at 1732–33.

363. AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 43.

364. *See* Peter H. Schuck, *Legal Complexity: Some Causes, Consequences, and Cures*, 42 DUKE L.J. 1, 4 (1992) (describing indeterminate terms as standards); HART, *supra* note 321, at 124–32 (discussing open-textured rules); DAVIS, *supra* note 306, at 78 (explaining that undefined concepts in legislation, such as “undesirable,” confer discretionary power on administrators).

365. AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 38.

366. *Id.* at 23.

C. Procedures Reconceived and Replaced for the Automated State

1. Protecting Individual Rights

Automation jeopardizes the due process guarantees of meaningful notice and opportunity to be heard. Both technological and legal mechanisms can secure meaningful notice, combat automation bias, and enhance the accuracy of decisions about constitutionally significant individual rights.

a. Securing Meaningful Notice

The inadequacy of notice in this automated age must be addressed.³⁶⁷ At a minimum, automated systems should generate audit trails that record the facts and rules supporting their decisions.³⁶⁸ Audit trails should include a comprehensive history of decisions made in a case, including the identity of the individuals who recorded the facts and their assessment of those facts.³⁶⁹ Audit trails should detail the actual rules applied in every mini-decision that the system makes. With audit trails, agencies would have the means to provide individuals with the reasons supporting an automated system's adjudication of their important rights.

Requiring audit trails would adopt a norm that other countries, such as Australia, have embraced.³⁷⁰ It would ensure that agencies uniformly provide detailed notice to individuals, no matter the identity of the private vendor that built the system. A per se requirement would guard against a contractor's inclination to omit this feature as a cost-saving measure. It would facilitate judicial review of the different factual adjudications made by human operators.

Furthermore, audit trails might help to combat a hearing officer's presumption that automated decisions are infallible. By providing a detailed map of a computer's decision-making process, audit trails would

367. In the "No Fly" context, national security concerns may outweigh an individual's right to advanced notice of her "No Fly" status. But in nearly all other instances, courts should insist on strict compliance with notice requirements.

368. See AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 23; WEITZNER ET AL., *supra* note 197, at 4–5 (describing TAMI software architecture that records justifications for data matching and mining "No Fly" determinations to ensure transparency in such systems, including clear view of logical, factual, and legal bases for inferences made by system).

369. AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 23, 48. This can be accomplished by additional prompts that ask operators to describe their thought processes. Some jurisdictions, such as Australia, already provide such prompts to operators. *Id.*

370. *Id.* at 46–47.

encourage officers to critically assess the computer's specific findings. Although developing the capability to produce audit trails would have initial fixed costs, it would have few variable ones.

Individual agencies would naturally determine the precise contours of such audit trails and the notices they generate. Agencies should ensure that their audit trails follow industry best practices.³⁷¹ They, and reviewing courts, should apply the familiar *Mullane* standard to ensure that the system provides sufficient notice.³⁷² This approach would encourage agencies to incorporate advances in the design of audit trails into their systems.

b. Protections for Hearings

Administrative law must confront the automation bias that threatens the impartiality of hearing officers and deprives individuals of meaningful opportunities to be heard.³⁷³ This may be more difficult than avoiding hearing officers' biases for or against particular parties because recusal is unlikely to help. Two rules could be employed to combat such bias.

First, agencies should make it clear to hearing officers that automated systems are fallible.³⁷⁴ To that end, hearing officers should receive explicit training about the phenomenon of automation bias.³⁷⁵ Studies demonstrate that individuals who receive such training are more likely to scrutinize an automated system's suggestions.³⁷⁶ The training of judges has been effective in a parallel enterprise. Special workshops on scientific theory and methodology have provided needed training to federal district court judges charged with assessing the reliability of expert testimony.³⁷⁷

371. A rule prescribing the exact contours of an audit trail would surely be inadvisable given the rapidity of change in technology and industry best practices.

372. See *supra* text accompanying notes 204–06 (discussing due process notice formulation of *Mullane v. Central Hanover Bank & Trust Co.*, 339 U.S. 306, 319 (1950)).

373. See *supra* notes 150–54 and accompanying text (discussing the phenomenon of automation bias and its risks).

374. See John K. Hawley, *Patriot Fratricides: The Human Dimension Lessons of Operation Iraqi Freedom*, FIELD ARTILLERY, Jan.–Feb. 2006, at 18, available at http://sill-www.army.mil/famag/2006/JAN_FEB_2006/JAN_FEB_06_PAGES_18_19.pdf (arguing that soldiers operating automated aircraft systems need to be aware that computerized system is fallible so that soldiers can provide meaningful check on system's decisions).

375. See Skitka et al., *supra* note 151, at 94 (arguing that automation bias can be dispelled by training decision makers about phenomenon).

376. *Id.*; cf. Neil M. Richards, *The Information Privacy Law Project*, 94 GEO. L.J. 1087, 1098–99 (2006) (drawing parallels between movement in antidiscrimination law to redesign workplace design to combat implicit cognitive bias and the response in information privacy scholarship to implicit cognitive limitations of actors in information transactions).

377. Scott Brewer, *Scientific Expert Testimony and Intellectual Due Process*, 107 YALE L.J. 1535,

Second, agencies should require hearing officers to explain, in detail, their reliance on an automated system's decision.³⁷⁸ Officers should identify the computer-generated facts or legal findings on which they relied in making their decisions. This accords with administrative law's longstanding faith in the prophylactic power of requiring explicit statements of reasons. Asking hearing officers to evaluate the basis for their decisions would further mitigate the effects of automation bias.³⁷⁹

Fighting automation bias is a logical next step from *Daubert v. Merrell Dow Pharmaceuticals, Inc.*³⁸⁰ and *Kumho Tire Co. v. Carmichael*.³⁸¹ In those cases, the Court upheld the exclusion of unreliable expert testimony due to the jury's inability to reject evidence carrying the imprimatur of science or engineering.³⁸² If the Seventh Amendment countenances taking issues away from juries due to the risks of scientific bias,³⁸³ surely administrative law can similarly address automation bias. These suggested requirements are certainly less invasive than the exclusion of evidence in *Daubert* and *Kumho*. Requiring warnings and statements of reasons would be the equivalent of cautionary instructions, not flat bans on officers beset by automation bias.

Providing a means to combat the effects of automation bias would not undermine the Court's traditional reluctance to dissect the motives of decision makers. In *United States v. Morgan*,³⁸⁴ an agency head publicly announced his disappointment about the Court's reversal of an earlier decision of his agency.³⁸⁵ Addressing allegations of bias, the Court refused to assess the administrator's convictions on matters of policy.³⁸⁶ The Court reasoned that decision makers are presumed to be persons of "conscience and intellectual discipline."³⁸⁷

The reporting and warning requirements would not transgress the letter or the spirit of *Morgan*. They would not entail an individual assessment of

1677 (1998).

378. Cummings, *supra* note 147, at 4.

379. *Id.* (requiring operators to explain extent to which they relied on automation leads to fewer instances of bias).

380. 509 U.S. 579 (1993).

381. 526 U.S. 137 (1999).

382. *Daubert*, 509 U.S. at 597; *Kumho*, 526 U.S. at 158; see ERICA BEECHER-MONAS, EVALUATING SCIENTIFIC EVIDENCE: AN INTERDISCIPLINARY FRAMEWORK FOR INTELLECTUAL DUE PROCESS 232 (2007) (arguing that judicial gatekeeping of scientific evidence is matter of due process and fairness due to risk of overreliance on junk science by juries).

383. BEECHER-MONAS, *supra* note 382, at 232.

384. 313 U.S. 409 (1941).

385. *Id.* at 420.

386. *Id.* at 420–21.

387. *Id.* at 421.

a particular hearing officer's inclination to adopt computerized decisions. Instead, they would erect safeguards to dispel the influence of automation bias without intruding on and evaluating a particular judge's thought process.

Reconceptualizing the *Mathews* balancing test would also help individuals to receive meaningful hearings. As suggested in Part II,³⁸⁸ the *Mathews* analysis needs a more realistic way to compare the fixed costs of corrective action with the future benefits of that correction.³⁸⁹ The theoretical foundations of *Mathews* would, in turn, reflect the new realities of the automated administrative state. It might countenance requiring additional costs in cases where retrofitting an automated system's reasoning was essential to enabling individuals to address an agency's intended actions.

For instance, a reconceived *Mathews* test might permit hearings on flaws in the CBMS software in a case involving a child whose Medicaid benefits were abruptly terminated. Because CBMS does not generate audit trails, and because automation bias will likely influence the hearing officer, expert testimony would be critical to demonstrate that the computer decision is flawed. If experts discover a distortion in the encoded policy that, once fixed, would avoid errors in thousands of other cases, the *Mathews* analysis might support such additional process. In the "No Fly" context, if independent advisory boards were provided testing data that included false positives, the system might be recalibrated to be more accurate. Coupled with measures to combat automation bias, this approach would vindicate due process values for the automated administrative state.

2. Replacing Rulemaking Procedures

Automated systems must be designed with transparency and accountability as their primary objectives, so as to prevent inadvertent and procedurally defective rulemaking. This approach incorporates several basic norms of behavior.

First, vendors should release systems' source codes to the public.³⁹⁰ Opening up the source code would reveal how a system works.³⁹¹ It would

388. See *supra* text accompanying notes 243–53.

389. See *supra* text accompanying notes 248–50.

390. See Citron, *supra* note 32 (arguing that the release of various information systems' source codes used by agencies, including decision-making systems, would advance various models of the administrative state); Lawrence Lessig, *Open Code and Open Societies*, in PERSPECTIVES ON FREE AND OPEN SOURCE SOFTWARE 358 (Joseph Feller et al. eds., 2005).

shed light on the policies encoded in it.³⁹² The Office of Management and Budget could issue a circular conditioning the provision of federal funding for technology purchases on the use of open code.³⁹³ A state budget office could do the same for local purchases receiving state aid.³⁹⁴ Alternatively, legislators could mandate open code systems.³⁹⁵ Certain systems such as the “No Fly” program, however, might fall outside an open code mandate because public safety concerns might outweigh transparency’s benefits.³⁹⁶

One might argue that the public’s ability to identify encoded policy changes would force agencies to engage in notice-and-comment rulemaking, the costs and delays of which have already caused it to fall into disuse. This concern, however, is inapplicable in cases where the public has identified programming mistakes that can be fixed. For example, a software glitch may have caused CBMS to apply illegal income and asset requirements to breast cancer patients on Medicaid.³⁹⁷ There, the agency programmers may have understood established policy, but nonetheless executed it improperly. An open code system would help ensure the correction of encoded policy without involving expensive rulemaking procedures.

This argument, however, does indeed have force in cases where programmers’ interpretations establish new rules. CBMS’s inquiry about whether individuals seeking food stamps were “beggars” arguably falls into that category.³⁹⁸ Programmers’ translations of policy into code inevitably involve some interpretation, and it would be impossible to force

391. David M. Berry & Giles Moss, *Free and Open-Source Software: Opening and Democratizing e-Government’s Black Box*, 11 INFO. POLITY 21, 23 (2006).

392. Dr. John Henry Clippinger, Senior Fellow at the Berkman Center for Internet & Society at The Harvard Law School and Director of the Open Identity Meta-system, suggests that programmers write the code in natural languages, which lend themselves to policy commands and are easier to read. Comments of Dr. John Henry Clippinger, Podcast, Berkman Center for Internet and Society at Harvard Law School, “Danielle Citron on *Technological Due Process*,” Jan. 15, 2008, <http://blogs.law.harvard.edu/mediaberkman/2008/01/15/danielle-citron-on-technological-due-process-podcast/>.

393. Citron, *supra* note 32.

394. *Id.*

395. See Jyh-An Lee, *New Perspectives on Public Goods Production: Policy Implications of Open Source Software*, 9 VANDERBILT J. OF ENT. & TECH. L. 45, 61 (2006).

396. Citron, *supra* note 32.

397. See *supra* note 133 and accompanying text (discussing programming error that imposed income and asset limits on breast cancer patients on Medicaid in violation of federal and state law).

398. See *supra* note 217 and accompanying text (discussing CBMS inquiry into applicant’s status as a “beggar”). Agency programmers seemingly did not generate notes documenting their thought processes while building the decision tables. My FOIA request for the decision tables and accompanying notes only yielded the decision table fixes that I cite throughout the Article. Such notes, however, would be fruitful in ascertaining whether the question “Are you a beggar?” can be attributed to policy interpretations made by programmers or bureaucrats.

agencies to write rules on every possible interpretation of a rule. But certain interpretations, such as the “beggar” inquiry, arguably exceed what would constitute a permissible interpretation and instead arbitrarily create new rules that deserve notice-and-comment rulemaking.³⁹⁹ If so, an agency should consult with programmers before publishing its notice of proposed rulemaking in order to clearly establish the precise rule that would be automated.

Second, agencies should be required to test a system’s software.⁴⁰⁰ Agencies should maintain testing suites that run expected and unexpected hypothetical scenarios designed by independent policy experts through decision systems to expose distorted policy.⁴⁰¹ Agencies should invest resources into designing such suites, which should include many complex and varied cases with expected outcomes.⁴⁰²

Testing protocols should be run before a system’s launch, during implementation, and every time policies change. Federal procurement regulations could require contracts to specify that decision systems pass testing suites before states can accept systems from vendors.⁴⁰³ This would prevent programmers who otherwise might test a system from foregoing testing in the face of dwindling resources.⁴⁰⁴

Rigorous testing reflects a norm of proper software development.⁴⁰⁵ Testing would help identify and eliminate a programmer’s bias.⁴⁰⁶ It would

399. *See, e.g.*, *Hector v. U.S. Dep’t of Agric.*, 82 F.3d 165, 169–72 (7th Cir. 1996) (striking down interpretative rule imposing eight-foot fence requirement as a procedurally defective rule that required notice-and-comment because interpretation was arbitrary choice that did not necessarily derive from the rule).

400. AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 40, 45; PETE GOODLIFFE, CODE CRAFT: THE PRACTICE OF WRITING EXCELLENT CODE 130 (2007); Mark Underseth, *A Test-Driven Approach to Developing Embedded Software*, EVALUATION ENGINEERING, Apr. 2007, at 44. Testing is a term of art that includes a variety of methodologies. GOODLIFFE, *supra*, at 130. Naturally, the particular type of testing that should be used would be determined by systems specialists who could identify the “best practices” for testing a particular system.

401. *See* Comments of Dr. John Henry Clippinger, *supra* note 392. Although outcome testing cannot cover every possible situation, the Australian government notes that it would test enough scenarios for agencies to have a high level of comfort in the rules embedded in the system. AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 45.

402. To address policy changes and possible leaks to vendors, the contents of the testing suite should be constantly evolving and expanding.

403. I thank my colleague David Super for this insightful point.

404. *See* Terry Shepard, Margaret Lamb, & Diane Kelly, *More Testing Should be Taught*, 44 COMM. OF THE ACM, June 2001, at 103, 104 (explaining that because testing is usually allocated at end of software development process, it bears brunt of resource constraints). It may be worth considering whether the details of testing protocols should be kept confidential to prevent vendors from “teaching” to the test by inserting hidden work-arounds into the system so that it produces the right answers in the testing suite.

405. AUS. ADM. REV., AUTOMATED ASSISTANCE, *supra* note 69, at 21; GOODLIFFE, *supra* note 400, at 130 (explaining that testing is central to building software).

pinpoint policies that have been altered in their translation to code.⁴⁰⁷ Testing would identify software bugs that distort policy. Although testing would not provide all of the benefits of obtaining public comment on proposed rules, it would provide a critical layer of assurance about the content of encoded policy and the algorithms employed by systems.⁴⁰⁸

To be sure, testing would entail fixed costs. But it would add negligible variable ones. It is certainly cheaper, and arguably more precise, to find defects in a computer program's decisions before its implementation than it is to uncover ex post a software program's flaws in individual cases.

Despite the fact that rigorous testing is a baseline requirement of software development, independent contractors did not adequately test CBMS or TIERS before those systems went live.⁴⁰⁹ This caused many of the problems that currently plague those systems. Absent a testing requirement, contractors seeking to submit the lowest bid are unlikely to build testing costs into their project budgets. As state and federal agencies automate more of their decisions, often relying upon many of the same private contractors,⁴¹⁰ a uniform testing rule is essential.

Trial-run testing embodies the notion that the accountability of rulemaking can be replaced with an adjudication involving interested parties. In *NLRB v. Bell Aerospace Co.*,⁴¹¹ the Court allowed the agency to make policy through such adjudications in lieu of formal or informal rulemaking.⁴¹² The Court explained that adjudicative procedures can produce "relevant information necessary to mature and fair consideration of the issues" in the same way that rulemaking generates informed views of affected groups.⁴¹³

Testing would serve as a substitute, albeit an imperfect one, for the interested parties of *Bell Aerospace*. Testing provides a set of hypothetical scenarios to reveal software's flaws.⁴¹⁴ Although broad public

406. Friedman & Nissenbaum, *supra* note 77, at 344 (arguing in favor of rules regarding testing of software to detect programmer bias).

407. GOODLIFFE, *supra* note 400, at 130; Underse, *supra* note 400, at 44.

408. See Grimmelmann, *supra* note 29, at 1738 ("The ambition of software engineering is to remove the most important bugs and reduce the unpredictable errors (i.e., 'wrong' decisions) to a tolerable level, not to eliminate them entirely.").

409. See *supra* notes 139, 145–47 (discussing involvement of EDS and Accenture in building CBMS and TIERS).

410. See *supra* note 65 (detailing role that EDS will play in building future Medicaid automated systems).

411. 416 U.S. 267 (1974).

412. *Id.* at 295.

413. *Id.*

414. Dr. John Henry Clippinger and Gene Koo, Senior Fellow and Fellow, respectively, at the Berkman Center on the Internet and Society at Harvard Law School, both suggested that vendors

participation naturally would not occur in testing regimes, the set of scenarios designed to expose a system's errors would serve as a surrogate for clients adjudicating cases, which would reveal a software flaw.⁴¹⁵

Third, agencies should explore ways to allow the public to participate in the building of automated decision systems. Such participation is not without precedent.⁴¹⁶ For instance, states and localities have established welfare reform boards that create opportunities for the public to participate in setting welfare policy.⁴¹⁷ The City of Denver has a Welfare Reform Board, consisting of appointees of the Mayor, representatives of the business community, service providers, and welfare recipients.⁴¹⁸

In the same vein, agencies could establish information technology review boards that would provide opportunities for stakeholders and the public at large to comment on a system's design and testing. Although finding the ideal makeup and duties of such boards would require some experimentation, they would secure opportunities for interested groups to comment on the construction of automated systems that would have an enormous impact on their communities once operational.

Last, agencies might consider refraining from automating policy that has not undergone formal or informal rulemaking procedures, such as interpretative rules and policy statements. The public and often elected officials have not had the opportunity to respond to these policies.⁴¹⁹ Programmers encoding interpretative rules and policy statements are simply too far removed from the democratic process to justify the significant risk of distorted policy that automation entails.⁴²⁰ Although adherence to rulemaking procedures would not solve the accountability

establish testing suites before a system's official launch. *See* Comments of Dr. John Henry Clippinger and Gene Koo, *supra* note 392. Bureaucrats and interested stakeholders should be permitted to submit unusual scenarios for testing. *Id.* The testing of such scenarios would allow vendors to identify problems that plague these systems. *Id.*

415. Surrogate advocacy plays an important role in administrative law. Because of principles against retroactive application of new policies and doctrines keeping alive mooted disputes capable of repetition yet evading review, some litigants in landmark cases before administrative agencies—and courts—actually have little immediate stake in the outcome of their litigation.

416. Diller, *supra* note 294, at 1213 (giving examples of such public participation in welfare administration).

417. *Id.*

418. *Id.*

419. 5 U.S.C. § 553(b)(A) (2000) (interpretative rules and policy statements are not subject to notice-and-comment requirement); *see supra* notes 285–86 (defining interpretative rules and policy statements).

420. Policy statements also should not be automated because such statements should not be designed to control rights and duties of individuals, which is precisely what automation would accomplish. *See* Anthony, *supra* note 277, at 1315 (arguing that agencies are not entitled to make policy statements binding).

deficit accompanying today's inadvertent delegation of legislative power to code writers, it would allay some of these concerns.

CONCLUSION

This Article engages in a crucial conversation about means to protect our due process values in this age of automation. In an earlier era, legislators and judges embarked on a project to safeguard the interests of individuals without stifling the administrative state's expansion. Their efforts produced the twin procedural regimes governing individual adjudications and policymaking.

Automation demands that we revisit that project. Automation has enormous potential to eliminate persistent errors in human-based systems and to produce consistent decisions. But today's decision systems fail to take advantage of the potential for error correction and indeed become devices for error propagation themselves. This Article offers a model of technological due process that would protect individuals' interest in fair, accountable, and transparent adjudications and rulemaking without forgoing the benefits offered by computerized decision systems.