Procedural Transformation and Regulatory Pathways of Automated Administration in the Digital Age

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Abstract: Automated administration represents a transformative shift...While demonstrating significant potential for enhancing administrative efficiency and standardizing procedural justice, it concurrently presents substantial challenges: on the one hand, it realizes the transformation of efficiency from manual discretion to algorithmic rationality in administrative efficiency, promotes the standardization of procedural justice, and enhances the level of intelligentization of administrative governance; on the other hand, it triggers problems such as weakening of the value of procedures, crisis of procedural legitimacy and failure to adequately safeguard the rights of administrative counterparts. In order to resolve the dilemma, it is imperative to construct 'technical due process', and the specific path includes: strengthening the algorithmic transparency mechanism, realizing the layered disclosure for the public, the administrative relative and the supervisory department; constructing the three-dimensional regulation mode of beforehand, during the process, and after the process, which covers the mechanisms of technical access, procedural participation, and auditing and relief; and designing the graded attribution system to distinguish between technical and managerial faults based on the "dual-order identification" and the "two-step identification" system. The design of a graded system of attribution of responsibility, based on "dual-order identification", distinguishes between technical and managerial faults, and clarifies the responsibilities of different subjects, thus balancing administrative effectiveness and the protection of the rights of the relative, and building a solid institutional foundation for the orderly development of automated administration.

1. Introduction

The 2021 revision of China's Administrative Penalty Law[1], [2], [3], [4] (Article 41) legitimizes automated enforcement. However, cases like Du Baoliang v. Beijing Traffic Management Bureau reveal risks including algorithmic opacity and procedural justice erosion, necessitating regulatory frameworks balancing efficiency and rights.

At present, there is no lack of research and practice in the international community on the topic of automated administration. For example, the "right to algorithmic interpretation" in the European Union's General Data Protection Regulation[5], [6], [7] (GDPR), Articles 13-15 of the GDPR require data controllers, in automated decision-making scenarios, to provide data subjects with "meaningful information about the logic involved in the automated decision", including the "logic, meaning and expected consequences" of the decision. "This includes the "logic, meaning and expected consequences" of the decision. Relatedly, in 2020, the Dutch court in the SyRI case[8], [9], [10] ruled that the government's use of an algorithmic system to screen for social welfare fraud violated Article 8 of the ECHR right to privacy, emphasizing the need for automated decision-making to comply with the principles of transparency and necessity. In addition, U.S. academics have focused on restraining public power algorithms through administrative procedures (e.g., algorithmic impact assessments, bias audits) and judicial review, suggesting that algorithmic decision-making should follow the "due process" requirements of traditional administrative law (e.g., notice, hearing, and relief), but need to adapt to the algorithmic characteristics of the reconstruction criteria, and advocating that the government conduct a review of its algorithms prior to deploying them, modeled on the Environmental Impact Assessment[11], [12] (EIA). It also advocates that the government conduct a

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public assessment before deploying algorithms to analyze their fairness, transparency, and potential risk of discrimination, following the example of the Environmental Impact Assessment (EIA).

This paper starts from the normative system of Article 41 of the Administrative Penalty Law, explains the driving role of automated administration for enhancing administrative efficiency, realizing procedural justice, and improving the level of administrative governance intelligence from the front, and then focuses on the structural change of automated administration, and discusses the procedural rights faced by the process from the weakening of procedural value, the concrete embodiment of procedural due process crisis, and the failure of protection of the relative's rights in the three aspects of procedural rights. Finally, it emphasizes the strengthening of the transparency of algorithmic disclosure in the light of due process and advocates the construction of a three-dimensional regulation model of ex-ante, ex-post and ex-post, and the implementation of a graded system of attribution of responsibility to alleviate the dilemma of the automated administration nowadays.

2. Paradigm Evolution in Digital Administration: the Potential for Process Optimization Driven by Automation Technology

The evolution of automated administration shows a significant positive correlation with the innovation of digital technology. China's e-government has gone through four stages, namely, office automation, the "Three Gold Project", government access to the Internet and primary e-government, and in recent years has entered a new stage in the construction of "digital government". Various regions have launched integrated government service platforms, such as Guangdong Province's "Guangdong Provincial Affairs" and Shanghai's "Apply for Office", to promote the further intelligentization of government services. This technological iteration not only drives the administrative system to continuously deepen the application level of automated administration but also derives its core motivation from the practical value of automated administration in optimizing administrative efficiency. Academic research confirms that information technology and administrative efficiency constitute a dialectical unity of instrumental rationality and value objectives, that is, "administrative organs must follow the principle of high efficiency and convenience of the people in the implementation of administrative behavior, strictly fulfill the requirements of the legal time limit, and through reducing administrative costs and deep integration of modern information technology, to effectively improve the administrative efficiency, and then provide citizens, legal persons and other social subjects with high-quality public services".

2.1 Administrative Leapfrogging: Efficiency Transition from Manual Discretion to Algorithmic Rationality

OECD defines administrative effectiveness as maximizing public benefits through institutional and technological optimization. Automated systems, as seen in Beijing's traffic enforcement (90% efficiency gain), reconstruct information processing through real-time data capture and blockchain storage, achieving triple breakthroughs in capacity, standardization, and procedural optimization.

In order to promote automated administration to help efficiency transformation, it is of the utmost importance to give full play to the governance efficacy of digital technology and data resources, and the key lies in the construction of an institutional framework that is suitable for digital transformation. The systematic reconstruction of administrative procedural evidence rules demonstrates how dual-track governance enhances operational efficiency. In government service delivery, process reengineering has been achieved through integrated digital platforms. Representative cases include Shanghai's 'Apply as You Go' mobile platform, Guangdong's 'Provincial Affairs' system, and Sichuan's 'Tianfu Tongban' smart governance system.

Meanwhile, administrative law enforcement innovations feature Zhejiang's behavioral coding system via its 'Zhejiang Government Nail' collaboration platform. Cross-regional mechanisms have also emerged, particularly in the Yangtze River Delta and Chengdu-Chongqing Economic Circle, where digital technologies enable inter-jurisdictional enforcement coordination. These parallel developments collectively provide empirical foundations for optimizing digital governance systems.

2.2 Standardization of Procedural Justice: Enabling New Horizons

As an important direction of modern administrative reform, automated administration is profoundly changing the mode of operation of traditional administrative procedures. Examined from the perspective of procedural justice, automated administration realizes the standardization, normalization and transparency of administrative procedures through technical means, providing new possibilities for the realization of procedural justice. Procedural justice emphasizes the neutrality, consistency and predictability of the administrative process, while the automated administrative system, through the preset procedural rules and algorithmic logic, has given birth to the "digital governance" as a new type of governance technology and mode, which empowers the public management with digital technology and analyzes and solves the problems of the social reality through the collection, sharing and application of data, realizes the socialization, universalization and transparency of data. Through the collection, sharing and application of data to analyze and solve social realities, has realized the socialization, generalization, precision and rule of law of data, has effectively avoided the bias and arbitrariness caused by human factors, and has made the administrative decisions more objective and fair.

Automated systems enhance procedural equity through standardized data processing that enforces "like cases, like treatment" principles (e.g., intelligent traffic enforcement reducing human error and discretion bias) and blockchain-enabled audit trails aligning with Administrative Procedure Law mandates, as evidenced by Zhejiang's approval systems and Shanghai's blockchain-registered market oversight. While such technical rigidity prevents power abuse through irreversible procedural chains (Beijing's penalty system intercepting 100+ procedural violations), over-reliance on algorithms risks administrative inflexibility, necessitating balanced mechanisms integrating manual intervention spaces, ethical algorithm reviews, and legal safeguards to reconcile technical determinism with discretionary justice.

2.3 Intelligent Administrative Governance: Further Enhancements

With the deep integration of artificial intelligence, big data and Internet of Things technologies, automated administration is reconfiguring the way in which administrative inspections, administrative law enforcement and administrative orders are carried out. This technology-enabled change not only enhances administrative efficiency but also realizes the optimization of resource allocation, the precision of law enforcement and the scientific implementation of orders through intelligent means, marking a profound transformation of administrative governance from "human-intensive" to "technology-enabled".

1) Administrative Inspections: from "Manpower tactics" to "Precision Guidance"

Automated administration overcomes traditional inspection limitations through data-driven risk prediction, transforming governance from indiscriminate checks to targeted interventions. Machine learning analysis of historical enforcement records enables intelligent risk stratification by modeling violation probabilities. Practical applications demonstrate this evolution: Hangzhou's catering supervision system analyzes takeout platform reviews for risk indicators like "diarrhea", cross-referencing business licenses to pinpoint violations with 3.7 times higher detection efficiency than manual methods. Shenzhen's environmental monitoring network integrates satellite, drone, and ground sensors to track industrial emissions continuously, automatically flagging 300+ pollution incidents in 2023, most resolved remotely via digital orders. This machine-vision paradigm transcends human inspectors' spatiotemporal constraints while strengthening evidentiary validity through digital traceability.

2) Administrative Enforcement: from "Empirical Discretion" to "Algorithmic Regulation"

Automation addresses inconsistent legal outcomes through standardized protocols and AI-assisted decision-making. Case applications validate efficacy: Shanghai's 808 low-light traffic cameras supplemented ambient illumination to detect 417,000 violations, while light-free variants handled 2,000 cases without artificial lighting. In tax enforcement, the national intelligent inspection system integrates enterprise filings, banking data, and supply-chain records to construct AI-driven fraud detection models. By digitizing expert experience through big data analytics, the system achieves

multidimensional case analysis covering entity identification, suspicious pattern recognition, and tactical early warnings.

3) Executive Orders: from "Reactive Response" to "Dynamic Regulation"

Automated administrative systems enable dynamic adaptation through real-time analytics and intelligent feedback, contrasting with static rule-based traditional approaches. Empirical validation includes: Hangzhou's urban traffic brain optimized 400+ km of green wave corridors and 600+ variable lanes via intersection-specific flow analysis. Guangdong's smart emergency system preemptively relocated 230,000 residents during Typhoon Terry using predictive modeling. Suzhou's environmental platform implemented digital self-regulation protocols, where enterprises conduct AI-assisted pollution source diagnostics through automated monitoring data parsing.

3. Structural Changes in Smart Governance: the Decline and Reconstruction of Procedural Rights in Algorithmic Administration

Administrative procedure is an effective means of limiting the abuse of administrative power, and procedural due process cannot be disregarded in automated administration because of automatic decision-making. The principle of due process in administrative law originated from "natural justice" in English law and developed in "due process of law" inherited from American law, which can be specifically expressed as "any person who has been punished or subjected to other adverse action has the right to be heard or to be heard", and it has three minimum requirements - procedural neutrality and procedural fairness. The right to a hearing or to be heard", has three minimum requirements - procedural neutrality, procedural participation and procedural openness, which can be specifically extended to avoid bias, administrative participation and administrative openness of the three basic elements. According to this principle, the administrative subject should ensure procedural propriety when exercising the power, explain the basis of the act in advance, meet the requirements of the number of law enforcement personnel, show the relevant documents, respect the relative's right to state, plead, read the file, organize hearings, etc., so as to effectively regulate the abuse of administrative power. However the automated administration of this technology-driven governance model in the simplification of traditional administrative procedures at the same time, but also to the administrative relative of the procedural rights of the substantive threat. It often omits or compresses the key links in the traditional administrative procedures, such as justification, statement and defense, hearing, etc., resulting in the administrative relative's right to know, right to participate and right to relief being weakened to different degrees. How to find a balance between the convenience and high efficiency brought about by automated administration and the procedural rights of administrative counterparts has become a core issue that must be emphasized in the legal regulation of automated administration.

3.1 Tension between Technological Evolution and Procedural Values

Algorithmic governance operates on an operational continuum between semi-automated (human-machine collaborative) and fully-automated administrative acts. Semi-automated systems, exemplified by traffic violation processing where AI captures infractions yet requires officer confirmation, retain human oversight across domains like business licensing and tax auditing. Full automation, typified by ETC toll collection and digital invoicing systems, executes administrative decisions end-to-end without human intervention. Current legal frameworks adequately regulate semi-automated processes through established e-government protocols, whereas fully automated mechanisms face normative gaps in error correction mechanisms and procedural legitimacy. This regulatory asymmetry risks undermining administrative discretion in complex scenarios, potentially reducing human operators to mere decision validators.

The Administrative Penalty Law establishes three procedural mechanisms: summary, general, and hearing procedures. However, automated governance introduces a fourth paradigm - the e-decision procedure. Enabled by technologies like hawk-eye monitoring, this system independently identifies violations and imposes penalties through algorithmic processing, bypassing traditional procedural frameworks. While such automation reduces administrative costs and prioritizes substantive legal

rules over formal procedures, it simultaneously destabilizes the original procedural design. This shift challenges the foundational values of administrative due process, though data neutrality may mitigate value abstraction by anchoring decisions in verifiable factual relationships.

3.2 The Threefold Manifestation of the Crisis of Procedural legitimacy

1) Primary Evidence Bias

In the field of artificial intelligence, the core model of its operation is based on the summarization of massive social experiences, which in turn lead to the generation and execution of corresponding automated decisions by the system. These social experiences originate from daily life, are abstracted and refined by technicians, aggregated and organized, and finally transformed into electronic codes. Since the underlying data largely determines the decision-making content, it is crucial to ensure the universality, authenticity and objectivity of the data. Compared to data defects arising from improper collection methods and approaches, the inherent one-sidedness of raw data is easier to overlook and presents a greater challenge when designing circumvention programs. This is because raw data bias refers to the limitations of data in terms of source, composition, etc., and such limitations will creep into the automated decision-making process, affecting the fairness and scientificity of decision-making. Specifically, on the one hand, in the stage of data statistics, the limitation of the sample range is the key factor that causes the data to fail to reflect the universal information, and due to the limitations of the real conditions, it is often difficult for the data collection process to cover all possible situations and groups; on the other hand, the customary and institutional bias that exists in the society itself also profoundly affects the quality of the raw data of AI, because the data itself is a social reality of a kind of mapping, as long as the inequality factor persists in the society, it is impossible to completely eliminate the bias component in the data by expanding the sample capacity, which in turn affects the results of data mining, making the AI model unconsciously perpetuate this bias when dealing with the relevant problems.

2) Algorithmic Black Boxes

The non-interpretability of algorithmic decision-making in automated administration has become the primary threat to procedural legitimacy, the most typical of which is the phenomenon of the "algorithmic black box". With the wide application of deep learning and other algorithmic mechanisms, artificial intelligence has been able to realize autonomous learning and dynamic evolution to a certain extent, which makes its decision-making process highly complex and uncertain. In addition, many AI algorithms are closely related to the developer's trade secrets and also involve key issues such as privacy protection of data sources. Based on the consideration of commercial interests and privacy security, algorithm controllers often adopt a confidentiality strategy for the specific details of automated decision-making algorithms and are reluctant to publicize them. As a result, automated decision-making has evolved into a "black box" problem in some cases. When administrative organs make decisions that have a significant impact on the rights and interests of the relative based on algorithms, it is difficult to explain the basis of the decision to the relative due to the opacity of the algorithms. In addition, the data source and design of the algorithm may be biased, and these biases may be magnified in the automated administrative process. In the area of administrative licensing, algorithms may produce discriminatory results against specific groups based on historical data, resulting in qualified applicants being unreasonably denied licenses, in clear violation of the principle of equality in administrative law and exacerbating "algorithmic bias".

3) Imbalance in Enforcement Density

While the acquisition and processing of electronic data has made automated administration more efficient, it has also led to an imbalance in the density of law enforcement, with minor offenses, in particular, being handled with unprecedented scope and rigor, most notably in the "Du Bao Liang Case. In 2005, Du Baoliang, a Beijing resident, was recorded 105 times by electronic monitoring devices for traffic violations at the same location, with a cumulative fine of up to 10,000 yuan. The case exposed a significant imbalance in the density of enforcement by automated administration: on the one hand, the electronic monitoring equipment was able to record violations around the clock, leading to repeated recordings of the same violation; on the other hand, the administrative authorities

failed to notify the relative of the violation in a timely manner, resulting in the relative continuing to violate the law without knowing it. Article 5 of the Administrative Penalties Law clearly stipulates that the setting and implementation of administrative penalties must be based on facts that are commensurate with the facts, nature and circumstances of the offense and the degree of social harm. However, automated law enforcement systems often lack comprehensive consideration of the circumstances of the offense and mechanically impose penalties based solely on technical records. In the "Du Bao Liang case", the electronic monitoring equipment recorded 105 violations but did not distinguish between the specific circumstances of each violation (such as whether due to emergency situations), and did not take into account the subjective degree of fault of the relative. This "one-size-fits-all" approach to law enforcement is clearly contrary to the principle of equivalent penalties and jeopardizes the legitimate rights and interests of the administrative relative.

3.3 Failure to Meet Benchmarks for the Guarantee of Rights

While automated administration enhances governance efficiency through rapid algorithmic decision-making, its technical opacity erodes procedural safeguards: non-interpretable algorithms create informational asymmetries that undermine rights to explanation and defense, with agencies exploiting "internal management" classifications under China's Government Information Disclosure Regulations to circumvent transparency obligations. Despite judicial recognition of public interest disclosure requirements, systemic gaps persist in mandating algorithmic accountability, hollowing out participatory protections essential to administrative due process.

The non-contact nature of automated administration puts the traditional statement and defense procedure at risk of formalization. The traditional administrative law provides that during the participation in administrative procedures, the parties concerned shall enjoy the right to express their opinions, make representations and defenses, and apply for a hearing on specific related issues in accordance with the law. Statement, defense, and hearing procedures, despite the differences in the hearing time nodes, specific processes, types of classification and other levels, are extremely important legal rights of the parties, is an indispensable part of due process. However, in the context of automated administration, as the learning ability of the algorithm continues to improve, the algorithm is embedded in the administrative process in the form of "legal code". This phenomenon certainly improves the efficiency and accuracy of administrative decision-making to a certain extent, but at the same time, it compresses or even omits the hearing process, and cannot meet the relevant requirements of the principle of due process. In this way, the views of the relative is difficult to use effective procedural design, administrative decision-making results have a substantive effect, ultimately leading to the relative enjoying the statement, defense and hearing and other procedural rights have been seriously infringed. Substantial lack of procedural participation results in the intelligent system not being able to realize effective human-computer interaction, and it is difficult for the relative to fully express his opinions; the lack of pertinence of the algorithm-generated formatted response also further leads to the formalization of the justification, and fails to meet the requirement of "explaining the reasons" in Article 44 of the Administrative Penalty Law; in addition, the review by the court of the automated decision is also formalized, which gradually results in the automated decision being reviewed by the court. In addition, the formal review of automated decisions by the court has gradually resulted in a weakening of the remedial effect, making it difficult for procedural flaws to be discovered.

4. The Construction of Technical Due Process: the Path of Procedural Regulation Based on the Administrative Penalties Law

The concept of "technical due process" was proposed by Citron in 2007 and refers to the improvement of transparency and accountability of automated decision-making systems through the optimization of computer program design. Therefore, to explore the legitimacy of algorithmic design, we need to start from the requirements of due process. From a macro point of view, the construction of "technical due process" requires the regulation of algorithmic rights from both the technical and legal dimensions, i.e., it is necessary to realize algorithmic regulation based on legal norms. However,

since the power of the algorithm is more covert than the traditional public power, it is necessary to set the basis of regulation with the clarity and stability of the order and to strengthen the transparency and procedural consistency of the algorithm. In the aspect of procedural regulation, it is necessary to implement the triple regulatory model of ex-ante regulation, ex-post control and ex-post supervision, and to introduce the system of filing and reviewing, algorithmic interpretation right of the request, and the system of through-the-board algorithmic auditing, etc.; in the aspect of the system of attribution of responsibility, it is necessary to establish a graded responsibility. In terms of the attribution system, it is necessary to establish a graded responsibility identification rule, adopt a two-step identification method to realize responsibility regulation and impose different administrative responsibilities on the algorithm designers, equipment purchasers, and applicators in different cases. This series of system design and algorithm regulations to respond to the State Council's "New Generation of Artificial Intelligence Development Plan" "inclusive and prudent" governance requirements, to provide a prototype system for the codification of administrative procedures in the digital era.

4.1 Enhanced Transparency of Algorithmic Disclosure

Based on the previous arguments, the non-interpretability of algorithmic decision-making in automated administration has triggered algorithmic transparency crises such as the "algorithmic black box," which not only breeds corruption and reduces transparency, but also further erodes public trust, leading to stagnation in the application and implementation of automated decision-making systems. In this predicament, it is imperative to enhance the openness and transparency of algorithms, and while countries have issued policies emphasizing the importance of transparency in AI decision-making for regulatory purposes, the Chinese government enacted the Principles of Governance for a New Generation of Artificial Intelligence in 2019, which requires that "AI systems should continuously improve their transparency." Overall, there are three main categories of reasons why algorithms generate opacity: first, opacity due to the protection of trade or state secrets, second, opacity due to technical ignorance in code writing and algorithm design, and third, opacity due to the characteristics of machine learning algorithms and the scale and degree of scale required to effectively employ them. The second and third types of opacity are due to the complexity of the algorithm, often mixed together, and the effect of regulation on them is very limited, and should be based on different subjects as the basis for differentiation, relying on the use of interpretable AI technology and blockchain deposit technology to achieve open and transparent algorithms in a hierarchical manner.

The first is basic transparency for the public. As a wide audience of algorithm applications, the public has the basic right to know about the algorithm, and publicizing the type of algorithm, function description and decision-making process is the basic step to give the public this right. Algorithm developers and users have the responsibility to clearly explain to the public the basic attributes of the algorithm and its operation framework, and provide the public with understandable algorithm description documents when necessary so that the public can initially understand the role of algorithms in the operation of the society. The role of algorithms in the operation of society can be initially understood by the public. Taking Guangzhou's "Spike Smart Management" platform as an example, it has built "one map for situational awareness" and "one map for smart operations" to assist city managers in understanding the city's urban villages in a macro way. The platform provides city managers with a macro view of the city's urban villages and a general overview of "people, houses, vehicles, fields and networks", enabling precise decision-making and command. The platform transforms complex algorithmic logic into easy-to-understand content for the public through clear and concise language and charts, effectively reducing the cognitive barriers between the public and algorithms, enhancing public trust in algorithmic applications, and promoting more active public participation in digital social governance.

The second is the case-by-case explanation for the administrative relative. Transparency requires a complete record of the operation process of AI systems. When algorithmic decision-making involves individual rights and interests, the relative has the right to know the key factors behind the decision, and the relevant departments should disclose the key parameters on which the decision is

based; for example, Hangzhou stipulates that the confidence level of identification of traffic violations shall not be lower than 95%, which enables the relative to clearly know the quantitative basis of algorithmic decision-making and to judge the reasonableness of the decision. At the same time, the visual presentation of personalized decision-making logic can further protect the relative's right to know. As represented by the pilot decision tree display function of Shanghai "with the application", the logic of the algorithm in the individual decision-making process is displayed in an intuitive tree structure, which enables the relative to clearly see the complete path from the input data to the final decision-making, realizing the transparency of the decision-making process, and effectively safeguarding the relative's right of participation and right of appeal.

Finally, it is a deep transparency for regulators. The purpose of the system of government data opening is to provide data production factors for economic and social development. Regulatory departments are responsible for maintaining market order and safeguarding public interests, and in-depth supervision of algorithms is an inevitable requirement for the fulfillment of their duties. Source code filing and dynamic review is an important means of realizing in-depth supervision, drawing on the experience of the Zhejiang "administrative code" system, through the filing of the source code, the regulatory authorities can grasp the core logic of the algorithm, and discover the possible loopholes, biases or violations of law in the algorithm in a timely manner. At the same time, should also be synchronized to achieve real-time access to algorithm operation logs, such as the Beijing Internet Court electronic evidence platform practice, the regulatory authorities can monitor the whole process of the operation of the algorithm, the operation of the algorithm state, data processing, etc. to conduct a comprehensive review to ensure that the operation of the algorithm in line with laws and regulations and social ethical requirements, to ensure that the algorithm operation compliance.

4.2 Three-dimensional Model of Due Process Regulation

The closed nature of algorithmic decision-making, the scale of data processing and the ambiguity of the responsible subject make the administrative relative's right to know, participation and relief face new types of risks. Based on the principle of procedural justice of the Administrative Penalty Law and the governance requirements of the State Council's New Generation Artificial Intelligence Development Plan, there is an urgent need to construct a full-cycle regulatory system covering "prevention beforehand - control during the incident - relief after the incident", and to realize the value balance between administrative efficiency and rights protection through the synergistic innovation of legal norms and technical measures. Through the synergistic innovation of legal norms and technical measures, it is necessary to realize the value balance between administrative efficiency and rights protection.

1) Prevention: Technology Access and Risk Prevention Mechanisms

Core safeguards require layered algorithmic review and standardized data governance. Implementing tiered algorithm filing under China's Algorithm Recommendation Regulations enables defect identification and accountability tracing, supported by dedicated oversight committees for code audits and parameter transparency. Concurrently, aligning data collection/storage protocols with the Data Security Law's classification framework ensures evidentiary integrity, exemplified by tax authorities' standardized financial data analysis for audit reliability. Integrating Explainable AI (XAI) principles mandates visual disclosure of algorithmic parameters, complemented by mandatory third-party audits to curb bias. Regional pilots like Hangzhou's transparency metrics (e.g., ≥95% accuracy thresholds for traffic violation algorithms) demonstrate how quantifiable confidence benchmarks enhance public trust in automated decisions.

2) Controls in Progress: Procedural Involvement and Dynamic Corrective Mechanisms

Implementing "human-in-the-loop" mechanisms balances algorithmic efficiency with rights protection by mandating manual review for high-risk decisions (e.g., pension amount adjustments requiring verification when algorithmic outputs show anomalies). Blockchain timestamping of enforcement data ensures procedural integrity through immutable audit trails, critical for dispute resolution. Embedding real-time objection channels within automated systems enables immediate redress while preventing rights erosion. Market supervision agencies demonstrate this through

blockchain-recorded enforcement processes that withstand administrative reconsideration.

3) Ex-Post Facto Remedies: Audit Systems and Redress Assurance Mechanisms

Ex post facto supervision repairs damaged legal relationships through the division of responsibilities and relief innovations. Among them, the implementation of a penetrating algorithmic audit system can effectively ensure algorithmic compliance. By introducing a third-party organization to conduct regular audits of algorithms, the administrative authorities can identify and correct technical defects and compliance risks in algorithms in a timely manner. Typically, in the field of financial supervision, the supervisory authority should commission a professional third-party organization to audit the risk assessment algorithms of financial institutions on a regular basis, so as to timely capture the unfair credit scoring tendency of the loan risk assessment algorithms of financial institutions for specific groups, and safeguard the fairness of the financial market and the legitimate rights and interests of consumers through timely correction and imposition of penalties. In addition, individuals have the right to be free from automated decision-making. Improvement of the intelligent relief system is the last line of defense to safeguard the rights of the relative. By optimizing the online reconsideration procedure and strengthening the obligation of algorithmic interpretation, administrative authorities can provide the relative with efficient and transparent relief channels to repair the legal relationship damaged by automated decision-making. For example, with the intelligent online reconsideration platform launched by the administrative reconsideration agency, the parties can submit an online application for reconsideration, requesting the administrative organ that made the automated decision to explain the algorithm in detail during the reconsideration process, and the system automatically pushes relevant laws and regulations and similar cases for the parties' reference, which greatly improves the efficiency and fairness of the reconsideration.

4.3 Gradient Design of the Attribution System

In the face of the illegal behavior and infringement of artificial intelligence, there is no legal norms to clarify the specific principles of attribution and responsibility, and there is no final conclusion about the identification of the subject status of artificial intelligence, some scholars believe that the behavior of artificial intelligence does not have its own purpose, and is only the implementer of the purpose of human beings, and therefore does not have the status of the subject, while some scholars believe that we should introduce the "proposed system" technology, and differentiate the situation to give its subject status when the decision-making or behavior of artificial intelligence leads to damage. Some scholars believe that we should introduce the "simulation" technology, and differentiate the situation, in the decision-making or behavior of artificial intelligence that leads to the damage to give it the status of the main body. On the basis of this theory, the author believes that we should construct a gradient model of responsibility determination on the basis of the "dual-order identification" responsibility regulation, and reasonably divide the responsibility boundary between technology suppliers and administrative subjects by distinguishing between technological faults and management faults, so as to avoid responsibility shifting and relief difficulties.

The dual-stage identification mechanism addresses AI's legal accountability gaps through procedural legal fiction and proportional liability allocation: first creating provisional responsibility anchors via administrative law's presumptive liability doctrine to prevent accountability vacuums without conferring AI substantive legal personhood, then distributing obligations among developers, deployers and operators based on technical participation levels and risk governance capacities, thereby resolving algorithmic opacity through legal accountability proxies, reconciling technological neutrality with administrative oversight imperatives, and bridging preventive risk control with post-hoc damage remediation within a unified framework that maintains normative coherence in AI governance.

The gradient liability model operationalizes "two-step identification" through a three-tier framework: 1) Developer fault liability under Data Security Law Art.32 for design defects (e.g., discriminatory parameters), given their technical primacy; 2) Operator no-fault liability for operational risks as system controllers; 3) Administrative result liability per Administrative Penalty Law Art.41, mandating accountability despite technical mediation. Remedy protocols follow

proportionality: algorithmic adjustments for minor defects, state compensation for rights infringement, and punitive accountability for systemic failures, thereby materializing risk-control principles in AI governance.

5. Conclusion

Automated administration represents a fundamental reconfiguration of administrative power dynamics, transcending mere technological adoption to reshape procedural logic through algorithmic decision-making and data scalability. This necessitates constructing "technological due process" that integrates algorithmic transparency, tripartite oversight (pre-access controls, real-time monitoring, post-hoc remedies), and gradient liability frameworks. By anchoring responsibility across developers, operators, and agencies via dual-order identification theory, these mechanisms reconcile technical efficiency with administrative law's core principles while preventing accountability voids.

The legitimacy of automated governance derives from its dual commitment to technological empowerment and procedural justice. Future institutional design must embed digital governance rules within administrative codification processes, maintaining tension between algorithmic efficiency and humanistic values through rights-constrained innovation. This paradigm ultimately tests our capacity to forge symbiotic relationships between code-based governance and legal norms, ensuring digital civilization evolves as an extension rather than negation of rule-of-law fundamentals.

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