

Judicial Artificial Intelligence and the Challenge to Core Judicial Principles in the Chinese Context

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Abstract: *The growing use of artificial intelligence in China's smart-court reform has improved judicial efficiency, case management, and consistency, but it has also raised a more fundamental question: whether AI-assisted adjudication can remain compatible with the normative foundations of judicial authority. Focusing on the Chinese context, this article examines the interaction between judicial artificial intelligence and core judicial principles, particularly judicial independence, accountability, transparency, procedural justice, neutrality, and substantive fairness. Methodologically, the study adopts normative legal analysis and qualitative interpretive inquiry based on policy documents, judicial materials, and comparative scholarship on algorithmic governance. It argues that judicial AI tools such as case similarity recommendation, judgment prediction, and deviation alerts are not merely neutral instruments of modernization. Their expanding use may reshape the boundary of judicial power, blur responsibility, weaken procedural guarantees, and reproduce bias in ways that affect adjudicative legitimacy. The article therefore contends that judicial AI should be assessed not only by efficiency gains, but also by whether it preserves the core judicial principles on which public trust depends. It further proposes stronger human control, clearer accountability structures, and more effective regulation of algorithmic opacity and bias.*

Keywords: *judicial artificial intelligence; core judicial principles; smart courts; algorithmic governance; human oversight; Chinese context*

1. Introduction

The application of artificial intelligence in judicial settings has become a major development in contemporary legal modernization. Across jurisdictions, courts increasingly use algorithmic tools to support case management, legal retrieval, and adjudicatory coordination. These developments are often justified in terms of efficiency and consistency, yet they also raise deeper questions about responsibility, fairness, and legitimacy (Cantero Gamito, 2024; Ciobaca, 2024; Thommandru et al., 2025).

In China, these developments have unfolded within the broader framework of smart-court reform. Over the past decade, courts have accelerated the use of digital platforms, data-based systems, and intelligent tools to improve judicial operations. In this setting, judicial artificial intelligence has moved beyond peripheral assistance and now plays a more visible role in adjudication, especially in case similarity recommendation, judgment prediction, and deviation alerts (Wang, 2018; Zheng, 2020; Zhang, 2022).

However, judicial decision-making is governed not only by institutional efficiency but also by core principles such as independence, accountability, transparency, procedural justice, neutrality, and substantive fairness (Zhang, 2017; He, 2019). Once intelligent systems begin to influence how cases are processed, compared, or evaluated, they inevitably interact with these principles. The key issue is therefore not simply whether judicial AI improves adjudicatory performance, but whether its use remains compatible with the normative structure of legitimate adjudication (Sun, 2020; Peng, 2021; Arkan, 2025).

This article approaches judicial AI as a governance issue rather than as a purely technical instrument. By combining normative legal analysis with qualitative interpretive inquiry, it examines the principal tensions generated by judicial AI in the Chinese context and considers what safeguards are needed if intelligent systems are to be integrated into adjudication without undermining judicial legitimacy (Ji, 2018; Zhang, 2022; Thommandru et al., 2025).

2. Judicial AI and Baseline Judicial Safeguards

Within China's smart-court reform, artificial intelligence has been applied to intelligent services, adjudication, enforcement, and judicial management. Among these, intelligent adjudication is the most sensitive because it most directly affects the exercise of judicial authority and the rights of litigants. In this article, "judicial artificial intelligence" refers specifically to AI systems that support or interact with adjudicatory functions (Wang, 2018; Zheng, 2020).

Existing scholarship has mainly explored the upper limit of AI participation in adjudication. One line of research emphasizes technological constraints, arguing that AI cannot independently perform core judicial tasks such as evidence evaluation, legal interpretation, and context-sensitive reasoning (Zhang, 2018; Wang, 2018). Another line stresses the nature of adjudication itself, noting that judging requires practical reason, moral evaluation, and contextual interpretation that exceed computational logic (Pan, 2017; Sun, 2020; Peng, 2021).

This article shifts the focus from the upper limit of AI intervention to the baseline conditions that must remain intact. To make the analysis accessible to an international readership, the article reframes the notion of "bottom-line thinking" as a form of baseline safeguard logic. It refers to the minimum institutional and normative conditions necessary to preserve judicial authority, impartiality, transparency, and accountability under technological integration (He, 2019; Zhang, 2019a). In this sense, judicial principles are not secondary constraints imposed after innovation, but the foundational standards that must guide the development and use of judicial AI from the outset.

From this perspective, the central questions are whether current applications of judicial AI risk crossing these baseline safeguards, how such tensions emerge, and what governance responses are needed to ensure that technological assistance remains compatible with legitimate adjudication. Similar questions have emerged in comparative research on judicial and algorithmic governance in Brazil, Japan, and the European Union (Bitencourt and Martins, 2023; Nitta and Satoh, 2021; Thommandru et al., 2025).

3. Research Design and Analytical Framework

This study adopts a normative legal research design combined with qualitative interpretive analysis. Its purpose is not to generate empirical generalisations, but to assess whether current applications of judicial AI remain compatible with core judicial principles. This orientation is consistent with comparative socio-legal analyses of algorithmic decision-making and judicial digitalisation (Bitencourt and Martins, 2023; Ciobaca, 2024; Arkan, 2025).

The analysis draws on three types of publicly available materials: policy documents and institutional reports concerning China's smart-court development; judicial opinions and illustrative case materials showing how AI tools interact with adjudication; and academic scholarship, both domestic and international, on judicial technologies and algorithmic governance. These materials were selected for their relevance to judicial AI, their implications for core judicial principles, and their institutional significance (Nitta and Satoh, 2021; Bitencourt and Martins, 2023).

The study uses a normative risk-assessment framework that distinguishes among three types of risks: institutional risks, such as shifts in the boundary of judicial authority; procedural risks, such as opacity, weakened participation, and reduced explainability; and substantive risks, such as bias and diminished fairness. Through close reading and thematic interpretation, the article identifies the principal dilemmas created by judicial AI and evaluates them in light of the baseline safeguards of adjudication (McAlinden, 2021; Zhang et al., 2022; Arkan, 2025).

4. Core Functions and Technical Features of Judicial AI in China

As China's digital judicial reform has deepened, a variety of intelligent legal systems have been developed to support adjudication, documentation, and case management. Although these systems differ in design, they generally pursue the same objective: improving consistency and efficiency, especially under the logic of "same case, same judgment" (Yan, 2018; Gao, 2019; Zheng, 2020). At present, this objective is mainly pursued through three core functions: case similarity recommendation, judgment prediction, and deviation alerts (Wang, 2018; Zhang et al., 2022).

Case similarity recommendation relies on the extraction and structuring of factual elements from

large numbers of judicial documents. On that basis, the system compares new cases with existing clusters of similar cases and produces recommendations. Judgment prediction extends this logic by using historical judgments to identify statistical relationships between case features and likely outcomes. Deviation alerts function after a judgment is produced, comparing the result with reference patterns in similar cases and flagging significant departures (Tang, 2002; Wang, 2018; Ma and Zhang, 2022).

Technically, these functions depend on data mining, natural language processing, knowledge-graph construction, and machine-learning-based pattern recognition (Tang, 2002; Zhang et al., 2017). In this sense, judicial AI operates not as an autonomous legal decision-maker, but as a large-scale inferential system trained on historical judicial data. Yet precisely because it relies on data extraction, statistical inference, and opaque model structures, it raises governance concerns regarding explainability, dependence on prior patterns, and the reproduction of historical bias (Tan and Fan, 2020; Zhang, 2022). These concerns are not unique to China, but reflect broader global debates about legal-tech development and algorithmic decision-making (Nitta and Satoh, 2021; Bitencourt and Martins, 2023; Thommandru et al., 2025).

5. Challenges to Core Judicial Principles

5.1 Judicial Independence and Exclusive Judicial Authority

Judicial independence requires that adjudicatory power remain within the judiciary and free from improper external influence. Yet the development of judicial AI has increased the role of outside technology providers in system design, data processing, maintenance, and model updating. This creates a new form of influence often described as “algorithmic authority,” in which non-judicial actors indirectly shape the conditions under which judicial reasoning operates (Zheng, 2018; Zhang, 2022).

The concern is not simply that courts purchase technical services, but that system architecture, model design, and data-processing choices may influence how legal information is structured and how judicial options are presented. In this way, technical support may begin to affect the practical boundary of judicial authority. Chinese discussions of smart adjudication have already noted the deep involvement of technology companies in judicial system development (Yan, 2018; Zhang, 2022). Similar concerns have also appeared in comparative debates on judicial AI and automated decision-support systems (Bitencourt and Martins, 2023; Thommandru et al., 2025). The central institutional question is therefore whether AI-assisted adjudication remains genuinely under judicial control, rather than gradually shifting adjudicatory influence toward technical actors and embedded algorithmic logic.

5.2 Accountability in Human-Machine Decision Structures

A second challenge concerns accountability. Judicial reform traditionally links adjudicatory power with adjudicatory responsibility: the judge who decides must also bear responsibility for the decision (Zhang, 2017). AI-assisted adjudication complicates this arrangement by creating multi-actor decision structures that involve judges, developers, data systems, and algorithmic processes (Ji, 2018).

This difficulty appears in at least three ways. First, a judge’s discretionary process may be indirectly shaped by design choices built into a system. Second, when errors occur, responsibility becomes difficult to attribute because multiple actors contribute to the production of the outcome. Third, algorithmic opacity makes it difficult to reconstruct decision pathways, which weakens meaningful review and obscures responsibility (Tan and Fan, 2020; Zhang, 2022). As a result, judicial AI risks undermining the traditional unity of power and responsibility that is central to legitimate adjudication (Ji, 2018; Arkan, 2025).

5.3 Opacity, Transparency, and Procedural Justice

China’s smart-court reform has expanded procedural openness by improving information sharing, documentation, and public access to judicial processes. However, greater procedural visibility does not necessarily mean greater decisional transparency. The internal operation of judicial AI often depends on data mining and model inference that are not intelligible to litigants, the public, or even judges themselves (Tan and Fan, 2020; Zhang, 2022).

This is significant because judicial transparency requires more than public access to outcomes. It also requires that decisions be understandable and open to explanation. If algorithm-influenced outcomes rely

on reasoning that cannot be meaningfully interpreted, then transparency is weakened even when procedures appear more open. This also affects procedural justice. Litigants are not only entitled to a formal process, but also to a process in which reasons can be understood, challenged, and reviewed (Huang and Liang, 2001). To the extent that judicial AI introduces opaque decision-support structures, it may weaken participation rights and diminish the procedural legitimacy of adjudication (Ciobaca, 2024; Thommandru et al., 2025).

5.4 Judicial Ritual and the Value of Procedure

Judicial procedure is not merely instrumental. Court hearings, formal argument, and reasoned judgment also perform symbolic and participatory functions that contribute to legitimacy and public trust (Huang and Liang, 2001). These procedural forms communicate authority, allow parties to feel heard, and reinforce the social meaning of adjudication.

By contrast, AI systems operate through computational rather than dialogic logic. They cannot replicate the experiential and symbolic dimensions of judicial process (Sun, 2020; Peng, 2021). When machine-generated recommendations shape judicial conclusions after the formal hearing has ended, the lived value of procedure may be diminished. In addition, algorithmic error may not fit neatly within traditional review structures, which complicates correction and remedy. Judicial AI therefore raises not only technical questions, but also deeper concerns about whether procedural justice is being hollowed out from within (Cantero Gamito, 2024; Ciobaca, 2024).

5.5 Neutrality, Bias, and Substantive Fairness

Judicial neutrality requires that like cases be treated alike and that adjudication remain impartial toward competing interests. Yet algorithmic systems may reproduce bias derived from historical data, model assumptions, or developer choices (Zhang et al., 2017; Liu, 2019). In that sense, AI does not eliminate discrimination by becoming more “objective”; it may instead translate existing inequalities into new technical forms.

This risk is especially serious where algorithmic outputs become influential in legal reasoning. If historical data already reflect structural imbalance, then prediction tools and similarity recommendations may carry these distortions forward under the appearance of neutrality. The well-known COMPAS controversy in the United States illustrates how predictive tools can produce systematically skewed outcomes. Comparable risks arise in judicial AI when historical regularities are treated as reliable guides for future adjudication (Liu, 2019; McAlinden, 2021; Zhang et al., 2022).

The problem extends beyond bias to substantive fairness. Difficult cases often require moral judgment, contextual reasoning, and the interpretation of open-textured legal concepts (Robert, 2002; Peng, 2021). AI systems built on inductive generalisation cannot assume this evaluative role. The Luzhou bequest dispute illustrates how a recommendation system based on historical similarity could produce outcomes misaligned with public order, morality, or broader normative reasoning. Excessive judicial reliance on algorithmic outputs may also generate automation bias, weakening the active role of judges in protecting fairness (Zhang, 2019b). For that reason, substantive justice remains a distinctly human responsibility that cannot be reduced to statistical inference.

6. Governance Responses to Judicial AI

6.1 Preserve Human Judicial Control

The first requirement is to preserve meaningful human control. AI must remain an auxiliary tool rather than a substitute for judicial reasoning. Judges should retain final decisional authority, including the practical ability to question, reject, or depart from algorithmic recommendations (Zhang, 2017; Zheng, 2018). Judicial autonomy is not protected merely because a human formally signs the judgment; it requires that judges remain substantively capable of independent reasoning.

6.2 Build Explainable and Accountable Governance

A second requirement is the creation of clearer accountability structures for AI-assisted adjudication. This includes greater transparency in system design, clearer allocation of responsibility among courts and technical developers, and stronger mechanisms for auditing and reviewing algorithmic outputs (Tan

and Fan, 2020; Zhang, 2022; Arıkan, 2025). Explainability is important not only for technical inspection, but also for legal accountability, because responsibility cannot be meaningfully assigned where decision pathways remain opaque.

6.3 Regulate Bias and Protect Procedural Fairness

A third requirement is the regulation of algorithmic bias together with the protection of procedural justice. Judicial AI systems should be subject to bias testing, periodic review, and institutional safeguards that prevent automated outputs from displacing adversarial participation, reason-giving, and the opportunity for challenge (Liu, 2019; McAlinden, 2021). The use of AI may improve consistency in routine matters, but its role should be limited in cases requiring difficult moral, contextual, or value-based judgment (Peng, 2021; Arıkan, 2025). In this sense, procedural fairness and substantive justice must remain the normative boundary of technological assistance.

7. Conclusion and Future Research

Although the concept of “bottom-line thinking” appears in Chinese policy discourse, this study treats it analytically as a form of baseline safeguard logic. In the context of judicial AI, it refers to the minimum normative conditions that must remain intact if judicial authority, procedural integrity, and impartiality are to be preserved under conditions of technological integration. From this perspective, the central question is not simply how far judicial AI can be extended, but whether its development and application remain within the boundaries required for legitimate adjudication.

Viewed in this light, judicial norms are not external constraints imposed on technology after the fact, but the foundational conditions that must guide its design, deployment, and use from the outset. The analysis in this article suggests that current forms of judicial AI have already generated tensions with core principles of adjudication, particularly in relation to judicial independence, accountability, transparency, procedural justice, neutrality, and substantive fairness. For that reason, judicial AI should not be evaluated solely in terms of efficiency, consistency, or technical sophistication. It must also be assessed in terms of whether it preserves the normative structure on which judicial legitimacy depends.

At the same time, the present study has certain limitations. As a normative legal and qualitative interpretive inquiry, it relies primarily on policy documents, judicial materials, and existing scholarship rather than on interviews, field observation, or quantitative evidence concerning how AI-assisted tools operate in everyday adjudicatory practice. In addition, although comparative perspectives have been introduced to situate the Chinese experience within broader global debates, the comparative dimension of the article remains selective rather than systematic. Future research could therefore deepen the discussion through empirical study of AI-assisted adjudication, including interviews with judges and court staff, case-level analysis of judicial practice, and more sustained cross-jurisdictional comparison.

These limitations, however, do not weaken the central claim of the article. On the contrary, they underscore the urgency of developing clearer legal and ethical frameworks for judicial AI. If artificial intelligence is to play a constructive role in the judicial field, it must do so under conditions that preserve the independence of judges, the coherence of responsibility, the openness of judicial reasoning, the integrity of procedure, and the fairness of outcomes. In this sense, the future of judicial AI should not be framed as a choice between innovation and restraint, but as a question of whether technological development can be brought within a framework of safeguards strong enough to preserve the essential character of judicial decision-making.

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