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Access, Management and Procedural Intervention-Explorations of Artificial Intelligence Innovation and Judicial Backlog in Indian Judiciary

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Abstract
The aim of this study is to discuss the problem of case pendency in the judicial system of India that, as of late 2025, violates the right to speedy trial guaranteed by Article 21 of the Constitution due to the number of pending cases exceeding 53 million across the country [1]. As per the data provided by the National Judicial Data Grid, some 88 per cent of this pendency falls on subordinate courts, namely district and taluka courts [2, 3]. The factors identified by the study causing delay include the permanent lack of judges to the extent of approximately 35 per cent on average, procedural failure in the form of frequent adjournments and counsel's absences, and administrative burden, with the Government being the biggest litigant in almost 46 per cent of court cases [4, 5].
The comparative analysis of international judicial artificial intelligence systems like COMPAS of the USA, VICTOR of Brazil, and PROMETEA of Argentina reveals that the key advantage of artificial intelligence is the role of an augmentative nonjudgmental tool used in high-volume appeals triage and document creation [6, 7]. In turn, the digital infrastructure of India, based on the National Judicial Data Grid and e-Courts Phase 3, together with already existing software for legal research and translation in the Supreme Court, creates a solid ground for the use of artificial intelligence; however, this process will require rigorous legal governance. In particular, such governance should take care of the threat of algorithmic bias and ensure human supervision, which has been emphasized recently in the guidelines of the Kerala High Court [8].

Keywords: Judicial Pendency, National Judicial Data Grid, Artificial Intelligence, Judicial Reform, SUPACE, Procedural Inefficiency

1. Introduction

1.1 The Constitutional Imperative and Pendency Crisis- Denial of Substantive Justice

India's judiciary system acts as the backbone of the largest democracy in the world and follows a hierarchical structure ranging from the Supreme Court to 25 High Courts and then thousands of subordinate courts. "In the Constitution of India, justice is not treated as an empty procedural formality." Justice is promised in the Preamble of the Constitution itself. Articles 14, 21, 38, and 39A of the

Constitution collectively guarantee that the State will ensure equality before law, life and personal liberty, and justice which ensures equal opportunities. In Hussainara Khatoon v. Home Secretary, State of Bihar, the right to a speedy trial was upheld to be an inherent right of the right to life and personal liberty under Article 21.

Judicial delay is thus something beyond mere inefficiency in the process. A right that cannot be enforced in a reasonable time period is a right that does not exist at all, and the onus of failure lies with those who are poorest. The best example is found in the prisons. By the end of 2022, there are estimated to be nearly 5.7 lakh prisoners in Indian prisons, out of which 76% are still undertrial cases waiting for investigations and trials to be completed, as compared to 66% in 2012, with the occupancy rate in the country reaching as much as 131% [17]. At the national level, 22% of undertrials were in custody for one to three years, while 11,448 individuals had been detained for five years or more [17]. Also, this group is least able to bear delay, since one quarter of all prisoners do not know how to read and write and 40% have education up to the tenth standard only [17]. For such people, delay implies loss of liberty even before their guilt has been proved, and thus can never be considered social justice. While a formal democracy protects the rights of people through the process of regular elections, substantive democracy is one in which there are mechanisms in place for citizens to enjoy these rights. Delay perpetuates loss of public confidence in the judiciary, damages economic progress, and makes the difference between the rights of people and their remedy even bigger.

The magnitude of the issue is not small. At the end of 2025, the national pendency of cases in all tiers of the courts was more than 53 million cases [1], representing an increase of about 70% from the 30.8 million cases estimated to be pending across the nation as of early 2018 [4]. Based on figures provided by the National Judicial Data Grid (NJDG), 88% of this backlog is in the lowest tier, which consists of the subordinate courts [2, 3]. It is ordinary litigants who have to deal with the consequences of this failure of the system that causes “justice delayed”, in pursuit of civil, criminal, and family cases.

1.2 Artificial Intelligence as a Potential Solution

Whereas the conventional fix for judicial delay has been described as a rise in the number of judges per capita, this study argues that pendency is a nuanced issue of overlapping procedural and structural inadequacies which cannot merely be attributed to inadequate resources. This study also places India amid the emerging trend worldwide of judicial systems experimenting with AI solutions to issues such as backlog, with countries including Germany, China, and Estonia implementing some form of judicial automation. Such trends warrant an evaluation of whether such technologies can also be safely and effectively implemented in the context of India’s unique judicial backlogs.

This paper presents a data-led analysis of the problem by identifying institutional weaknesses and procedural inefficiencies based on empirical data from the National Judicial Data Grid (NJDG). Subsequently, it presents a comparative analysis of existing international judicial AI systems to identify best practices and pitfalls. Finally, it evaluates the practicality and legality of the implementation of AI in the Indian judicial system, presenting a policy proposal for simultaneous structural and technological change necessary for clearing the judicial backlog.

2. Objectives

The present paper intends to accomplish the following objectives:

1. To measure pendency: gather the current statistics of pending cases in all judicial forums i.e. Supreme Court, High Courts, and lower courts, classified into the types of cases (civil or criminal) and

the age groups, using NJDG and other reports.

2. To uncover the causes: examine the factors which cause pendency, paying particular attention to deficiencies inherent in the judicial system (permanent lack of judges, insufficient infrastructure) and shortcomings in the process of case management, adjournments, and high caseloads from the government agencies, in particular.
3. To examine AI systems: provide an overview and assessment of international examples of judicial AI like COMPAS (Correctional Offender Management Profiling for Alternative Sanctions, United States), VICTOR (Brazil), and PROMETEA (Argentina), mentioning their features and the related legal and ethical issues.
4. To assess feasibility: estimate the technical possibility, legal preparedness, and ethical limitations with regard to the implementation of AI-augmentation tools in the current Indian judicial system, putting forward certain measures.

3. Methodology

3.1 Data Collection and Sources

Quantitative data is drawn primarily from the NJDG, India's centralised, daily-updated repository of case information covering district and taluka courts, High Courts, and the Supreme Court [2, 3]. These official statistics provide a solid foundation for analysing the magnitude and distribution of the backlog. Additional quantitative and policy data on historical pendency trends, filings, disposals, and judicial vacancies are drawn from legislative research reports [4].

3.2 Comparative and Legal Analysis

Evaluating the feasibility of judicial AI requires the use of a comparative case study method among three prominent systems which have been documented publicly – the risk assessment software COMPAS (USA) [6], the triage system VICTOR (Brazil) and the opinion writing software PROMETEA (Argentina) [7]. Such an analysis provides some universal learnings in terms of efficiency, transparency and accountability in the deployment of judicial AI. The discussion on the feasibility of AI in the Indian legal scenario is done through a doctrinal analysis of the constitutional framework (Articles 14 & 21) and a review of the recent judicial policies in the country such as the guidelines laid down by the Kerala High Court in the usage of AI in the district judiciary [8].

4. Literature Review

The persistent backlog in the Indian judiciary is attributable to a confluence of structural deficiencies, procedural abuses, and institutional practices.

4.1 The Structural Case for Pendency

Persisting resource shortage continues to be a major impediment to timely justice delivery. The official statistics indicate the presence of a vast difference between the sanctioned and actual number of judges. As of 2022, India had an average of 21 judges per million people compared to the required figure of 50 per million proposed by the Law Commission [9]. There is also the high prevalence of vacancies of judicial seats, estimated at around 35% in 2018 [4]. Such shortages result in a serious deficiency of the judicial capability necessary to deal with the incoming flow of cases.

The deficiencies in infrastructure are another problem. While there has been progress in terms of the e-Courts Mission Mode Project and the NJDG, there have been persistent shortages of infrastructure both physical and digital in many subordinate courts. According to post-pandemic studies, just one-third of the

lower courts had proper digital infrastructure, such as video-conferencing facilities or computers connected to the internet at the time when personal hearings were suspended [9]. Problems with non-digital infrastructure have also been noted; for example, only 8% of court buildings in Jharkhand state had functioning toilets [9].

This problem of lack of material resources becomes self-reinforcing due to the fact that the lack of judges and inadequate facilities leads to an increase in workload that requires ad-hoc measures such as crowding in courts or lack of digital connectivity that further reduces the efficiency of judges. Infrastructure investment such as the funds made available through e-Courts Phase 3 should come before any application of AI technology because of the digital infrastructure constraints.

4.2 Procedural Impediments and Litigation Overload

Gaps that exist in structure are further exacerbated by fundamental issues of process. The government, whose definition includes public enterprises and corporations (under Article 12 of the Constitution), is believed to be the cause of about 46 percent of all cases coming before the courts [5]. Legal analysts have found the large number of cases brought by the government to not be policy-based [10].

Procedural matters within the court system are not free of problems of administrative inefficiency. The findings of the analysis made by the committees and legal experts always highlight the common practice of routine adjournment of proceedings, mismanagement of interlocutory applications and unavailability of key parties as the major methods of delaying court proceedings. In this regard, the figures provided by NJDG regarding the causes of delay of proceedings in lower courts are quite relevant: the unavailability of lawyers is responsible for the delay in about 6.2 million cases, whereas the non-availability of key witnesses results in delay in about 2.7 million cases [2, 3]. This demonstrates that case management and procedural discipline, rather than the process of judicial deliberation, are the real problems. Previous efforts to tackle this issue by launching Fast-Track Courts after landmark decisions like Hussainara Khatoon v. Home Secretary, State of Bihar, and introducing ADR under the Code of Civil Procedure have been launched, but have not produced enough results to stop the increase in the number of new cases [11].

4.3 International Precedents in Judicial Technology

1. **COMPAS (Correctional Offender Management Profiling for Alternative Sanctions), USA.** COMPAS is a commercial US decision-support application designed for criminal risk assessment. It creates a recidivism risk score in pre-trial, sentencing, and bail decisions. This tool was supported by the court ruling State v. Loomis (2016), although it has been widely criticized because of the algorithmic opacity and biases. Some studies demonstrate that COMPAS shows a high probability of reoffending for black defendants [6].
2. **VICTOR, Brazil.** VICTOR is an artificial intelligence application applying the methods of optical character recognition (OCR) and convolutional neural networks. It has been created for Brazil's Supreme Federal Court to automate the process of triaging appeals. The tool recognizes cases with "general repercussion," cases of wide legal and social importance. In pilot trials, VICTOR manages to sort cases within 5 seconds as compared to 44 minutes required for human reviewers**.**
3. **PROMETEA, Argentina**. The Buenos Aires Public Prosecutor's Office employs PROMETEA to automate the process of drafting. This program performs analysis of the case, searches for analogies and provides a solution based on the historically made decisions analyzed through the machine learning technique; according to the developers, the accuracy of its work reaches 96% in about 20 seconds [7]. Human control is compulsory.

These international examples show that the usefulness of AI in judicial processes is related only to tasks of large volume and repetitive augmentation. In addition, these models emphasize the common problems of transparency, algorithmic biases, and the necessity of human control.

5. Analysis: Quantifying and Categorising the Backlog

Data in this section is drawn from National Judicial Data Grid reports [2, 3].

5.1 Distribution and Magnitude of the Backlog

As of mid-2025, estimated total pendency exceeded 53 million cases, overwhelmingly concentrated at the lowest judicial tiers, with significant implications for the efficacy of the judicial system as a whole. Table 1 summarises the distribution by court level and case type.

Table 1: Pendency Breakdown by Judicial Tier and Case Type (Mid-2025 Estimates)

Court Level	Total Pending Cases (approx.)	% of National Pendency	Civil Cases (approx.)	Criminal Cases (approx.)
Subordinate Courts	47,474,970	~88%	11,094,719	36,380,251
High Courts	6,255,414	~12%	4,416,482	1,838,932
Supreme Court	90,213	<0.2%	71,150	19,063

The subordinate courts have about 47.5 million pending cases, accounting for approximately 88% of all pending cases in the nation. In this category, the number of criminal cases (36.4 million) is higher than that of civil cases (11.1 million). In the case of the High Courts, the total number of pending cases is over 6.2 million, in which the percentage of civil cases is higher. While the Supreme Court has comparatively a very small percentage (90,213 cases), about 0.2% of the total [2, 3].

Though 87% of the Supreme Court's total cases are disposed of every cycle, there is hardly any significant effect on pending cases in the subordinate courts. It becomes clear from above that any initiative for judicial reforms, especially with the help of technology, must focus on the lower courts due to their large number of criminal cases.

5.2 Supreme Court on Procedural Decay and Administrative Inefficiency

Case backlogs in the Indian judicial system, especially those of long pending cases, arise due to lack of procedural discipline in the system. "Adjournment syndrome," in which a case is continuously put off without any reasonable cause, poses a serious impediment to efficiency even after digitization.

This aspect has been severely criticized by the Supreme Court on various occasions, including one in which a bail case at the Allahabad High Court was adjourned 21 times [12], and another in which continuous adjournments of civil cases defeated the purpose of litigation altogether.

From NJDG statistics, we can see that external reasons such as unavailability of advocate (6.2 million cases) and unavailability of witnesses/accused (2.7 million cases) play a huge role in creating delay in lower court cases [2, 3]. This problem cannot be solved just through technological means but needs disciplined functioning of the judicial process.

6. Institutional Design and Technological Fixes- Assessing AI Feasibility and Judicial Governance

AI could help the Indian judiciary reduce case backlogs, but only if technical readiness, legal frameworks, and ethical guidelines are properly addressed.

Millions of pending cases are largely responsible not only for eroding public confidence in the rule of law but also for straining the institutional capacity of the Indian judicial system. Artificial Intelligence bears immense potential as a viable technological fix within India's existing judicial administration and management. One needs to understand that AI's feasibility depends less on technical capability and more on institutional design—specifically, the distribution of authority and consensus among the executive, judiciary, and administrative bodies; assured constitutional safeguards for judicial independence; and the availability of accountability mechanisms for algorithmic intervention. In order to assure institutional restructuring and the realization of AI's potential, it requires not merely technological adoption but the removal of politico-legal constraints too.

6.1 India's Digital Foundation and Current Augmentation Models

The e-Courts Mission Mode Project of India has developed a very robust digital platform including NJDG (National Judicial Data Grid), a database for case data from all courts [2, 3]. e-Courts Phase 3 (2023-27) is an initiative worth ₹7,210 crores to work towards digitization, cloud, and new services such as e-filing and NSTEP (National Service and Tracking of Electronic Processes), where NSTEP attempts to cut down delays by automated summon services [13].

There have been initiatives in the Supreme Court involving the use of AI exclusively in the domain of assistance and not adjudication:

1. **SUPACE (Supreme Court Portal for Assistance in Court Efficiency)**. It is an AI tool used for legal research, fact extraction, and decision information support for judges [14].
2. **SUVAS (Supreme Court Vidhik Anuvaad Software).** It is an AI-based language translation utility aimed at reducing linguistic barriers by translating complicated judgments from English to vernacular languages [14].

AI implementation in India, however, continues to be impeded by data preparedness, since the lower courts continue to maintain their records in physical files, making data consistency difficult with regard to the 18,735+ computerized courts that have been funded for digitization. The immediate implementations of AI would thus be in natural language processing (NLP) processes, including translation (via SUVAS), and data processing, similar to the use of VICTOR's OCR technology.

6.2 Judicial Backlogging in India and the Limits of Algorithms -The Black Box Dilemma

There are certain legal and ethical barriers to the adoption of AI in the judiciary. At present, there is no single statute in India that deals with the issues associated with AI, such as algorithmic decision-making and autonomy, along with opacity and the responses it has received, such as the black box dilemma, which refers to the core paradox faced by India's judiciary when introducing AI to address case backlog.

AI systems can provide desired outputs but actually cannot add reviewable reasoning, while the Indian Constitution requires judicial decisions to be supported by reasons. In India, where over 55 million cases are pending, AI tools (such as SUPACE and LegRAA) are positioned as assistants for judges. Most machine learning models have internal logic based on algorithms that are unexplainable, making it impossible for both judges and litigants to scrutinize how conclusions are derived. The Supreme Court Bar Association has explicitly referred to this as the black box paradox. Indeed, the lack of regulations leads to the risk of algorithmic bias. The AI system based on the historical data will continue to reproduce existing societal inequalities, which would be a violation of human rights according to Articles 14 and 21. In fact, the policy adopted by the Kerala High Court in July 2025 is the first judicial policy on AI in India that bans the use of AI for decision-making at district courts [8].

6.3 The Proposed Model: Human-in-the-Loop Augmentation

India needs to utilise AI to supplement, and not substitute, its judicial process. The global experience of AI suggests that it could be efficiently utilised for reducing the clerical work and improving workflow, saving the precious time of judges. AI can only be utilised for data correlation and document retrieval. AI must never be utilised for making legal decisions. Table 2 gives an analysis of the feasibility of each system.

Table 2: AI Feasibility Assessment for the Indian Judiciary

AI System / Model	Primary Function	Key Ethical / Legal Controversy	Viable Indian Application & Rationale
COMPAS (USA)	Pre-trial risk assessment; sentencing support.	Algorithmic racial bias; opacity.	Low feasibility / high risk. Deployment should be avoided given the potential to embed existing social disparities and undermine constitutional equality.
VICTOR (Brazil)	Appeal triage; case sorting.	Transparency concerns in the appeal process.	High feasibility. Automated prioritisation and listing in overloaded High Courts, and initial criminal-filing triage in subordinate courts; addresses the volume issue directly.
PROMETEA (Argentina)	Automated legal opinion drafting.	Requires mandatory human supervision.	High feasibility. Drafting routine, high-volume, low-complexity orders (e.g., traffic violations, uncontested process orders) under mandatory judicial review.
SUVAS / SUPACE (India)	Translation / legal research.	Currently operational but needs an integrated governance framework.	Expandable. Integrating legal research and multilingual capacity into all subordinate courts, enhancing judicial preparation and reducing linguistic barriers.

From the above comparative review, it becomes evident that India must follow examples like that of VICTOR and PROMETEA. The key elements of both VICTOR and PROMETEA include efficiency and clerical support within the context of judicial review. The strict following of the principle of human in the loop is essential, keeping in mind the guidelines provided by the Kerala High Court.

7. Way Forward: A Dual Liquidation Strategy

Reducing India's case backlog requires concurrent, coordinated intervention in resource allocation, proce

dural governance, and cautious technological adoption.

7.1 Structural and Resource Augmentation

1. **Hiring judges quickly**. There needs to be a quick filling of the about 35% vacant positions for judges in India and an attempt to increase the number of judges per million population to 50 [9]. Lack of staffing will make the implementation of every other strategy ineffective.
2. **Complete infrastructure and standardization**. It would be necessary for the government to allocate the ₹7,210 crore funding towards the e-Courts Phase 3 program [13] in such a manner that the complete digitization of existing records and standardization of hardware, software, and IT education is achieved.
3. **Court administration should be professionalized**. Judges need to hand over their responsibility for administration, such as HR, finance, procurement, and IT, to professional court administrators.

7.2 Procedural and Case-Management Reforms

1. **Limiting government litigation**. Introduction of a National Litigation Policy, which has stringent sanctions in place to prevent government entities, which form the largest litigating group at 46%, from engaging in frivolous appeals, will greatly alleviate the burden on the courts [5].
2. **Trial discipline.** It is necessary that trials be conducted within strict time limitations, as has been emphasised by the Supreme Court in cases involving numerous adjournments, such as the Allahabad High Court case involving 21 adjournments [12]. Expansion of the NSTEP scheme to use electronic summonses will also facilitate the reduction of logistical delays in tracing the accused and witnesses, both of which contribute significantly to the number of pending cases.
3. **Alternative dispute resolution and online dispute resolution**. Aggressive expansion of ADR and online dispute resolution (ODR) in particular will help resolve disputes out-of-court and thereby lessen the burden on the subordinate courts [11, 15].

7.3 Governance Framework for Judicial AI

1. **Form a National AI Justice Committee.** An e-committee of the Supreme Court ought to set up a committee which will develop a tiered risk-based regulation framework for judicial AI in relation to accountability, liability, and transparency to ensure that the development and acquisition of AI complies with constitutional obligations [16].
2. **Mandatory bias auditing and transparency.** Algorithms applied to high-risk processes such as pre-trial screening and case prioritisation have to go through regular independent audits in order to ensure that they do not discriminate against individuals. Algorithms similar to PROMETEA that provide transparent reasoning must be preferred to the "black box" algorithms such as COMPAS [6, 7].
3. **Human control codification**. AI must be restricted to assist in high volume routine tasks only following the example of VICTOR/PROMETEA and complying with the recommendations of the Kerala High Court [8]. Absolute AI autonomy in decision making, legal reasoning and judgments preparation is prohibited.

8. Conclusion

Analysis highlights that the case backlog in India cannot merely be attributed to the lack of judges. This issue is caused by structural deficiencies, poor procedural discipline, and government litigation and it affects the district courts the most. The artificial intelligence could only provide an auxiliary function in solving it. Programs for the screening of appeals, drafting of routine documents, translation of judgments, and search of case law will be helpful in freeing judicial time [6, 7], while programs for scoring defendants

and shaping results pose high risks of bias and opacity. Hence, technology could be used after and not instead of the filling of vacancies, better management of adjournments, fewer government appeals, and standardisation of the e-Courts infrastructure. All such use should be in line with the guidelines on human intervention in the Kerala High Court [8]. The testing of the proposed human-in-the-loop model at the district level with the results in terms of the disposal rate should be the next step.

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