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Enhancing Judicial Efficiency and Access to Justice Using AI

Shubham Gaddi, Saquib Hussain, Nandini Devalla, Hugo Bizcek, Ayush Gupta, Darshan Upadhyay, Rohan Ajay, Matthew A. Lanham
Purdue University, Department of Management, 403 W. State Street, West Lafayette, IN 47907
sgaddi@purdue.edu; hussai71@purdue.edu; ndevalla@purdue.edu; hbizcek@purdue.edu;
gupt1248@purdue.edu; upadhy33@purdue.edu; rajay@purdue.edu; lanhamm@purdue.edu

ABSTRACT

This study explores how AI can enhance productivity in Indiana's legal system. The motivation is that Integrating AI into court workflows requires balancing efficiency gains with accountability and protecting sensitive data from AI feedback loops. We use survey data from over 100 Indiana judges, and apply Python-based NLP and Azure Language AI to extract sentiments and key concerns, offering guidance for responsible AI integration in judicial processes.

KEYWORDS: Artificial Intelligence, Judicial Productivity, Legal Technology, Natural Language Processing, Sentiment Analysis

INTRODUCTION

Artificial Intelligence (AI) has inevitably become a part of our daily lives in more ways than we realize, and the sooner we start accepting it, the better our lives are going to be. More and more industries and workplaces are incorporating AI into their daily workflows to optimize output, reduce processing time, and focus human resources on more complex tasks. One domain that struggles with AI incorporation is the legal system due to the nuances of how AI impacts its principles.

Not only do the courts have to set the tone on what is and what is not permissible, but they also need to set precedent by leading by example (Illinois Supreme Court, 2025). Given the sensitive nature of court data, security and safety of the information is also of unparalleled importance. These reasons make it tricky for the courts to adopt AI-enhanced operational workflows, which could make them lag behind in efficiency and productivity gains other domains are realizing.

This study explores two major problem statements—the incorporation of AI into everyday legal workflows to improve efficiency and facilitate easier access to justice, and the identification of AI-generated or AI-altered evidence during legal processes. The first problem deals with the aspect of ensuring that the courts are using AI ethically, optimally, and synergistically with human supervision, while the second concern ensures that access to justice is not deterred by modern-day AI capabilities. AI can generate and process a significant amount of information, and being able to flag errors in legal processes is important. It helps in raising reasonable doubt for further investigation and brings up the question of ethics and accountability around the use of AI.

Through this study, we explore some common challenges that stand in the way of incorporating AI into daily legal workflows, along with how these problems were tackled and the impact of these strategies. We also dive into the impact of introducing AI tools to help speed up processes like legal research, writing briefs, and courtroom transcriptions in terms of time saved, cost incurred, and overall efficiency gains. We then dive into a more specific question—how do we identify what information is AI-generated or AI-altered with a certain level of confidence and accuracy.

It is crucial that our legal system become appropriately aware and equipped of AI technologies as AI-generated images and videos, along with deepfakes, are becoming more common. Providing educational resources for these decision-makers can help them better identify, evaluate, and rule on these items with confidence (National Courts and Sciences Institute, 2024). This confidence could come from a process that creates reasonable doubt around the nature of such media, which in turn makes the decision-making process transparent by accounting for AI as a factor.

We structure the remainder of this paper by reviewing the academic literature, outline the methodology and models used which include the use of the Azure Language AI through Python. We find this approach could made it easier to identify and pick out key themes and concerns coming from the courts. We show how we built on these themes to optimize court workflows. Lastly, we provide a set of guidelines and best practices for potentially identifying AI-generated content and media based on our ongoing research, and currently available AI tools.

LITERATURE REVIEW

AI has been increasingly used in judicial systems to enhance decision-making, automate administrative tasks, and increase legal research capability. The Indiana National Courts and Sciences Institute conducted a survey of the awareness and use of AI among judicial officers and discovered that while some judges use AI for legal research and administrative tasks, 50% have never used generative AI tools (Indiana Judiciary Report, 2024). Likewise, the Illinois Supreme Court has crafted policies for AI adoption, focusing on the need to keep ethical and legal standards in place while recognizing the ability of AI to enhance access to justice. The National Center for State Courts has also issued advice regarding AI adoption, cautioning against threats like bias, accuracy problems, and ethics issues.

With the emergence of generative AI models such as ChatGPT, concerns over the authenticity of AI-generated content have grown. Some have experimented with the susceptibility of AI text detection techniques and established the susceptibility of existing systems under paraphrasing and spoofing attacks (Sadasivan et al., 2025). The authors found that watermarking techniques, retrieval-based detectors, and zero-shot classifiers all fall drastically if the attackers apply paraphrasing attacks. This reflects how difficult it is to ensure reliable AI text detection.

The massive expansion of deepfake technology has brought about colossal challenges to digital forensic examination and disinformation detection. Blümer et al. proposed a deepfake detection pipeline combining background-matching with CNN-based classification, whose efficiency was realized on unseen datasets. Traditional classifiers are very accurate on cleaned datasets but are not generalizable to real-world deepfake detection. Thus, making a need for robust and adaptive detection methods.

Despite advances in AI adoption in the judiciary and AI-generated content detection, there are several gaps:

- *Judicial AI Policies:* While there exist frameworks such as the Illinois Supreme Court AI Policy providing ethical guidelines, empirical research evaluating AI's impact on case outcomes and judicial biases is limited. The New Jersey Supreme Court authorized preliminary guidelines to be effective immediately, while also providing directions for

lawyers to raise individual questions about specific AI ethics issues and provide comments and suggestions to inform the committee's ongoing work.

- *Robust AI-Generated Text Detection*: Today's AI text detectors do not work well with intelligent paraphrasing and spoofing attacks (Illinois Supreme Court Policy, 2025). Further research must be done to develop robust detection methods that can counter adversarial manipulations. One defense relies on retrieving semantically-similar generations and must be maintained by a language model API provider.
- *Scalable Deepfake Detection*: Semi-blind detection pipelines improve the performance on unseen datasets, yet real-world applications demand more scalable and computationally lighter models.

Some researchers have called for continual research in these avenues. The Illinois Supreme Court has committed to revisiting AI policies regularly as technologies emerge (Illinois Supreme Court Policy, 2025). Researchers in AI detection have stressed the importance of resilient watermarking and neural network-based approaches to address emerging threats (NCSC AI Guidelines, 2024). Additional advances in deepfake detection require integration of perceptual hashing techniques to create enhanced generalizability to datasets. We summarize these studies in Table 1 and compare it to this study.

Table 1: Literature review summary

Study By	Focus Area	AI Adoption	AI Detection	Policy Considerations	Empirical Evaluation	Limitations Identified
Indiana National Courts and Sciences Institute	Judicial AI Usage	✓	✗	✗	✓	✗
Illinois Supreme Court	AI Policy Guidelines	✓	✗	✓	✗	✓
National Center for State Courts	AI Advisory	✓	✗	✓	✗	✓
Sadasivan et al.	AI Text Detection	✗	✓	✗	✓	✓
Blümer et al.	Deepfake Detection	✗	✓	✗	✓	✓
Our Study	AI Use in the Judiciary	✓	✓	✓	✓	✓

In conclusion, reviewing the published literature on AI adoption in the judiciary, AI content detection, and deepfake detection has developed dramatically. Yet, policy implementation gaps, robust detection, and generalizability remain critical areas for continued research. Bridging these issues will advance knowledge on AI applications in legal domains could help shape more

effective AI content detection technologies. This review motivates the relevance and need for our research against the backdrop of the wider scholarly debate.

DATA

The foundation of this research is anchored in the data collected from a comprehensive survey designed to elicit insights into the role, requirements, and concerns surrounding the integration of AI within the Indiana court system. Responses were obtained from a diverse cohort of over 100 judges, representing a wide spectrum of judicial experience and backgrounds. The participant pool encompassed judges from various court types, including criminal, tax, mental health, and appeals courts. This audience had variations in time served on the bench, thereby ensuring a comprehensive representation of the Indiana judiciary.

This dataset was instrumental in identifying overarching themes related to areas of concern regarding AI adoption, in addition to consolidating suggestions pertaining to preferred methods of instruction and training. By analyzing the responses, the study was able to discern common anxieties, ethical considerations, and practical challenges that judges perceive as potential impediments to the successful implementation of AI technologies. Furthermore, the survey provided valuable insights into the preferred modes of learning and professional development that would best facilitate the integration of AI into judicial workflows.

The survey instrument also gathered data on the types of legal tools and processes that would most benefit from the application of AI, providing the research team with a clear starting point for targeted intervention. This information enabled the identification of specific areas where AI could offer the greatest gains in terms of efficiency, accuracy, and access to justice. The findings from this section of the survey elucidated the courts' and judges' aspirations for AI, their ideal pathways toward achieving the desired state, and how this research could best support and facilitate their objectives.

The survey included three open-ended questions, participation in which was optional, designed to capture qualitative insights into key concerns, most valued resources, and miscellaneous comments regarding AI. These responses were subjected to qualitative analysis to explore ambiguous themes and nuanced perspectives that might not be fully captured through quantitative data alone. This approach allowed for a deeper understanding of the judges' attitudes, beliefs, and experiences with AI, enriching the overall findings of the study and providing a more holistic view of the challenges and opportunities associated with AI adoption in the Indiana court system.

We also conducted qualitative interviews with 12 judges spread across different jurisdictions courts across Indiana, all of whom had varying levels of experience being on the bench to get information about their daily workflows and their key concerns. The interview transcripts and notes were instrumental in recognizing potential throttle points that could be solved through AI and analytical solutions to speed of the overall efficiency and turnaround time for the court. Key workflows were identified based on their importance, impact and ease of resolution to provide pilot proof of concepts for initial testing.

Figure 1: Level of Familiarity that the judges have with using different AI tools.

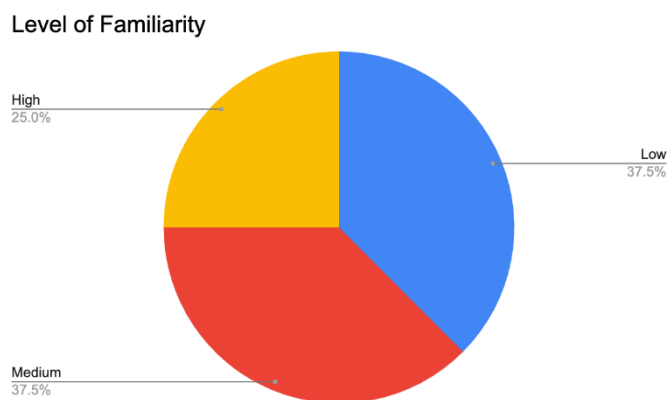
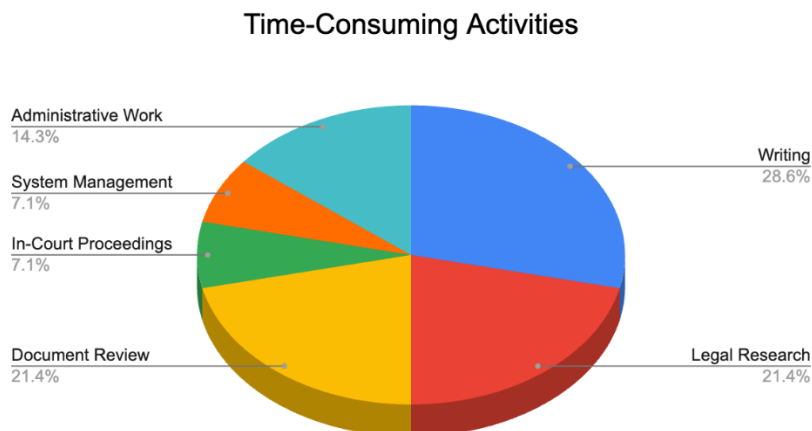


Figure 2: The most time-consuming activities according to Judges, some of which could be automated



METHODOLOGY

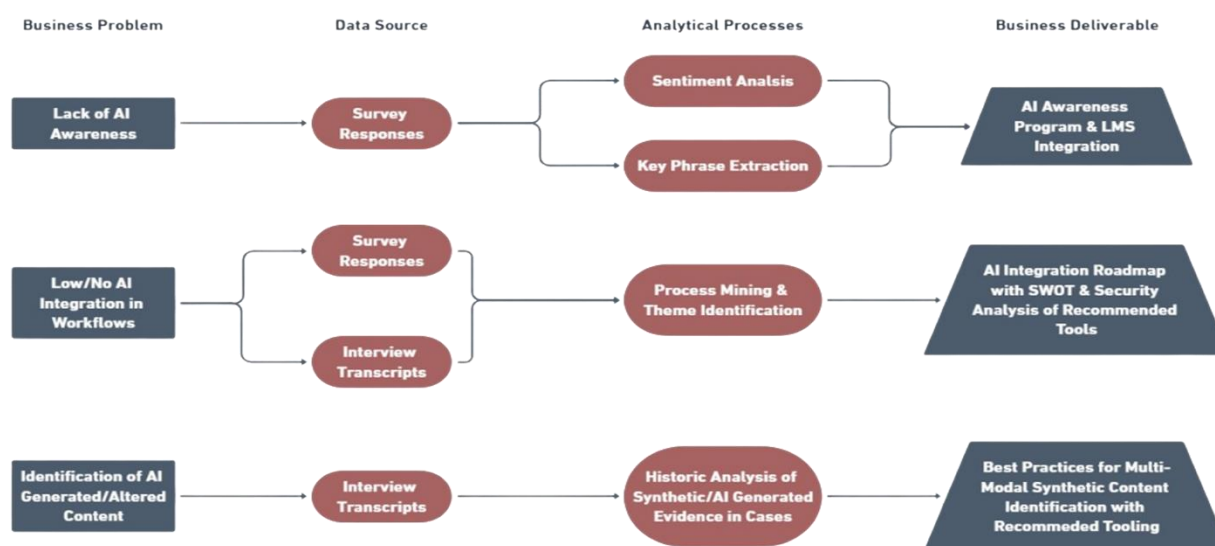
Our project operates on three major focus areas, each employing a blend of quantitative and qualitative modeling procedures.

The first area focuses on identifying gaps surrounding AI in the courts, which will inform the development and structure of an AI awareness packet for judges. The quantitative component of this area leverages survey data, wherein specific questions and responses are used to generate scores for key themes (e.g., Gen AI, Text to Speech, GPTs, Prompt Engineering). The most relevant themes, determined by these scores, serve as the foundation for the awareness packet. Additionally, sentiment analysis and key phrase extraction are performed on the open-ended survey responses to identify additional salient themes for inclusion in the awareness packet. The awareness packet will be created as an initial draft of documents and subsequently integrated into the Indiana Office of Court Services (IOCS) learning management system for regulation, control, and dissemination.

The second area of the project examines the daily workflows of judges to identify areas suitable for AI integration, with the aim of enhancing efficiency and productivity. This involves quantitatively scoring and identifying processes that judges would like to augment with AI. Qualitative interviews are then conducted with over ten judges across different counties, courts, and levels of seniority to gain deeper insights into these workflows, identify potential areas for improvement, and evaluate relevant AI tools for these specific needs.

The third area addresses multi-modal AI detection and is purely hypothetical. The goal is to identify tools that offer such services, identify datasets for testing these tools, and conduct a comparative market analysis to provide the IOCS with a list of costs and benefits associated with each tool. AI poses a wide range of challenges including bias, transparency and accountability². A recent UNESCO survey revealed that 44% of judicial operators are utilizing AI tools¹. A lack of guidance and training on AI usage is evident¹. This highlights the need for scalable and computationally lighter models for real-world application. We summarize the three research focuses below in Figure 1.

Figure 3: Three focus areas and methodological approach



AI TECHNOLOGIES

The first phase of our project involved performing NLP analysis on survey responses, particularly focusing on the open-ended questions, to establish a clear starting point for the content of the AI awareness packet. These questions primarily revolved around gauging judges' concerns, requirements, openness toward adopting AI, current familiarity levels with AI technologies, and overall opinions regarding the use of AI within their courtrooms. Instead of relying on basic or naive NLP algorithms, we leveraged the advanced capabilities of Azure Language AI services for two main analytical purposes—sentiment analysis and key-phrase extraction.

Survey responses from over 100 Indiana judges served as the primary data source for this analytical effort. Sentiment analysis and key-phrase extraction performed using Azure Language AI were chosen due to their superior accuracy and reliability compared to simpler algorithms. These advanced techniques helped identify critical themes such as generative AI, text-to-speech

tools, GPTs, and prompt engineering. The insights gained from this analysis were directly used to inform the development of an AI awareness packet, which serves as an educational resource specifically tailored for judges. This awareness packet was initially created as a draft document and subsequently integrated into the Indiana Office of Court Services (IOCS) Learning Management System (LMS) for controlled dissemination, regulation, continuous updating, and sharing among judicial officers.

The second part of the project aimed at identifying opportunities for integrating AI technologies into judicial workflows to enhance efficiency and productivity. Data sources included quantitative survey responses as well as qualitative interview transcripts from judges across different counties, courts, and seniority levels. Process mining techniques and thematic identification methods were employed to analyze this data comprehensively and pinpoint specific areas where AI could be effectively incorporated. The findings informed the creation of an actionable AI integration roadmap that included a detailed SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis and security evaluation of recommended tools. To ensure practical relevance and accuracy in understanding judicial needs, interviews were conducted with 12 judges representing diverse jurisdictions—including criminal courts, mental health courts, family courts—and varying levels of seniority. These interviews provided deeper insights into existing workflows and highlighted specific pain points faced by judges in their daily tasks.

The information collected through these interviews was combined with open-ended survey responses related to areas that judges believed would significantly benefit from AI integration. Some notable points of interest identified through this analysis included assistance in calendar tracking systems, opportunities for significant improvements in court transcription processes—particularly within mental health hearings—and the establishment of automated check-in and case-tagging systems during walk-in hours in family and misdemeanor courts. Although many of these processes are not inherently complex or overly convoluted, targeted AI integration could substantially boost efficiency by minimizing routine administrative burdens. This would allow judges more time to focus their efforts and decision-making capacities on more pressing judicial matters and complex processes that require nuanced human judgment.

The third component of our project addressed the growing challenge associated with identifying synthetic or AI-generated content within legal proceedings—a concern amplified by the rapid proliferation of generative AI models and deepfake technologies. Interview transcripts served as one primary qualitative data source for this prong. Additionally, historical analyses of synthetic or AI-generated evidence presented in legal cases were conducted to derive robust best practices for detection procedures. This involved systematically evaluating existing tools designed for multi-modal synthetic content identification and conducting a thorough comparative market analysis to assess each tool's costs, benefits, accuracy levels, scalability potential, transparency features, ease-of-use considerations, as well as overall suitability within a courtroom context.

To rigorously evaluate these detection tools' performance metrics—including precision rates and computational efficiency—we utilized publicly available benchmark datasets featuring diverse examples of AI-generated images, deepfakes videos, synthetic audio clips, and other forms of artificially generated media content. Each evaluated tool was documented comprehensively within a detailed proposal outlining their respective advantages and disadvantages across various critical metrics such as performance accuracy rates under realistic conditions, cost-effectiveness considerations for implementation at scale within judicial systems statewide or nationwide if necessary; transparency regarding underlying detection methodologies; ease-of-use by non-technical courtroom personnel; computational resource requirements; scalability; vendor support

availability; training needs; integration complexity with existing judicial IT infrastructure; and potential ethical implications surrounding their deployment in sensitive legal environments. This comprehensive proposal was formally submitted to the IOCS leadership team for further deliberation regarding strategic planning decisions related to future adoption pathways.

RESULTS

The AI awareness packet was successfully integrated within the IOCS learning management system allowing for it to be rolled out to judges on demand. The content can be controlled, managed, modified and monitored by the IOCS and make changes accordingly to keep the contents relevant over time.

Pilot programs for the workflows were setup and recommended to the IOCS and relevant owners to test and implement, subject to appropriate approvals being granted. If successful, the programs would be introduced to a wider set of judges with a choice to implement in their respective courts.

The overall comparison and proposal packet for AI tools to aid with multi-modal synthetic media detection was also prepared and provided to IOCS. The overall decision is subject to jurisdictional and approval process at multiple levels.

CONCLUSIONS

We were able to successfully obtain answers to our initial research questions and provide reasonable and practical suggestions to the Indiana Office of Court Services as a proposal for them to look at and decide on next steps.

We were able to successfully identify the key points of concern and the areas surrounding AI that the Indiana judges lacked understanding on. Some interesting things that came out of this analysis included – security concerns around sharing files with GenAI tools, lack of knowledge about AI tools and their use-cases, lack of understanding about other industrial use-cases for AI etc. The judges also seemed to agree on the fact that there were certain resources that would be more useful than others when it came to learning more about the current AI landscape. Most judges preferred videos as the preferred mode of instruction with a significant number of judges also giving a high priority to guest lectures. We also noticed a lot of judges being hesitant to use AI tools because there was no clear distinction between what tools classify as AI, a simple example would be ChatGPT v/s Grammarly.

We were able to tackle the question of what part of a judge's daily workflows can be optimized through the use of AI and analytical processes. The interviews with the judges proved to be immensely helpful in this regard and provided us with a lot of key insights. We learnt that a lot of judges would appreciate help in identifying useful or important parts of documents to speed up the process of doc review, allowing them to scan through larger documents in smaller amounts of time without having to spend a good chunk of their time on it. Calendar management was also a key concern that came up in some conversations. There were also court procedure related concerns such as the lack of a check-in process in the family and misdemeanor courts which makes it difficult for judges to figure out which defendants are in court, which ones have attorneys of their own etc. This slows down that overall process for everyone and therefore was something that the courts would appreciate. Expedition of transcription processes for mental health cases

and other occasional cases was also a major concern and something that needed to be solved on the ready.

We also made progress on the front of identifying tools that can detect and flag synthetic media. We provided a comprehensive list of tools available for the courts to test and then choose to rely upon for identify AI generated texts, videos, images and audio.

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