

Towards Automation and Digital Justice: A Review of Digital Twin Technology for Automation in Justice System

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Abstract

The problem in modern legal regimes is access to justice, which is often hindered by excessive expenses, excessive bureaucracy, and inefficiency within the entire system. Although new technologies in court automation have made it easier to obtain judicial access, increasingly gauged by convenient case law and ease of document handling, much remains unexplored, especially for marginalised groups. In turn, in the 21st century, solutions to digital justice emerged, and one such prospect is Digital Twin Technology. DTT was initially designed as an industrial tool to support the creation of a real-time, dynamic virtual model of a physical system, which can support simulation, monitoring, and predictive analysis. The given research examines the next generation use of DTT in courts. It involves two main novelties: (1) Virtual Reality (VR) Trials, allowing participation remotely with the use of fully immersive digital courts, and (2) Immersive Evidence Presentation, where 3D models are applied to bring maximum clarity and objectivity in the processing of a complicated case. Such tools hold the potential to address long-standing issues related to access, fairness, and efficiency within the judicial system. Nevertheless, the issue of implementation barriers, including algorithmic bias, data security, and infrastructural requirements, should be handled by implementing effective regulatory policies, transparent algorithms, and interdisciplinary collaboration. In methodological terms, the study is qualitative, based on a systematic analysis of secondary sources that involve examining primary documents in the context of peer-reviewed literature and reports presented by institutions. The paper critically analyses the current state of DTT applications in judicial systems, examining both the opportunities and limitations.

Keywords: Digital Twin Technology, Judicial System, Automation, Digital Justice, Court Proceedings, Digital Evidence, Case Management System.

Introduction

In modern legal systems, the administration of justice remains a key challenge, and inefficiency, high costs, and complex procedures often hamper fair dispute resolution (Bush, 1984). Although court automation has made significant strides in improving justice by digitising case law, streamlining document exchange, and simplifying judicial procedures, marginalised groups and ordinary citizens still face substantial obstacles (Afzal, 2024). In the 21st century, the convergence

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of emerging technologies and judicial processes has led to a paradigm shift toward a digital justice system that enhances transparency, efficiency, and inclusiveness (Babikian, 2023). Among these innovations, digital twinning technology (DTT) has emerged as a ground-breaking tool with the potential to revolutionise the administration of justice, case management, and trial procedures (Bhatt et al., 2024).

Initially developed for industrial optimisation, DTT enables real-time monitoring, predictive analysis, and simulation-based decision-making by creating dynamic virtual replicas of physical systems (Al Zami, Shaon, Quy, & Nguyen, 2025). Today, its applications range from health care to urban planning to justice. In the legal system, DTT has facilitated automated case management, virtual courts, artificial intelligence-assisted judicial decision-making, and immersive evidence presentation, addressing long-standing inefficiencies and improving the effectiveness of law enforcement (Varshney, 2005). At the same time, it ensures higher fairness and accessibility.

This study explores innovative applications of digital courtroom technology (DTT) in the justice system, focusing on two cutting-edge advances:

1. Virtual Reality (VR) trial by building fully immersive digital courtrooms, DTT enables judges, litigants, and witnesses to participate remotely, eliminating geographic and logistical constraints. This is particularly transformative for transnational disputes, high-risk cases, such as those involving infectious diseases, and individuals with reduced mobility.
2. Immersive evidence presentation through 3D modelling and dynamic simulations, DTT can enhance the clarity of evidence in complex cases (e.g., accident reconstruction, construction disputes), reduce judicial bias, and improve decision accuracy.

Despite the promise of the DTT, challenges to its implementation include data privacy issues, algorithmic bias, and high infrastructure costs. This study proposes a regulatory framework to ensure ethical deployment, emphasising transparent algorithms, robust cybersecurity, and interdisciplinary collaboration among legal, technical, and social science experts. By addressing these obstacles, the DTT can usher in a new era of efficient, transparent, and fair justice, aligning with global efforts to modernise the judiciary.

By providing empirical insights into the transformative potential of digital twin technologies while outlining actionable policy recommendations for their sustainable integration into the global justice system, this study highlights the potential of digital twin technologies to transform the global justice system, contributing to the growing body of legal technical discourse.

The ethical review process of digital twinning needs to be strengthened to validate its social value and legal principles in the application process. The full implementation of digital twins will require extensive cooperation among experts from various fields of study. The justice system requires experts from the fields of law, technology, and social sciences to collaborate on implementing digital twin solutions for judicial advancement. Justice projects will accelerate healthy development through interdisciplinary collaboration and the full utilisation of the interests of each, enabling the implementation of digital twins.

Research Methodology

This study employs a qualitative research method, grounded in a comprehensive review and analysis of the existing academic literature. The methodology was based on a systematic literature analysis using secondary sources only, including peer-reviewed academic articles, relevant books, and authoritative institutional reports retrieved from Google Scholar, Web of Science, and Scopus. The method consists of several key stages: first, a comprehensive literature search using target keywords such as "digital twins, judicial system," and "legal automation"; and then, a

comprehensive literature search using target keywords such as "digital twins, "judicial system, "and "legal automation." The most relevant sources were systematically screened and selected according to predefined inclusion criteria. A rigorous content analysis of the selected materials was conducted to identify the main themes, patterns, and gaps in the current research on the application of digital twins in the field of justice. This analytical process includes a comparative examination of the experiences of different justice systems using Digital Twin Technologies, a critical assessment of the reported benefits and challenges, and a synthesis of key findings to form a unified understanding of the topic. The strength of the method lies in its ability to integrate and analyse existing knowledge; its limitations include potential gaps in literature coverage and reliance on previously documented cases. The ultimate goal is to conduct a well-structured, evidence-based assessment of the role of digital twinning technology in the justice system, informing both academic discussions and practical implementation strategies.

Digital Twin Technology: An Overview

The Definition and Concept of Digital Twin

A Digital Twin is a technology that creates virtual copies of physical entities through Digital means, utilising real-time data for interaction and feedback to achieve accurate simulation, prediction, and optimisation of physical entities (Javaid et al., 2023). NASA first proposed it in the context of spacecraft health management and has since been widely adopted in industry (Litt et al., 2004). The core of the digital twin is to connect the physical world with the digital world, and to manage the entire life cycle of physical entities by constructing virtual models (Jiang et al., 2021). The digital twin model can not only reflect the current state of the physical entity but also predict its future behaviour through data analysis and simulation, supporting decision-making (Rasheed et al., 2020).

Key Features and Benefits of Digital Twin Technology

Real-time performance, enabled by sensors, allows the DTT model to process data from the real entity and update itself easily over time. Because the model updates in real-time, it can accurately display what the real thing is doing and assist with continuous monitoring and decision-making (Jedermann et al., 2023). High Fidelity, with accurate modelling methods for shape, function, and behaviour, a digital twin model can restore the characteristics of physical entities to a great extent (Tao et al., 2022). Since the digital twin model is highly accurate, it is valuable for analysing and enhancing complicated systems. Extensibility through DTT is scalable, as it can be modified or expanded to meet the project's specific needs. Its use in diverse industries becomes possible because digital twins can be scaled to meet the needs of these industries (Attaran & Celik, 2023). The operation and optimisation of the model with DTT depend on a large amount of data. If the digital twin is fed with data frequently and updated, it will grow and enhance its predictive capabilities (Javaid et al., 2023). Due to this feature, digital twin technology leverages big data and artificial intelligence to inform wise decisions. Digital simulation and optimisation enable you to do less work and incur fewer expenses. Evaluate risks and conduct emergency drills in a virtual environment to mitigate operational risks. DTT use live monitoring to ensure the highest quality and improved performance of the products being produced.

Digital Twin Applications in Various Industries

Manufacturing: Many manufacturing companies rely on digital twin technologies for design, process control, and equipment maintenance. The use of digital twin models by engineers enables

them to verify and enhance designs virtually, resulting in reduced expense and effort in creating a physical prototype. While the production process is ongoing, the digital twin model can monitor the equipment's operation, identify potential issues, initiate repairs early, and enhance productivity and equipment reliability.

Aerospace: Digital twin technology originated from the Aerospace field. Using digital twin models, engineers of aircraft and satellites can observe the machines' activities as they happen, find problems, and carry out planned maintenance. This technology is also used in flight simulation training to enhance the training of pilots and their safety (Dinçer, 2023).

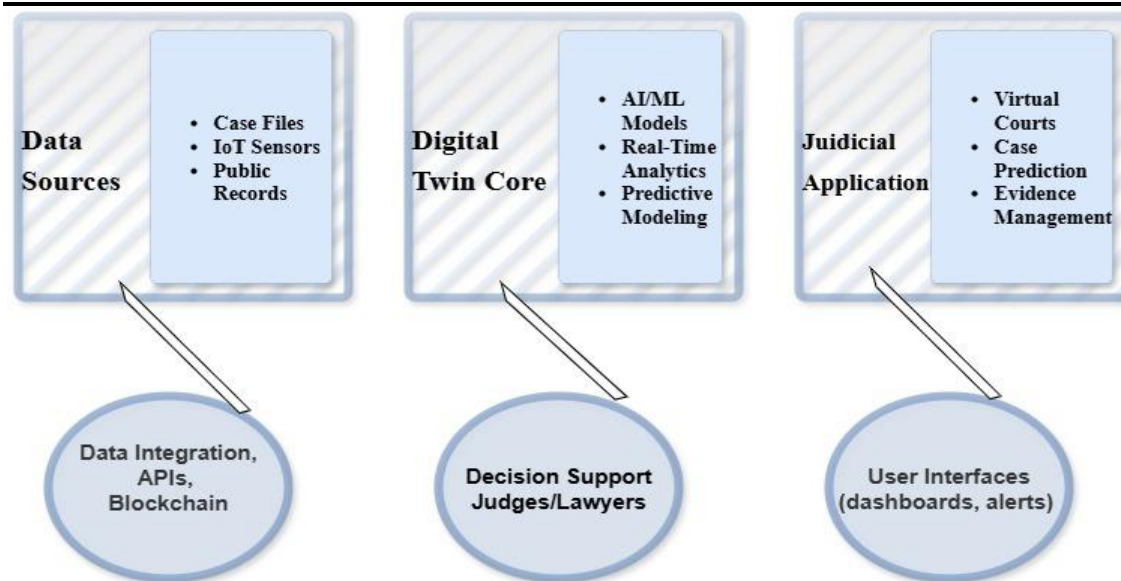
The energy sector, including power plants, energy infrastructure, and energy management systems, utilises digital twins extensively in the energy industry (Dinçer, 2023). Having a digital twin model enables in-depth monitoring of the equipment's condition, which helps boost energy output and reduce energy usage (Fatima, Amjad, & Afzal, 2025). In digital twin technology applied to transmission grids, it is now possible to observe and manage power grid operations in real-time, thereby enhancing the stability and reliability of the power grid (Fatima et al., 2025).

Medical care: Digital twin technology aids in patient care plans, virtual surgical training, and the enhancement of medical equipment. Developing a patient's digital twin enables doctors to monitor their health and tailor treatment plans to meet the individual's needs (Fatima et al., 2025). With digital twin technology, surgeons can use a virtual environment to practice and guarantee that surgeries are carried out safely.

Transportation and logistics: Digital twin technology finds applications in various fields, including innovative traffic management, logistics planning, and vehicle maintenance. If we digitalise our traffic network, we can monitor the situation, adjust traffic light patterns, and help prevent traffic jams (Lämmer & Helbing, 2008). In logistics distribution, the use of digital twin technology enables the selection of the most efficient routes, thereby increasing efficiency and reducing shipping costs (Ghani & Amjad, 2024).

Architecture and urban planning: With architects, urban planners, and construction managers, the digital twin technology has seen wide application in design, building management, operations, and city planning (Al-Sehrawy et al., 2021). With a digital twin model, architectural designs are displayed virtually and optimised, resulting in improved building performance and quality. In this area, digital twin technology can simulate city activities and growth, providing the scientific basis for urban planning and management (Haider, 2024).

Rapidly, digital twinning is revolutionising how businesses conduct their daily operations, thanks to its cutting-edge technology. As technology continues to advance and costs decrease, digital twins will be applied in other fields, assisting in the development and growth of society (Mihai et al., 2022).

Figure 1: Conceptual Framework of Digital Twin in Justice Systems

Automation in the Justice System: Challenges and Opportunities

Challenges Facing the Current Justice System

Growth in caseload and limited resources: As society develops, the number of judicial cases increases year by year; however, the growth rate of judicial resources is difficult to match (Dakolias, 1999). This imbalance between supply and demand has led to the aggravation of the backlog of cases, which causes parties to wait too long for their trials and affects the realisation of judicial efficiency and fairness (Nnamanya, 2019). For example, some grassroots courts are faced with a large number of civil disputes, and judges must spend a considerable amount of time dealing with cases, resulting in prolonged trial periods and a failure to promptly protect the legitimate rights and interests of the parties.

Increased complexity of cases: The legal relationship in modern society is becoming increasingly complex, with new cases constantly emerging, such as cybercrime, intellectual property disputes, and financial fraud (Amoo et al., 2024). These cases involve not only complex legal issues but also often require specialised technical expertise to assist in the conduct of the proceedings. In this case, the traditional mode of judicial work is inadequate. Judges and judicial personnel must dedicate a significant amount of time and energy to studying and understanding the complexity of cases, which increases the difficulty and risk associated with judicial work (Robel, 1990).

Data management and information sharing: The judicial system has a large number of paper documents and decentralised information systems. There are many problems in data management and information sharing between these documents and systems. On the one hand, the storage, management, and retrieval of paper documents are inefficient and prone to loss and damage; on the other hand, the information systems between different departments lack effective interoperability, which leads to the serious phenomenon of information isolated islands and affects the coordination and efficiency of judicial work (Otjacques, Hitzelberger, & Feltz, 2007). For example, in criminal cases, there is frequent exchange of case information between the Public Security Bureau, the prosecution, and the courts, but manual data entry and transmission are often required because of incompatible information systems, which increases the amount of work and the potential for error (Goodhue et al., 1992).

The public's expectation of judicial justice has increased: With the progress of society and the enhancement of legal consciousness, the public's expectation of judicial justice is continually rising (Gallagher, 2006). They demand not only the fairness of judicial results but also the transparency and efficiency of the judicial process. However, the current judicial system still has some deficiencies in terms of information disclosure, live court proceedings, and judicial documents, which cannot fully meet the public's needs. It might result in people questioning the credibility of law courts and eroding their influence (Shafiq et al., 2023).

Potential Benefits of Automating the Justice System

Improving judicial efficiency: The process of automation makes inputting, storing, and accessing case data much quicker and less prone to error. Judges and judicial officers can now work more efficiently, as they have access to case documents at any time through the electronic filing system (Fatima et al., 2025). Furthermore, the automation of procedures enables faster case management, improved case sharing, more efficient resource allocation, reduced case overload, and shorter trial times, ultimately benefiting litigants with faster judicial assistance (Fatima et al., 2025).

Making judicial fairness better: With the help of automation, mistakes caused by human factors can be avoided, and the fairness and correctness of decisions may increase (Cummings, 2017). Thanks to big data analysis and AI, the cases can be wisely analysed and forecasted to give helpful guidance to judges in applying the law and finding facts (Moses & Chan, 2014). At the same time, an automated system ensures that the entire process and its outcomes can be tracked and followed by relevant parties, thereby increasing transparency and enabling the public to understand better how the system operates (Amjad et al., 2024).

Optimising the allocation of judicial resources: Due to automation, resources in the judiciary can be well-managed and assigned based on their specific needs. The number of judges, bailiffs, and clerks is determined based on the nature of the case and its location, resulting in more efficient use and reduced waste of these resources. Additionally, with its automated system, the justice bureau can forecast and issue early warnings about the need for additional resources, allowing necessary resources to be prepared and deployed promptly (Hassan et al., 2023).

Enhancing the Adaptability and Flexibility of the Judicial System

Changes and development in the judicial system do not hinder the automation system because it can adjust easily and quickly (Pasquale, 2019). Case processing procedures and rules can be updated through automation as laws and regulations are regularly modified, ensuring that all legal work follows the correct steps (Kluttz & Mulligan, 2019). In addition, due to automation, the judicial system's resources can be easily adjusted depending on the types of cases and needs, making the response to these cases faster and more effective (Petrova, 2017).

Overview of Existing Automation Initiatives in the Justice System

Electronic filing system: The electronic filing system automates the judicial process by allowing case files to be stored electronically. Judges and those working with them can quickly locate case files, hold meetings, and complete necessary paperwork, made possible by the electronic system (Fatima et al., 2025). Electronic files make it easy to organise, search, and store case information, and they also speed up and improve the accuracy of work connected to the cases. Additionally, integrating the electronic file system with the court hearing system and document service system ensures that the judicial process runs smoothly and automatically (Fatima et al., 2025).

Intelligent case handling system: Utilising big data, AI, and comparable technologies, the intelligent auxiliary case handling system assists by analysing cases, providing legal recommendations, and generating documents for judicial personnel (Nosheen et al., 2024). Through case data analysis, the system can identify similarities and differences between various cases, providing valuable insights that benefit judges in studying and applying laws and facts to specific cases. At the same time, the department can rely on the intelligent case handling system to create documents, thereby increasing the effectiveness and quality of their preparation (Zantout & Marir, 1999).

Online court hearing system: The online court hearing system is a type of judicial automation measure that has been rapidly developed in response to exceptional circumstances, such as the current epidemic situation (Sourdi et al., 2020). Through the online trial system, judges, parties, and lawyers can conduct court activities in various locations across the network, thereby breaking the restrictions of time and space and enhancing the trial's efficiency. The online trial system can not only facilitate the real-time transmission of video and audio during the trial process, but also perform functions such as evidence display and trial transcript production, thereby ensuring the smooth progress of trial activities (Chen et al., 1995). Additionally, the online trial system can also record the entire audio and video recording of the trial process, thereby enhancing the transparency and fairness of the trial (Nosheen et al., 2024).

Judicial open platform: Judicial open platform is an essential manifestation of the automation of the judicial system, which realises the openness and transparency of judicial information (Myronenko et al., 2024). Through the judicial open platform, the public can easily query the progress of a case, view judgment documents, watch court videos, and access other relevant information, thereby understanding the judicial process and results. The judicial open platform can not only enhance the public's trust in the judicial system, but also accept the public's supervision and promote the realisation of judicial justice. Currently, China's judicial open platform encompasses courts, procuratorates, and other judicial departments, thereby forming a relatively comprehensive system of judicial openness.

Judicial big data platform: The judicial big data platform is a crucial support for automating the judicial system, enabling centralised management and analysis of judicial data. Through the judicial big data platform, the judicial system can integrate and analyse case data, judicial resource data, and social data to provide data-driven support for informed judicial decision-making. A judicial big data platform can not only facilitate intelligent analysis and prediction of cases, but also predict and warn of demand for judicial resources, providing a basis for the rational allocation of judicial resources. In addition, the judicial big data platform can also serve as a reference for the formulation and adjustment of judicial policies, promoting the scientific and standardised development of the judicial system.

The automation in the judicial system is continually developing and improving, providing strong support for the efficient operation of the judicial system and the pursuit of justice. However, the application of automation also faces several challenges, including data security and privacy protection, technical standards and specifications, personnel training, and adaptation. Therefore, in the process of moving forward with the automation of the judicial system, it is necessary to take complete account of these challenges and take adequate measures to address them to ensure the healthy development of the automation of the judicial system, make greater contributions to the realisation of judicial justice and the construction of a society ruled by law.

Digital Twinning in the Automation of the Justice System

The Potential Use of Digital Twins in the Justice System

Virtual court: Digital twin technology can build a virtual court environment and realise functions such as remote trial, virtual evidence display and interaction. Through the virtual court, parties and lawyers can participate in the trial from different locations via the network, thereby breaking the restrictions of time and space and improving the trial's efficiency. At the same time, virtual courts can utilise three-dimensional modelling and virtual reality technology to provide an intuitive display and interaction of evidence, thereby helping judges and juries better understand and evaluate the evidence.

Case management: Using digital twin technology, case information can be collected, stored, and analysed in real-time with the aid of a digital model. Analysis and real-time monitoring of the data by the digital twin enable the prediction of target development and support judges in their decision-making. Additionally, utilising digital twin technology enables cases to be handled automatically, ensuring that digital resources are allocated appropriately and cases remain open.

Evidence management: With digital twin technology, it is possible to digitally collect, store, and analyse every piece of evidence. With the use of Internet of Things sensors and devices, actual information is collected and stored in a digital model without delay. The digital twin model can intelligently examine the evidence data, verify its legitimacy, and support the case trial with solid evidence. Additionally, digital twin technology enables us to digitally display and interact with evidence digitally, thereby enhancing its presentation and transparency.

Management of prisoners: With the use of digital twin technology, a model of the prison can be created, and all activities involving prisoners can be closely monitored and managed in real-time. Through IoT devices and sensors, prisoners' behavioural data and health data can be collected in real-time and stored in a digital twin model. The digital twin model can intelligently analyse prisoner data, predict their behaviour trends, detect potential security risks in advance, and provide decision support for prison managers. In addition, digital twin technology can also realise the optimal allocation of prison resources and improve the efficiency and security of prison management.

Use Cases of Digital Twins in the Automation of the Justice System

Court Proceedings: Through the virtual court environment, parties and lawyers can participate in the trial from different locations via the network. Digital twin technology enables the real-time transmission of video and audio during the trial process, as well as the virtual display and interaction of evidence, ensuring the smooth progression of trial activities. The digital twin model can analyse data during the court trial in real-time and provide judges with legal application suggestions and case analysis reports. Through the analysis and mining of massive case data, the digital twin model can quickly identify the similarities and differences among cases, helping judges better understand the legal application and fact-finding in cases. Digital Twin Technology can automate the entire process of audio and video recording during court trials and automatically generate court transcripts. Through speech recognition and natural language processing technology, the digital twin model can convert speech information in the court trial process into text records, thereby improving the efficiency and accuracy of court trial records.

Evidence Management: Through Internet of Things devices and sensors, digital twin technology can facilitate the real-time Collection and storage of evidence. For example, in criminal cases, evidence data can be collected by surveillance cameras, fingerprinting devices, and DNA detection devices, and stored in digital twin models. The digital twin model can intelligently analyse the

evidence data to verify the authenticity and reliability of the evidence. Through the analysis and comparison of evidence data, the digital twin model can identify abnormal situations in evidence and provide strong support for the trial of cases. Digital twin technology enables the virtual display and interaction of evidence, helping judges and juries better understand and evaluate it. Through three-dimensional modelling and virtual reality technology, the digital twin model can intuitively display evidence, improving the display effect and transparency of the evidence.

Management of prisoners: DTT enables real-time monitoring of prisoners through Internet of Things devices and sensors. For example, prisoners' behavioural and health data can be captured by surveillance cameras, access control systems, and vital signs monitoring devices, among others, and stored in a digital twin model. The DTT model can intelligently analyse prisoner data, predict prisoner behaviour trends, and detect potential security risks in advance. Through the analysis and mining of prisoners' behaviour data, the digital twin model can identify abnormal behaviour in prisoners and provide decision support to prison managers. DTT can realise the optimal allocation of prison resources and improve the efficiency and security of prison management. Through the analysis and optimisation of prison resource data, the digital twin model can reasonably allocate personnel, materials, and equipment resources to ensure the regular operation of the prison.

The Benefits of Using Digital Twins in the Justice System

Improving efficiency: Digital Twins can automate the justice process, reducing manual time and errors. For example, through the electronic file system and intelligent auxiliary case handling system, case information can be automatically entered, stored, and analysed, thereby improving the efficiency of case processing. It can realise the dynamic monitoring and optimal allocation of judicial resources and improve resource utilisation. Through the analysis and optimisation of judicial resource data, the digital twin model can reasonably allocate judicial resources such as judges, bailiffs, and clerks, reduce the backlog of cases, and shorten the trial cycle.

Improving accuracy: DTT can utilise big data analysis and artificial intelligence algorithms to intelligently analyse and predict case data, providing reference opinions for judges to help them better understand the application of law and fact-finding in specific cases. Through the analysis and mining of massive case data, the digital twin model can quickly identify the similarities and differences among cases, thereby improving the accuracy of judicial decision-making.

Evidence Verification: It enables the digital Collection and intelligent analysis of evidence, verifying the authenticity and reliability of the evidence. Through the analysis and comparison of the evidence data, the digital twin model can identify abnormal situations in the evidence, provide strong support for the trial of the case, and reduce the possibility of incorrect judgment.

Enhancing transparency: Leave digital traces throughout the judicial process. Digital twin technology can achieve full traceability of the judicial process, thereby enhancing judicial transparency. Through the real-time Collection and storage of data in the judicial process, the digital twin model can record every step of the case processing and ensure the openness and transparency of the judicial process.

Information Disclosure: DTT can be integrated with the judicial open platform to realise the openness and transparency of judicial information. Through the judicial open platform, the public can easily query the progress of a case, view judgment documents, watch court videos, and access other relevant information, thereby understanding the judicial process and results, and enhancing their trust in the judicial system.

Enhancing Safety: DTT can facilitate the real-time monitoring of judicial facilities and enhance the security of these locations. Using the Internet of Things and sensors, the digital twin model

collects real-time data from critical locations, identifies potential security risks, and takes preventive measures to prevent them from compromising security.

Business Risks: DTT relies on big data and AI algorithms to detect potential issues in the judicial process and take proactive measures to mitigate any risks. The examination of judicial records enables the digital twin model to identify risk factors, support decision-making by judicial staff, and enhance the security levels of the judicial area.

The Major Challenges and Considerations

Technological Challenges

The field of cybersecurity: The process of uniting various data resources into a single, unified system, known as data integration, is crucial. The judicial system gathers data from various sources, including case details, evidence materials, court reports, and information about the parties. Because different information systems store data in various formats, it is challenging to integrate them effectively. There are times when data used for digital twin building may be mistaken, with some missing parts and duplicates, which makes the model unreliable. Ways to check and fix the data should be set to protect its quality.

Real-time update: Although a digital twin needs real-time updates, some updates in the legal system are made infrequently. The systems for obtaining and sending data must be perfected to achieve real-time coordination of the data. Personal privacy and sensitive information comprise a significant portion of the data processed in the justice system, and breaching this data can lead to serious problems and risks. Ensuring the security and integrity of data requires the use of encryption, access control, and data backup. Because the Digital Twin System communicates and shares data over networks, it is vulnerable to such attacks. We must add a firewall and an intrusion detection system to our network security to prevent attacks and malicious infiltration.

System stability: Having a stable and dependable digital twin system is crucial for the operation of the justice system. To ensure the system continues to work correctly in various situations, including high workloads, a high-availability architecture and fault-tolerant mechanisms are required.

Organisational Challenges

Change Management: There is resistance in the justice system because the old practices and culture make it hard to accept new technology. Focus on informing the general public about digital twin technology, developing judicial employees' understanding of it, and fostering a culture of adaptability among staff every year.

Coordination among departments: The process of utilising digital twins necessitates collaboration among various organisational units. Every department should collaborate and talk with each other to guarantee the project runs smoothly. Since using Digital Twins is a complicated engineering solution, a skilled project management team must plan, implement, and monitor its use. It is essential to create a plan and schedule for the project, ensuring it is completed effectively and within the required timeframe.

Training: It is essential to train legal experts in the technical aspects of digital twinning, as it utilises sophisticated instruments and methods. Data Collection, building models, and working with the system are some of the items covered in the training.

Legal Training: As digital twins introduce new issues and risks, judicial departments must train their staff in relevant laws and policies to ensure the technology is used legally.

Regular updates: Due to the regular updates in digital twin technology, judges should participate in ongoing activities and receive regular training to adapt to the new requirements.

Legal and Regulatory Considerations

Compliance with Laws and Regulations: DTT handles a significant amount of private and sensitive data belonging to numerous individuals and must therefore strictly adhere to both the Personal Information Protection Law and the Data Security Law, ensuring the proper handling of this information. Parties concerned must be able to detect and prevent mistakes and secure their data, so a mechanism to protect data subjects' rights should be established.

The legal effect of electronic evidence: Any electronic evidence from digital twin technology should follow the criteria set by law for it to be allowed and validated in a court of law. It is necessary to prove the authenticity of electronic evidence by establishing rigorous authentication and verification processes.

Legal Interpretation and Application: The use of digital twin technology may raise new legal questions and disputes. Explanations and interpretations of the law must be released promptly to maintain consistent and fair judicial practice.

Industry Regulation: The industry regulators should oversee and manage the use of digital twin technology in courts. It is essential to conduct regular inspections and evaluations to identify and resolve issues promptly. Regular compliance audits should be conducted to ensure that the system complies with all necessary laws, regulations, and policies, and that any identified problems are addressed promptly.

Conclusion

Improving judicial efficiency, digital twinning technology can significantly enhance the judicial system's efficiency through automation and intelligence. From case management to the trial process, from evidence Collection to decision support, digital twin technology can reduce the time and errors associated with manual operations, optimise the allocation of judicial resources, and shorten the cycle of case trials, thus providing judicial relief to litigants more quickly. Enhancing judicial fairness through accurate data analysis and prediction models, digital twin technology can provide an objective reference for judicial decision-making and reduce the interference of human factors. This helps improve the accuracy and consistency of judicial decision-making, reinforcing public trust in judicial impartiality. At the same time, digital twin technology can facilitate the entire process of judicial traces and traceability, thereby further enhancing judicial transparency.

Enhancing judicial transparency, digital twin technology can facilitate the real-time Collection, storage, and disclosure of judicial information, allowing the public to access it more easily. Through the judicial open platform, the public can inquire about the progress of a case, view the judgment document, watch the court trial video, and access other relevant information, thereby gaining a deeper understanding of the judicial process and its results. This not only strengthens the public's trust in the judicial system but also provides strong support for social supervision.

Improving the management of judicial resources, digital twin technology can dynamically monitor and analyse judicial resources, enabling the rational allocation of resources. Through the analysis and optimisation of judicial resource data, the digital twin model can reasonably allocate judicial resources, such as judges, Bailiffs, and clerks, improve resource utilisation, and reduce resource waste and idleness.

Promoting judicial innovation, digital Twin Technology provides new ideas and methods for the innovation of the judicial system. Through the application of virtual court and an intelligent

auxiliary case handling system, the judicial system can explore new working modes and processes, and improve the quality and level of judicial services. At the same time, digital twin technology can also promote the integration of justice and other fields, and promote the modernisation and intelligent development of the judicial system.

Responding to new legal challenges with the development of society and the progress of Science and technology, new legal problems such as cybercrime and the Ethics of artificial intelligence are constantly emerging. Digital twin technology can provide technical support and a decision-making basis for dealing with these new legal challenges. Through the analysis and simulation of new case data, digital twin technology can help judicial personnel better understand and address these problems, promoting the continuous improvement and development of the law.

In short, the application of digital twin technology in the judicial system has broad prospects and great potential. While many technical, organisational, and legal challenges remain, these are expected to be addressed through continued research and innovation. Digital twin technology can not only improve the efficiency and fairness of the judicial system but also enhance judicial transparency, optimise the management of judicial resources, and promote judicial innovation, providing strong support for the realisation of judicial justice and the establishment of a society governed by law. In the future, as technology continues to mature and applications expand, digital twin technology will play an increasingly significant role in the judicial system.

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