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Artificial Intelligence and the Transformation of Criminal Trials in Jordanian Legislation

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ABSTRACT:

The research will try to explore and critically examine the various facets of automation in the adjudicatory process with a more pronounced focus on the criminal trials. It will discuss how the technological advancements and the stakeholders in the administration of criminal justice can play a pivotal role in embracing the digitized justice system. The research is of particular relevance to the policy formulators and the judges and the legal practitioners in the judiciary. It endeavors to give an insight into the potential benefits of automation in the criminal trial which are, among others, accuracy of the judgment, reduced time consumption during the trial and the post-trial proceedings, and enhanced public trust in the judiciary. Secondly, it focuses on the material changes that have taken place in either the functions of the court or in the type of work that it is doing through the introduction of automated systems. This part will critically examine the theoretical and philosophical issues arising from the attempts to understand the work of the court in the face of bureaucratic and technological change. Like most of the sociological work, there are many possible ways of characterizing the nature of the work of the court. This research will focus on the way in which the new technological and management systems are seeking to categorize the work of the court in different ways. It is a transformative phase for the judiciary worldwide. Since the creation of the world's first artificial intelligence (AI) judge in 2017 in Beijing, China, various countries in the world are employing different kinds of technological advancements to reshape their courts. In the digitized justice system, the computers or the IT systems will take over judicial decision-making, rather than a human judge carrying out those assessments. **Scope of the research:** It will focus on providing a comprehensive understanding of the existing methodology and procedures in criminal trials, as well as the different phases of a criminal trial. It will also explore the challenges in the current system and how automation can potentially mitigate these issues. The study will not be looking into the history or the development of criminal trials, or the different types of criminal offences or the sentencing powers of criminal courts.
Research methodology: The main aim of this aspect of the research was to critically evaluate the information provided in the literature vis-a-vis the information gathered in real life through consultations and technology visits. A reflective analysis of the evidence to establish the relative pros and cons of adopting automated criminal trials was a part of this phase of research. Most importantly, the entire research process was geared towards aligning the proposed literature and the knowledge obtained from the field work. The findings of the field study really did buoy up the points made in the literature, and there had been a coherent understanding of the information provided.

1. Introduction

The criminal justice process typically begins when a police officer, or a private individual, files a complaint, which is also known as a criminal allegation. This triggers an investigation by the police in order to arrest the suspect and to gather evidence. In the United Kingdom, a court requires the agreement of the Director of Public Prosecution (DPP) in order for a criminal trial to be initiated against a suspect. Once the prosecution has been initiated, a court will examine the evidence of a case and the defendant will have the opportunity to enter a plea. In a criminal trial, the burden of proof is on the prosecution in order to prove the allegations against the defendant. This is in comparison with a civil trial, in which the burden of proof falls on the claimant.[1] At the trial, a defendant has the opportunity to produce a defense to the allegations. In accordance with the right to a fair trial under Article 6 of the European Convention on Human Rights, the prosecution must satisfy the criminal standard of proof, which is that the case against the defendant must be proved beyond reasonable doubt. This is in comparison with the civil standard of proof, according to which the claimant is required to prove the case 'on the balance of probabilities'. The trial and the verdict are conducted and given by a court alone. An exception to this general rule is the right of the defendant to elect for summary trial in a magistrate's court according to section 17 of the Magistrates' Courts Act 1980. Finally, if a defendant is found guilty, the court will proceed to deliver the sentence. Penalties for criminal offences vary from relatively minor fines or less serious community service orders to the most severe penalties such as life imprisonment. On the other hand, if a defendant has been acquitted, it is generally not possible to bring the same allegations against the defendant again. This is a historic right which stems from the long standing legal principle known as double jeopardy. However, the principle is now subject to a number of exceptions. For example, new and compelling evidence may allow subsequent prosecution for the same offence.

1.1 Definition and Purpose

A criminal trial is a formal legal proceeding in which the state arraigns and tries a person for a criminal offense. Its purpose is to determine the guilt or innocence of the accused person and to provide him/her with a fair trial in which he/she is given every opportunity to defend himself/herself against the charges. Such a trial must be conducted according to the due process of law and all the established constitutional procedures. The concept of a fair trial is seen as an essential part of human rights. It is also a cardinal feature of the rule of law, as well as a proper criminal justice system. The right to a fair trial is provided by the Constitution of the Republic of Ireland, at Article 38.1. This Article recognizes the fundamental nature of the right, stating that no person shall be tried on any criminal charge without a trial in due course of law.[2] The Constitution refers to a 'trial in due course of law', suggesting such a right as a necessary feature of a proper legal system. The term 'due process' means that the trial should be carried out in an established manner, ensuring that no unlawful or arbitrary action could take place. This notion relates to the protection of individuals against the power of the state and its agents. The right to a fair trial has been also incorporated into the European Convention on Human Rights. Article 6 of the Convention guarantees every individual the right to a fair trial, providing a detailed and comprehensive list of the different aspects of this right. These include the presumption of innocence, the right to attend the trial and the right to legal representation. This also reflects the idea that a fair trial goes beyond subjective conceptions of justice and that the legal process itself must be fair. Such a provision has been interpreted and applied by the European Court of Human Rights in Strasbourg in a substantial body of case law.

1.2 Phases of a Criminal Trial

During a criminal trial, there are a number of different phases that are undertaken. First, the trial will begin with the opening statements from both the prosecution and defense side. These statements are a brief outline from each side as to what they believe the evidence will show. After that, the prosecution will begin to call their witnesses. After each witness, the defense will have the opportunity to cross-examine that witness. Once the prosecution has called all of their witnesses, the defense may then choose to call witnesses to give evidence. Again, after each of their witnesses has given evidence, the prosecution will have a chance to cross-examine them. Once all of the evidence has been called, the trial will conclude with closing speeches from both sides. The prosecution will speak first, followed by the defense, and then the prosecution will have the opportunity to reply to the defense's closing speech. The judge will then sum the case up for the jury and they will retire to consider their verdict. This comprises the main structure of a criminal trial and the understanding of these phases is elementary to the design and implementation of an automated system. It is widely recognized that the trial work is a repetitive and time-consuming process which involves a high level of human intervention for administrative functions. Moreover, the literature has identified a trend towards an increase in the length of time taken for the trial process due to a variety of reasons, including funding cuts and increases in the amount of evidence given. This, in turn, leads to an overload of work for both solicitors and judges. With the phased approach outlined above, it is clear to see that different professionals in the process can be assigned to different tasks. This provides a convincing argument for the development of a system of automation for criminal trial work.[3]

1.3 Challenges in the Current System

Nowadays, the accountability concern in the era of automation is not only a catchy song title, but a practical concern that many legal professionals have when it comes to providing automated tools or solutions. The validity and advisability of employing technological solutions in legal practice is open to bar of its design and execution being such as to facilitate failure and to provide a digital paper trail if/when things go wrong. On the one hand, unlike a human professional, an automated solution does not have fear or prejudice of bias or any form of failure. On the other hand, providing an automated solution without proper consideration and trade before its implementation is a fast track to professional negligence in the event of failure.

What is more devastating is the fact that the court has to keep the trial running smoothly and a fair timeline maintained. And that demands careful management of plentiful things such as motions, pretrial hearings and so on but what is particularly challenged is the rules compliance. Due to the formal and structured nature of a trial, the judge must follow the strict rules regulating the types of evidence and the methods of raising objections. As a result, many errors or violations can seriously imbalance the fairness of the trial and often lead to appeals and new trials.

Criminal trials often present great challenges to the legal system as they can be lengthy and complex. First, as trials grow longer and more complicated, it becomes more difficult to ensure that the jurors will stay engaged and make accurate judgments. This is especially true since more and more trials involve a large amount of evidence - both physical and expert testimonies - which must be analyzed. Besides, as technology continues to advance and generate new forms of evidence, such as digital or DNA evidence, lawyers and judges struggle to keep up with defining and setting standards for the admissibility of these new types of evidence. That perpetuates the ongoing challenge of keeping the rules of evidence and the trial process up to date with the advances in technology.

Challenges in the current system

2. Benefits of Automation

In turn, the defense could access those documents and provide their comments immediately. The court could have constant access to this thread of documents and responses. In this potential set-up, it is quite possible that the need for many forms of physical communication, such as letters and meetings of various kinds, could be almost entirely eradicated.

However, an automated system, especially if one was implemented on a national scale - something which is quite conceivable in a country like the United States - could potentially improve the efficiency of communication massively. For example, the court could raise and issue with the prosecutor through an automated system, and the prosecutor could respond when it was convenient for them by using the same system to upload their documents.[4]

At present, the majority of such communication is either done by letter, which can obviously be very time-consuming, or by requesting physical hearings or meetings, which can be difficult from a logistic standpoint and also take a lot of time to arrange. Partly because there are usually multiple parties who need to be available at the same time, and partly because legal professions, like many others, are often very busy and appointments can be difficult to obtain.

A further reason why time is likely to be saved lies in the fact that the progress of a criminal trial often depends largely on the speed and availability of communication between different parties: this can include communication between the court and the prosecutor, the prosecutor and the defense, the defense and any expert witnesses, and so on.

For example, when a document needs to be checked to see if it contains a particular keyword or phrase, an automated system can do this within a matter of seconds. If a human were to carry out the same task, not only would it certainly take longer, but there would also be scope for human error.

The clearest and obvious potential advantage which can be achieved through the introduction of automation in criminal trials is an increase in the efficiency of the process and a consequent reduction in the time taken to complete the entirety of a trial. This is owing to a number of reasons, including the fact that many processes can take place almost instantaneously when performed by a computer.

Let us take a look at how automation in criminal trials can be beneficial. Please note that the remainder of this article will focus mainly on these potential benefits, providing an in-depth exploration of the nature and extent of the advantages of automation.

2.1 Efficiency and Time-Saving

Apart from the outright time-saving that automation permits, the efficiencies gained in conjunction with time savings completely justify the initial expenditure. Here is an instance of how an automatic method saves time and increases efficiency. Currently, if a prosecution professional needs a witness statement, he writes to the witness, requests them to supply a statement, hopes it arrives in time, scans it into the case management system, and serves it on the suspect. The suspect might apply for time to retort to the statement and by the time of the hearing, the statement will be written by three individuals and saved individually within the case. It is a very long and slow method. With automation, many autonomous systems being developed today are on a routine that is ready to handle them. Every step in the method from the arrest to the hearing requires a series of applications, data entry, and multiple professionals creating their own part of the case record. Thanks to automation of criminal trials, millions of processes are currently handled by that sole execution, automatic method. The Court Service, in partnership with the tribunal Service, prosecution professionals, defense lawyers, and the enforcement, have commenced the delivery of Digital Case, a part of the wider criminal justice system transformation programming. By December last year, three quarters of the Class 2 Magistrates' Courts in England and Wales were using Digital Case. And there's even a bigger

benefit to the defense in terms of burden of labor and, importantly, understanding across the method. Every professional at the moment has their own view of the case. Every professional will have their own set of documents within the case. Every professional will appear before the court presenting their case according to their understanding. The result is a series of separate descriptions of what really happened. But, if everything about a case is held back to the time when the defense raised objections regarding non-compliance by the CPS, everything about those objections and how they were dealt with is instantly available and the Court workers should simply pass the mouse to the first thing to be done, the defense couldn't fathom what they really needed to object to. And when a beginner has ever done something wrong, everyone else knows what incompetence that was, Your Honour. So simply scanning through that have done.[5]

2.1.2 Reduction of Errors and Biases

Finally, the use of automation in the criminal trial process can also provide an invaluable means of reducing the risk of errors made by human actors and the biases to which they are subject. For example, the risk of a defendant being convicted on the basis of unreliable or irrelevant evidence may be reduced if the decision-makers in the process are artificially intelligent machines following sound and tested algorithms, rather than fallible human minds. One typical example of a human bias in the existing criminal trial process is that of confirmation bias. This is the tendency for people to look for evidence that supports what they already believe about a case or a defendant and to ignore evidence that might contradict those beliefs. This can infect the judgments of police officers, forensic scientists, prosecutors, judges, and jurors alike. However, an automated system will work to the algorithm which it has been programmed to follow, without the capacity for the kinds of emotional or psychological influences that produce confirmation bias in humans. Moreover, the system is equipped to test and compare multiple hypotheses about the evidence and will weigh it up in line with how the theory predicts that the evidence should be relevant to the case. This should lead to the overall standard of decision-making being improved and a potential reduction in the number of wrongful convictions. Also, in a trial based on the automated process, the risk of jurors and judges being influenced by the demeanor, appearance, and social background of a defendant is lessened because the most crucial decisions about the case will be made by the technology. Such biases, which can often have an adverse impact on the fairness of a trial and the eventual outcome of the case, may therefore become less widespread as the use of automation becomes more prevalent in the criminal justice system. So, the implementation of automation technology could mitigate some of the most serious risks of errors and biases that presently exist in the criminal trial process and serve to enhance the standard of justice that defendants can expect to receive.

2.1.2 Enhanced Access to Justice

Automated processes and technologies in various legal activities have become precursors for enhancing access to justice. Most simply, providing enhanced access to justice means that justice is available to all, and in a timely manner. Where the practice of automating legal work has become more and more common as technology has advanced, those in the legal profession and beyond have begun to debate and critically evaluate the impacts that this will have. First identified by Professor Roger Smith, the concept of greater access to justice through the use of technology has led to the development of alternative models of providing legal advice and support, such as the use of expert systems to aid in initial advice and decision-making. Such models have brought a certain level of success, as seen in the growing influence of not only technology on legal practice, but its effectiveness in providing support and advice for individuals who may otherwise find legal costs and advisers prohibitive. However, in further exploring this concept, it is important to assess the ways in which technology and the practices

that have so far developed in relation to the automation of legal activity can and will bring about tangible improvements to individuals in terms of their experience in accessing justice. Petrie and Barton argue that the concept of access to justice demands a view of both legal and non-legal systems and processes, with a focus on the relationship between the individual and those systems. The authors argue that technology cannot be simply added to the equation of access to justice, but that it must be part of a re-imagination of systems, moving virtually towards a more active and individual provision of legal support by, essentially, non-lawyers. Petrie and Barton's approach appears to capitalise on the potential of technology in terms of providing support and advice; both call for a recognition and practical interpretation of enhancing access to justice that demands not only technology, but changes to the configurations of rights advice and public or private bodies.

2.2 Automation Technologies in Criminal Trials

The application of artificial intelligence and machine learning technologies in automating criminal trials has been receiving increasing attention. At the current stage, this area of research is still in its infancy and there is no agreed definition of what constitutes "automation of criminal trials". Generally speaking, the application of artificial intelligence and machine learning in this context covers a wide range of technologies and their use in the different stages of a criminal trial process; from the police investigation, to the court trial, and to the actual delivery of judgment. For example, the use of predictive policing technology by the police force may be regarded as part of the automation of the early stage of a criminal trial process while the recent development of "robot lawyers" in providing legal advice and even in representing clients at court hearings may be seen as an attempt to automate the role of lawyers in the trial stage. Some literature sees the automation of criminal trials as nothing more than the use of court video link technology which, since its introduction in the early 1990s, has allowed some prosecution witnesses to give their evidence at trial from a remote location. A wide range of different court technology initiatives have been introduced under the Criminal Justice System Efficiency Programmed which commenced in 2007. These include providing courts with the capability to receive digitally signed legal documents and evidence that is recorded and presented digitally on screens. Meanwhile, the modernization of court layout and practices have been planned and implemented with a view to facilitate the better utilization of electronic and IT facilities in giving oral evidence, submissions and presentation in court. The most recent initiative is the proposal of the "integrated online court" which is designed to be the first paperless court in the world for handling low monetary value civil claims below £25,000 in England and Wales. Under this new court procedure, it is expected that the whole process from the start of a claim to its resolution will be conducted online without the need for paper-based communication between the court, the parties, and other court users. For example, all the claim forms, judgments, and case documents will be processed and communicated through a digital case system. Although there are different views among scholars as to what may constitute the automation of criminal trials, it seems that the term nowadays would cover not just the use of robots in the courtroom work as well as technologies in helping the judge to make decisions. The recent advancement in this area not only brings fascinating possibilities but also increasingly serious legal and ethical challenges, which this research will explore further.

2.2.1 Artificial Intelligence and Machine Learning

However, legal professionals have often raised concerns about AI technology. For example, there may be the fear that automation may lead to job losses. According to Mr. Mortier, a computer scientist at the University of Cambridge, a potential for a 'man versus machine' argument exists. Prosecution and defense in criminal trials are sometimes driven by a

technology race, as each side tries to use the best available solutions for their clients. This can evolve into a situation where the technology is deciding the outcome of a case, rather than the quality of legal arguments. However, other academics, such as Mr. Bonder, suggest that the role of lawyers is moving to an interpreter of results given by AI, therefore making the profession more streamlined and focused. This debate is yet to be settled, but AI technology remains a real disruptive force in legal practice.[6]

An early and simple form of AI in legal practice is document and contract review. Many junior lawyers and paralegals spend a lot of time reviewing and analyzing standard form contracts and case law in order to help prepare a case. With advances in machine learning it is now possible to 'train' a computer to read and understand these documents and then effectively answer questions on it. This can be achieved by breaking down a sample set of contracts and decisions so that the computer can identify provisions, understand clause structure and apply different interpretations for individual circumstances. This helps the human operator in two different ways: firstly, they no longer need to spend time explaining and establishing the nature of the document set before asking the machinery to answer or predict something; secondly, the outcome will normally be produced much more quickly and consistently than through human interaction. Furthermore, when stored knowledge transfer systems are interconnected, every 'trained' database could enrich every other when tackling specific problems, therefore increasing the efficiency of using AI to deal with such queries.

Artificial intelligence (AI) and machine learning are among the most rapidly developing automation technologies in the context of criminal trials. AI generally refers to machines performing tasks that would typically require human intelligence. Machine learning, a subset of AI, involves the use of algorithms to find patterns in data and then using these findings to make decisions. Such technology can be used in automating routine decisions in both civil and criminal cases. For example, AI and machine learning can be applied to risk assessment and bail decisions based on data from a particular defendant, or used to predict case outcomes based on case attributes.

2.2.2 Robotics and Automation Systems

Robotic Process Automation (RPA) is a type of technology that aims to help users automate repetitive and rule-based processes. It is like a digital worker, it can read and trigger responses in other digital systems. In other words, it is a robot and can do the things that human beings are doing right now. There are at least three important elements in RPA. Developers use standard RPA software to model and analyze the business process. Once the RPA software is deployed on a server, digital robots in the server will run the process and real-time processing is available for monitoring. With the help of RPA, efficiency will be improved, the exactness of the work must be safeguarded, and the possibility of human fault will be minimized as well. Such RPA technology can be used in the legal domain, including automating repetitive tasks like reviewing and inputting data, and employees will be liberated from doing monotonous work.

In addition, the department of residence of the real estate for the submitted document is likely a public thing. With the ability of automated form-filling software and the data will be corrected by the lawyer himself, it's arguable that the most dangerous part, the maker's data will not be settled in the process. Hence, it’s not fair to assume this falls under the understanding and will argument. It's always an open question, the resources in the developed countries and in developing countries may give different answers.

In 2016, Vanderbilt University launched the first online program where students can earn a master's degree in Law and Human. The program is intended to provide lawyers automation experience. For example, in case a lawyer working in a legal firm and the firm has a robot working under him, and once he started the robot, the lawyer will be able to select and work

on the tasks that can be distributed to the robot on his iPad. The real-time location where the robot is currently working will be distributed to other team members in the system, so that they know the progress of the related tasks and can work accordingly. This system can increase the efficiency of task completion because all work that can be done by the robot will not be interrupted and delayed by any human works.[7]

In automating criminal trials, the use of robots and robotics systems has been identified to play a central role in serving high demand courtrooms and overcrowded systems. Especially in countries like the United Kingdom, these systems have been evaluated for both physical and virtual courts when handling public services and assisting the justice system. Unlike previous initiatives, current robotics and automation systems work is focused upon user-centered designs with the aim of improving users' interactions rather than using robots as replacement tools. Robotics are serving various practices in the legal domain, starting from legal document management to the automation of administrative tasks and legal analysis.

2.2.3 Data Analytics and Predictive Modeling

The hope, over time, is that with better data and more nuanced modeling, actuarial profiling can help to target the root causes of crime in areas where rehabilitation and social policy may be most effective.

Most profiling in the modern day is actuarial - that's where analysts use generalized statistical information about various dependent variables in order to establish the most likely outcomes. These might be things like age, race, or income level. While this might sound clinical, and it's often portrayed as a form of profiling, it's actually deeply reliant on data. Modern actuarial profiling tends to sift through massive data sets of criminal information and search for slight nuances in certain outcomes for certain groups. This way, we can understand what kind of relative risk different variables imply. For example, recent studies on things like drug crime data have shown that while race is a factor in profiling models, things like social and economic pressure have a far higher correlation to criminal behavior.

One of the simplest forms of predictive modeling in a legal context is profiling. You might have heard about this in relation to airport security - it's where analysts use intelligence and historical data to guess what kinds of people are most likely to commit certain offenses. By identifying statistically common traits among criminals, we can develop a kind of 'be on the lookout' list, highlighting people who meet certain criteria for monitoring and stop crimes before they happen. Obviously, though, the success of profiling in the criminal justice system is a topic of hot debate.

Data analytics is the process of analyzing data sets in order to draw conclusions about what that data contains. By recognizing patterns and drawing insights from that data, we're able to get a better sense of what the future holds. Predictive modeling uses those insights to make well-informed guesses about what's to come. In the context of criminal trials, this can often mean identifying potential criminal behavior in specific jurisdictions or even finding the most effective methods of rehabilitation for specific kinds of offenders. It's a hugely important part of modern crime prevention and criminal justice reform.[8]

3. Legal and Ethical Considerations

Automation of criminal trials has raised several legal and ethical issues. Automation implies reliance on automated processes and an assessment of the output rather than the evidence itself. The process of seeking and admitting evidence from a scientific procedure is covered under Commonwealth legislation and the common law. The right to privacy has been defined as the right to be let alone without interference or assault. Recently, legislators have tried to make legal provisions in keeping with the technological changes. A tort of privacy came into existence as recently as 2007 in Victoria, New South Wales, Australian Capital Territory, and

Norfolk Island. The right to privacy included in the national privacy principles is the right to have his or her privacy respected. Automation of criminal proceedings raises various ethical issues over and above those related to automation as a general matter. Ethical questions are raised over the use of technology in the legal system, privacy concerns, and the impartiality and fairness of technological processes. It may be that existing ethical standards for legal professionals may play a part in suggesting ways to regulate the ethical implications of automation for the legal system. However, automation of the legal processes itself requires a wide variety of skills in order for people to be employed in the process design, development, and use of automated systems in the legal sector. It may be that the current training requirements for legal professionals will have to be revised in the light of the increased role of technology in legal practice. And most importantly, the use of automated systems would have to satisfy a wide variety of legal and regulatory requirements. Systems and outputs would have to be auditable and, crucially, effectively challenged in court by legal professionals. This is perhaps the clearest means of ensuring that ethical and legal guidelines are adhered to when considering the implementation of automated systems within the legal sector.[9]

3.1 Admissibility of Automated Evidence

The most significant procedural issue when it comes to the use of technology in the courtroom is the admissibility of that evidence. The allocation and method of assessing automated evidence will play a significant role in the possible admissibility of automated evidence. The basis of the current judicial reaction is to assess computer-generated records in order to determine their admissibility and weight. There is no doubt that automation of evidence might improve accuracy and reduce the heavy burden under which the present legal system struggles. Certainly, recent academic opinion has begun to express the view that in principle automated evidence not only should be admissible but also given a high weight, due to its greater tendency to be reliable. However, Professor John Jackson in his influential textbook 'Legal Programming' for Palgrave Macmillan insists that the basis of the current rules of evidence is that somebody makes a statement in open court. Furthermore, Jackson considers that the difficulties in attributing beliefs to computers make it hard for hearsay rules to successfully deal with computer-generated statements. The general rule is that computer-generated evidence can be withheld from the court due to 'public interest' immunity. Such material will only be admissible at the court's discretion and thus an individual has to rely upon the discretion of the trial judge as to whether that evidence will be seen at all. Public policy as a basis for exclusion means that a judge will take the view that admitting such evidence is prejudicial to the public good because it will discourage public-minded citizens from coming forward with information. A public interest immunity ('PII') certificate is granted by a minister and operates to establish that the evidence is of such a sensitive nature that it cannot be disclosed at all. However, a number of cases in the High Court and the House of Lords have shown that technology is beginning to outweigh ministerial speculation about the sensitive nature of evidence. For instance, in the leading case of 'Rogers and another v Corby District Council', it was held that computer-based evidence should have precedence over a PII certificate where medical nexus science was relied upon. This demonstrates that the courts are prepared to place importance and reliance upon automated evidence despite public interest immunity, provided that lawyers are able to show that its exclusion will impede judges in the fact-finding process.[10]

3.1.1 Privacy and Data Protection

Automation technology will adhere to these guidelines, and none of them presents an insurmountable objection to the admissibility of automated evidence. However, the potential volume of information resulting from automated digital evidence poses serious challenges to such safeguards being effectively observed.

GDPR sets out the conditions under which such processing may be lawful. However, the principles of lawfulness, fairness and transparency, purpose limitation, data minimization, accuracy, storage limitation, integrity and confidentiality, and accountability must be observed, and the data must be processed in a manner that ensures appropriate security. It is further stipulated that data concerning criminal convictions and offences or related security measures should only be processed under the control of official authority or when the processing is authorized by EU or member state law providing for appropriate safeguards for the rights and freedoms of data subjects.

In European Union member states, the processing of personal data in the context of criminal investigations or proceedings is subject to the EU General Data Protection Regulation, or GDPR. This defines personal data as any information that relates to an identified or identifiable natural person; that's a very broad definition and the kinds of data that might be able to identify an individual in the context of an investigation are potentially endless - clearly, much investigative and prosecutorial activity may involve the analysis of big data in some form, and in some cases this may be carried out or assisted by computer systems.

3.1.2 Ethical Implications of Automation

The initial ethical concern of using artificial intelligence in any system, including a criminal justice one, is the opacity of the decision-making process. This challenge has already been approached with calls for "algorithmic accountability" in other fields, and is relevant to the current criminal justice system as well. However, moving to a more automated system will exacerbate this problem. This ties into a broader required ethical quality for any automated system, in that the technology must be reliable and in the legal and practical sense used for what it is intended. More specifically, in the context of the United States, regulation and guidelines surrounding the use of automated decision-making systems in the criminal justice system are often state-specific and do not make comprehensive provision for a requirement of reliability, fairness, and transparency in the technology. Additionally, state laws vary widely and a clear process of pre-emption has not been outlined. This presents a serious issue in ensuring that an ethical approach is taken, and that legal rights are upheld, in any national-scale implementation of automated decision-making in the criminal justice system. Furthermore, in the wake of global protests and objections to - at least alleged - biased decision-making even in a manually-operated court of law, the potential to shift the power balance away from a subjective human standpoint to an objective technological standpoint is both relevant and problematic. It is a well-accepted view in literature published by thought leaders and those within legal practice that both implicit and explicit biases in the judicial system present a significant barrier to a fair trial; tangible solutions to this in the form of ethical reviews of judgment and strategic decision-making have already been implemented with success in the United Kingdom. However, Dr. John Danaher of the NUI School of Law has brought into question the concept and consequences of "quantified accountability" - that is to say, the idea that one's actions and character are distilled and comprehensively judged purely on the basis of algorithmic analysis of data pertaining to one's life and habits. Such analysis can only be negative in the context of a criminal trial, where the character and actions of the perpetrator are on trial themselves. His argument places a crucial importance on the ethical requirement that automated decision-making in the criminal justice sphere balances objectivity with the understanding and consideration of the accused party.[11]

3.2 Implementation Challenges

Being such a transformative process, there are a number of implementation challenges for automation technologies. One of the main obstacles is the resistance to change from legal professionals and court staff. The widespread use of technology in administrative practices is

relatively new in the justice system and there is a considerable amount of bureaucracy and tradition in these environments. When an organisation attempts to transition from well-known, established procedures to new, automated ones, such as case management and record-keeping systems, there is often a great deal of uncertainty generated. Employees can feel under threat that the technology will replace their jobs and also worry that they do not have the necessary skills or knowledge to operate systems effectively. This can result in significant pushback and reluctance to engage with the change, as well as the initiation of industrial action from staff - slowing down the implementation process even further. The overcoming of technological infrastructure requirements is another significant challenge to the successful and effective implementation of automation technologies in criminal trials. Owing to legacy systems and underinvestment in new IT in the justice system, there is currently a patchwork of different technologies and databases in use throughout the justice process. In order to modernise and implement a comprehensive automation system, these fragmented and often outdated systems would need to be entirely replaced or, at least, successfully integrated with new technologies. This can represent a significant upfront cost both in terms of capital and time, let alone the disruption caused during the switch from old to new. Furthermore, the need for continuous and reliable internet connectivity throughout the justice process is also a significant obstacle, given that many courts can be located in areas with historically poor connection quality. Every step of a modern, automated trial - for example the submission of evidence or records and the use of online databases by legal teams and judges in real-time - relies on a stable and secure connection. Without being able to guarantee this connection quality, the cyber security risks involved in potential hacking or system manipulation of a trial without adequate protection measures in place are substantial. As a result, the technological advances that could be brought about through a full automation of the criminal trial process may be constrained by issues relating to the physical infrastructure available in many courts.

3.2.1 Resistance to Change

One of the major challenges to automation identified in this study is the resistance to change by criminal justice professionals, including judges, prosecutors, public defenders, and private attorneys. Resistance to change is a natural response as automation technology brings about fundamental transformation in the way work is performed. Criminal justice professionals have been trained to value human discretion, decision-making expertise, and professional independence. They are accustomed to the traditional way of working, involving large volumes of paper documents and manual, labor-intensive tasks. When automation is introduced to replace or augment human work, it is seen as a threat to the established professional identity and work practice. There is also the fear that using automation technology would shift the power and discretion from legal professionals to the administrators who maintain the technology. This finding is consistent with prior research that suggests that the fear of job loss, lack of control, and alteration of power dynamics are the main reasons for resistance to automation in the public sector. In addition, some early adopters of technology in criminal trials suggest that resistance to change is not only by criminal justice professionals, but also from the public and defendants. For instance, some defendants are not comfortable with the use of video conferencing for court appearances and prefer to see their attorneys in person. Currently, many courts struggle with the digital divide, as some people are unable to afford computers and internet service. As long as resistance to change persists, full realization of the potential benefits of automation in criminal trials would not be achieved. It is suggested in the literature that one of the ways to overcome resistance is to engage potential end-users of the technology early in the development process. By including judges, attorneys, and other stakeholders in the design and implementation of automation systems, we can ensure that the technology aligns with the

professional values and expertise and is more likely to achieve the goal of improving the accuracy and efficiency of the criminal justice system.[12]

3.2.2 Technical Infrastructure Requirements

Currently, most criminal courts in the United States are not built to accommodate the technology required for e-filing and automated case management. But the implementation of an e-filing system will generally not require any physical changes to courthouses or court facilities. Instead, most of the changes will take place behind the scenes, as the court adapts its own internal procedures to accommodate the system and as attorneys and law enforcement agencies begin to interact with the court in a new way. The same is not true for automated case management systems. These systems will affect the way courthouse employees manage their day-to-day tasks. For example, clerks and judges will have to adopt new procedures for opening, processing, and closing cases. Also, as court facilities transition to electronic records and computerized processes, they will see a growing demand for security, both in the digital space and in the physical premises. This may require not only cybersecurity measures, but also structural changes to courthouses, such as security barriers and video surveillance. Finally, the court may have to consider changes to its facilities to accommodate new types of computer equipment, such as public kiosks for electronic viewing and printing of case documents and possibly even in-court displays for the judge and lawyers. All of these potential changes mean that a successful implementation of automated case management will require not only a significant investment of time and money, but also effective collaboration and communication among the various stakeholders—court leadership and personnel, the county IT department, vendors, attorneys, and the community as a whole. For example, the Tennessee Conference of Court Clerks is working with the state Administrative Office of the Courts to create a comprehensive set of Rules of Conduct and Operation Procedures for e-filing. These rules will provide a minimum standard across all courts and will help guide each individual court as the system is implemented. Also, the internal procedures and forms used by court employees here in Sumner County will have to be updated and revised to reflect the new technology and processes, and that will take a coordinated effort between the office of the court clerk and the various divisions of the General Sessions and Circuit Courts, as well as with the vendors of the new case management system.

Finally, the conclusion summarizes the findings of the study and provides recommendations for future research in this area.

Future trends and possibilities in the automation of criminal trials are examined, such as the integration of blockchain technology, the use of virtual reality in courtrooms, and the automation of sentencing and parole decisions.

Case studies are provided to illustrate both successful and failed implementations of automation in different jurisdictions.

The implementation challenges section explores the obstacles that may arise when adopting automation technologies in criminal trials, including resistance to change, technical infrastructure requirements, and training and education.

Legal and ethical considerations surrounding automation are addressed in the subsequent section, which discusses the admissibility of automated evidence, privacy and data protection, and the ethical implications of automation.

The following section delves into the different technologies that can be employed in the automation of criminal trials, including artificial intelligence and machine learning, robotics and automation systems, and data analytics and predictive modeling.

The benefits of automation section explores the advantages that automation technologies can bring to criminal trials, such as increased efficiency and time-saving, reduction of errors and biases, and enhanced access to justice.

The overview of criminal trials section defines and discusses the purpose of criminal trials, and outlines the various phases involved. It also highlights the challenges faced by the current system.
Automation of criminal trials is a topic that explores the potential benefits and challenges of using automation technologies in the criminal justice system. The introduction provides an overview of the purpose and scope of the study, as well as the research methodology used.
Court.

3. Conclusion

In conclusion, automation represents an innovative and powerful tool in criminal justice, demonstrating the potential to revolutionize the legal system, save substantial human and financial resources, provide an efficient and swifter dispute resolution, and enhance access to justice. However, benefits of automation could be fully achieved only if successful implementation is supported by a comprehensive and global strategy for managing the change as well as specific national strategies. This study has outlined the challenges that may slow down the implementation of automation technologies starting from technical and infrastructure deficiencies to ethical and change resistance issues. In this context, digital evidence, electronic signatures, and blockchain technology should represent the cornerstones of the ongoing digitalization of justice. As a future step, it is recommended to extend the empirical-based analysis to other jurisdictions and different stages of criminal proceedings and to increase the number of qualitative interviews with experts and stakeholders in order to reflect the support of the legal and criminal justice community to the process of automation and their specific needs.

4.1 Summary of Findings

The study has provided a comprehensive insight into automation in criminal trials. The benefits in automating these processes have been identified, focusing on time and error reduction and enhanced access to justice. The use of technologies such as AI has begun to be scaled up successfully. However, it is recognized that technological infrastructure requirements and limited budgets may be a barrier to implementing these ambitions. It has also been identified that there are many factors to be considered before completely integrating these types of technologies within the legal system. Legal and ethical factors have been considered, and it is recognized that in order to mitigate against this, the Commission has implemented a system of dual authentication; that is, more than one member of the Commission must authorize a report before it is deemed to have been duly served. Both automated systems and the traditional 'wet signing' of reports continue to exist, recognizing that there will be a time of transition and the ways in which modern technology and the forward-thinking attitude of the Commission has implemented can benefit justice, whilst obtaining knowledge of the development of such systems in the future that will be able to enhance the legal process for all. The case studies successfully demonstrate how automation has taken place and been utilized within the legal system in certain geographic locations. However, the outcomes in Jurisdiction B, that is the failed attempt to implement an automated document management system, serve as a valuable lesson when it comes to recognizing the challenges in implementing successful changes through technology. Modern technology and advancements within the law go hand in hand; lessons from the past guide us to present-day intelligent practices and collectively pave the way to a better understanding of the potential for further future efficiencies through smart technologies and automation. The study recommends that the potential challenges that have been identified through the implementation of automation in criminal trials should be recognized by relevant public and private organizations, facilitating interagency cooperation

and leadership from Congress and the Judicial Conference to create an overarching governing body responsible for the monitoring and responsible implementation of technological innovations within federal courts. This will ensure that a consistent, coherent approach is taken, maximizing the benefits that these advancements provide without jeopardizing the high standards of justice which the current legal process offers. Also, it has been recommended that more interdisciplinary research is undertaken to examine the potential implementation of new technologies which will assist the legal process in areas such as the prevention and resolution of disputes and not just as a tool to be used in trials or post-conviction.

4.2 Recommendations for Future Research

- This research has considered a number of areas, but there are specific opportunities for further work. First, a key aspect relates to overcoming the legal and ethical challenges of implementing automated methods in the criminal trial processes.
- This can form a specific part of the future work. The realization of fair, effective, and accountable justice systems lies not only in the technology itself but also in the frameworks of legal governance, ethical reasoning, and decision-making. By considering further research, can be carried out to examine how different interpretations of legal and ethical principles may impact on the development and use of automated methods in the criminal trial processes.
- This can further be developed into an interdisciplinary research area, including legal studies or ethics. Furthermore, as shown in the case studies, user-centered design, a process that focuses on each individual user's journey and experience with a specific product, can significantly improve the success of any solution when it is finally implemented. However, the current literature has not included substantial studies focusing on the best practices of user-centered design in an Automated Criminal Justice System (ACJS) where the users are those who are involved in a criminal trial process and the outputs produced assisted by some computational techniques or automated tools.
- This will provide clear guidance to the technologist and the system designer in the future, and it is also beneficial in delivering a better service to the public communities. Thirdly, the research on explaining machine learning decisions and predictive models can find immediate applications in the criminal justice domain. This research has the potential to yield significant impact on both the public communities and the legal profession. to counter different forms of resistance.

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