Adoption Of Artificial Intelligence And Machine Learning Into The Criminal Justice System: An Overview

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***Abstract*—Over the course of the last several years, artificial intelligence (AI) has become the focus of a significant amount of discussion, especially in relation to the breadth and depth of its possible applications across a variety of sectors. Indian judicial system is facing huge pendency of the cases in different courts. Legal system is encouraged with the results of the broad application of AI ecosystem technologies which are helping to reduce the pile of pending cases by providing necessary assistance to the human resource working in judicial system. Integration of ICT is playing an important role the Indian legal system. Apart from the adoption of ICT in day-to-day work, the incorporation of AI into the judicial system at various levels will undoubtedly improve the efficiency of service delivery. Sensing this situation, the Vidhi Institute for Legal Policy in collaboration with TCG-Crest have published an independent research study analyzing the possible influence and implications that AI can have on the judicial system. This report has provided a larger framework, which addresses both immediate and prospective challenges and it also proposes different solutions that to be implemented to address the issues faced by the judicial system. The ultimate conclusion of the discussion is that the artificial intelligence (AI) may act as a driving force to revolutionize the entire system.**

***Index Terms*—Artificial intelligence (AI), Machine learning, The legal system's Evaluation, Challenges, Future trends, Indian judicial system.**

I. INTRODUCTION

The study conducted by the Vidhi Institute for Legal Policy and TCG-Crest was intended to address basic three key issues namely, the ability of 1) Whether intelligent scheduling of cases is possible with the help of machine learning tools, 2) Whether AI-enabled program help to determine the correct position of law from a multitude of precedents, and 3) Whether robots are capable of determining solutions in the matter of law. The team members working on this report, in order to provide insight into this matter of concerns, approached legal practitioners throughout the world. This survey helped them to identify specific applications where AI has already made significant contributions to the judicial system. It is noted that in the United States AI is being utilized to create risk assessment tools while in Singapore, it is mostly used for voice translation.

In the countries like Russia, Mexico, and China, people are receiving legal counsel from machines, and courts are delivering crucial decisions about award of pensions through the assistance of the robots. In Indian context, AI adoption is witnessed to enhance administrative efficiency and streamlining decision-making process. India, for instance, has already begun automating the process of paying traffic challans online.

In addition, ML algorithms or deep-learning technologies can be used in some cases like motor vehicle compensation claims or cases related to motor vehicle act. The paper also provides an outline of potential obstacles that might arise throughout the rollout of AI. The main difficulties are designing a decision-support system that complements human judgement rather than replacing it, as well as maintaining its transparency, explain ability, and objectivity.

II. OBJECTIVE

The research aimed to fulfill the following objectives:

- To study Integrating AI Technology Further into Criminal Justice System
- The use of technology inside prisons
- To study Neuro-based recidivism prediction using artificial intelligence

III. METHODOLOGY

The Indian judicial system is infamous for its snail-paced speed of justice delivery. From subordinate courts to supreme courts pendency of cases stands between 50 million and 54 million matters. In supreme court itself, more than 93000 cases are pending while in state High Courts, there is a backlog of over 60 Lakh cases. There is a requirement of voluminous volumes of paperwork. At the same time, its commitment to conventional and traditional approaches became the barrier in adoption of innovative technology. Though the old brass in the Indian Judicial system is reluctant to accept new technology, the younger lawyers are more receptive to new technology and understand the importance of the integrating technology into the judicial system. This can be seen as a ray of hope for judicial system. In light of the fact, it is necessary to establish an ecosystem to support the speedy delivery of justice. It is vitally crucial that a thorough plan be developed for the incorporation of AI into the legal system. It should also ensure a level playing field for the deployment of AI. All these expectations are fulfilled by this report as it provides a detailed road map of the procedure that to be followed to accomplish the task. According to the findings of the paper, the judicial system would need both the establishment of operational support and meticulous planning in order to facilitate the integration and phased deployment of AI. The study just lays the groundwork to start a dialogue about the integration of AI into the legal system and makes it possible to utilize AI in the future in a manner that is both ethical and measured.

IV. INTEGRATING AI TECHNOLOGY FURTHER INTO CRIMINAL JUSTICE SYSTEM

Over the years we have witnessed that, AI has shown its ability to improve the quality of human life and provide solutions to many of the pressing problems faced by the human being in its day-to-day life. Fraud detection, Risk assessment, Self-driving cars, Traffic optimization, Facial recognition programs, and Cancer-detection programs, Precision farming are just a few of the numerous examples in which artificial intelligence help to advance human civilization. According to UN Trade and Development (UNCTAD), by 2033, the global market for AI is expected to grow to about 5 trillion US dollars. AI is going to be a very powerful technology and will continue to gain traction in many fields. According to (Dennett, 2019), the most fascinating uses of AI, which are under development, are in the judicial system. Artificial intelligence might assess the risk presented by a defendant and prompt the risk assessment to take a balanced decision.

The realm of criminal justice consists of law enforcement, prosecution, the courts and corrections. It's hardly unexpected that use of AI will leads towards the potential for prejudice in deciding the criminal cases. Nonetheless, with proper training and implementation, algorithms may be less prejudiced than humans. Though we consider machines are less prejudiced, one must consider vital social and ethical factors such as reliability and transparency. Algorithmic bias and the “black box” problem where AI tools hide how it reached to conclusion may initiate difficulties for defense lawyers. These concerns must be addressed if AI is to be used effectively to assist courts in making sentence decisions and to provide accurate appraisals of offenders' risk and needs.

Judicial decision-making process is a mix of legal training, cognitive heuristics, physiological conditions and emotions. The factors which are unrelated to the particular case may influence the sentencing decisions which may leads to biased outcome of the case. This is due to the fact that people have inherent biases, distinctions, and divergent opinions. For instance, one study discovered that judges' sentence decisions were much more lenient in the morning and just after lunch. Indeed, this held true for each of those periods. The opposite was true at the end of the day and just before they took a break for the day, when they were far more likely to apply harsher sanctions.

This is only one example of how the judgements that judges make about sentences might be influenced by a factor that is completely random. When such judgements based on irrelevant factors are pronounced, one can say that these judgements are not entirely impartial. For instance, in division or larger bench, judges might have quite divergent perspective from one another. In such situation according to one judge, decision may be fair and impartial may while other may find it ludicrous.

In addition, judges do have different style of justice delivery. Some judges prefer to grant bail while others

think that person granted bail will influence the witness. Some judges support parole, while others prefer to give prisoners additional time in jail for particular offences. This is owing to the fact that each individual has their own unique perspective on the efficacy of various forms of punishment and rehabilitation.

But such decisions lead towards the discrepancies among the criminals. And it caused entirely by the judge who presided over their case. As judges do deliberate over sentence options, which leads in impartial decisions, artificial intelligence will provide assistance to them address this prejudice. Artificial intelligence can be used as tool for risk or need assessment in judicial system. The tool based on the algorithms which can work on the past history of criminal, his nature to reoffend, his behavior in the prison will assist judges to take appropriate decision. According to (Ogonio et al 2023), offender having higher risk assessment score indicate that he will more likely to commit more offences. Such pointers become handy to take proper decision about sentence. Appropriate risk and needs assessment methods which are used for centuries have proven their usefulness to assist and sentence persons so that they can be reintegrated into society and given an opportunity to live a normal life.

Contrarily, artificial intelligence has been emerged as a new technology and wasn't put to any practical use prior to 2000. AI based risk and needs assessment is a major step forward than the traditional methods like interviews and questionnaires. Due to limitations in data evaluation, they were not as trustworthy as the fourth-generation technologies that were bolstered by AI.

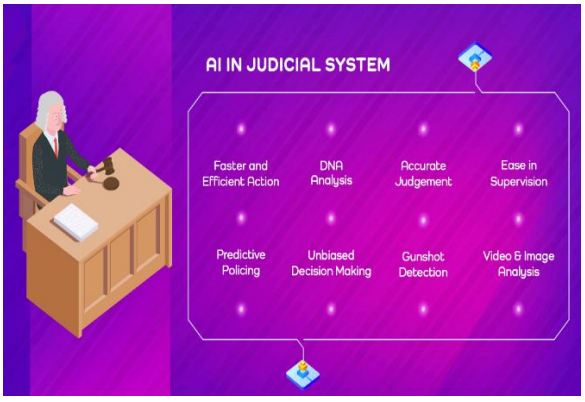


FIGURE 1. AI IN JUDICIAL SYSTEM

V. THE USE OF TECHNOLOGY INSIDE PRISONS

A law enforcement officer sitting close to a detainee in prison

The deployment of innovative tools does not end with a person's conviction. Artificial intelligence is being employed in correctional institutions as well. Correctional institutions are overcrowded and badly maintained. Over the years it has been well accepted fact that correction centers must provide secure custody and meaningful rehabilitation so that individual can be prepared for productive and law binding life. AI is providing both the automation of security measures and the rehabilitation of offenders. AI can be seen as a tool to strengthen the mission of justice, respect human dignity, comply with regulatory frameworks, and produce measurable outcomes.

For instance, AI is used for Surveillance, safety and situational awareness, Communication monitoring and language translation, Inmate grievances, requests and multilingual access, Risk assessment and dynamic case management, Rehabilitation, education and re-entry. A Chinese prison housing has adopted AI network to identify and track inmates 24/7. It alerts guards for any suspicious activities occurs in proximity. In US prisons, AI tools are used to transcribe and flag outgoing phone calls and emails. LLM-based language translation tools are used to communicate with non-English-speaking inmates and their families.

In addition, AI tools can be used to analyze offenders' criminogenic needs so that it can be offered amenable treatment and a subsequent change in their offending conduct can also be monitored. In Finnish prisons, AI training algorithms are used as part of a training program where prisoners may choose to answer simple questions or read content selected from numerous online sources. Marketable skills have been imparted which allow them to find gainful employment once they are released.

In case of solitary confinement, AI can be used to address the issue of mass incarceration. In the US inmates are allowed to use intelligent assistants like Amazon's Alexa as friend during their confinement. It helps to provide relief from the emotional stress they've been experiencing as a result of confinement in prison. Over-reliance on AI for surveillance and

prediction could shift correction institutions toward a purely risk-management institutions ignoring rehabilitation. AI should not replace prison and probation staff but assist them, and that technologies must contribute to the rehabilitation of offenders.

VI. NEURO-BASED RECIDIVISM PREDICTION USING ARTIFICIAL INTELLIGENCE

Predicting criminal conduct in the future using AI has shown to be a rather accurate endeavor.

A study conducted by researchers at Stanford College and the University in California, Berkeley, found that automated risk assessment systems are much superior than human analysts when it comes to simplifying the intricate workings of the criminal justice system and drawing reliable findings. Keep in mind that with only a few pieces of information, individuals can accurately predict which criminals will be apprehended for a second time. But, when there are more variables to consider, algorithms tend to do better than humans. In certain cases, the percentage of accuracy for predicting which repeat criminals would be apprehended was more than 90%. Compared to these machines, human accuracy was only about 60%.

Although there is some debate regarding the use of algorithm-based tools, studies have shown that in scenarios mimicking real-world criminal justice settings, risk assessment algorithms provide more accurate and precise conclusions compared to human judgement. (Fidell, 2016)

- *Concerns about openness*

If AI is to be used appropriately in the criminal justice system, then the rights of individuals to know how the AI and algorithms operate must always be balanced with the rights of corporations to maintain their data and material. AI tools are used to assist humans. One should evaluate the decisions made by AI to see whether they are at par with the decisions made by the humans or at higher degree of accuracy.

Algorithmic bias and the “black box” problem where AI tools hide how it reached to conclusion may initiate difficulties. In such mysterious situation around the inner workings of artificial intelligence systems, perhaps not even the developers of the AI understand the logic behind its actions. This can be matched with a box containing knobs that, when turned, produce diverse outcomes and nobody knows about the working code. These complex systems get better with time and more data.

Because of the algorithm's opaqueness and the difficulties of articulating its rationale, judges who utilize the technology cannot objectively analyze its merits and downsides. Instead of understanding how their score was calculated, students must blindly apply it to phrases. Judges who rely too much on algorithms without a thorough grasp of their inner workings may wind up being far more prejudiced than they would be if they were working in the traditional method, without the aid of an algorithm.

- *Bias implications*

We have shown that bias is the key ethical challenge when using AI in the criminal justice system to assess risk or requirements. There are numerous possibilities that AI systems can be turned as a bias machine. If the AI is a neural network, it will need training data. Hence, it is necessary to combine data on individual offenders' recidivism rates into a neural network that may be used as a risk/needs assessment tool. Unfortunately, the information used by AI systems frequently serves to further instill bias in its users.

In the end, it is possible that machines may turn into a bias system just as biased as humans. It depends on how data is provided to algorithm. Persons having different ideas and interpretation on what constitutes a violation of the law and how severe a penalty should be may feed different kind of data. Such erroneous data may lead machine to act bias. There are two distinct kinds of prejudice. Human prejudices, which AIs are meant to eradicate, are ironically the cause of the biases themselves.

Generally, people interpret the law in different ways to satisfy their own interests. This is why bias exists among us. Looking at the numbers, however, we may see that what seems to be a well-functioning judicial system is really made up of individuals who are inconsistent in their own assessments or who cannot divorce their personal convictions from the impartiality and reason required to be an effective judge.

It's important to keep in mind that AI is always developing, whereas human decision-making remains static. We are refining methods to remove bias from algorithms that are challenging to implement using human cognition alone.

- *Personal data protection*

A thief attempting to steal sensitive data

Some people may worry that their privacy is being invaded by AI systems because of the method in which they collect and use data. This is why people need to provide their explicit consent prior to any processing of their personal information. This includes the right to not be subject to an automated decision, as well as the principles of data reduction and purpose limitation. (2017)

Some helpful context may be found in the General Data Protection Regulation (GDPR). It is the controller's responsibility to take appropriate precautions to protect the rights, freedoms, and legitimate interests of data subjects while processing their data automatically.

The General Data Protection Regulation (GDPR) ensures individuals have access to "meaningful information about just the logic involved" when their data is being processed automatically.

In Article 11 of the Law Enforcement Directive, it is stated that automated decisions with adverse legal effects related to the data subject or can significantly affect them are prohibited unless authorized by Union or Member State law that also secures relevant safeguards for the rights and freedoms of the data subject. Judgments generated solely by an algorithmic tool will never be valid under the Law Enforcement Directive.

VII. CONCLUSION

It is imperative that we strive towards resolving these social and ethical concerns in order for artificial intelligence to be used in the legal system to the greatest extent feasible. Since there are certain circumstances in which total transparency is not achievable in either the decision-making process of AI or humans, we should also question how crucial it is that the algorithm be completely open. The presence of bias is a problem in both humans and AI; nevertheless, the vast majority of algorithmic bias is the consequence of human prejudices being incorporated into AI's training data. When it comes to the deployment of artificially intelligent risk/needs assessment tools, the most important thing to focus on is making sure that the training data is objective. With this in mind, it is strongly recommended to seek the assistance of a group of seasoned specialists who will take into account all aspects of the judicial system and do their best to ensure that AI is implemented appropriately and successfully. Over-reliance on AI for surveillance and prediction could shift correction institutions toward a purely risk-management institutions ignoring rehabilitation. AI must complement, not supplant.

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