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ABSTRACT

'AI has the potential to reduce wrongful convictions and improve the accuracy of the criminal justice system, but only if implemented responsibly.' This statement holds great importance and relevance in the current times because it emphasizes how AI can fundamentally transform the criminal justice system, by minimizing the number of erroneous convictions and increasing accuracy. The criminal justice system is being transformed by predictive policing and AI- powered crime prevention, but in order for this promise to be fulfilled, artificial intelligence must be properly and successfully integrated into the criminal justice system while keeping ethical, transparent, and accountable considerations in mind. While traditional procedures have been deployed by law enforcement agencies for assessing criminal risk, these systems are not without their limitations. The integration of artificial intelligence (AI) into the criminal justice system specifically, its application to the prediction of criminal behaviour—is examined in this article. It highlights the drawbacks of current law enforcement strategies, such as their subjectivity and bias, and how AI may be able to solve these problems by offering objective, personalised forecasts and data-driven insights. An equilibrium between the benefits of AI in predicting criminal behaviour and ethical and privacy issues is necessary to ensure a fair and impartial criminal justice system. Understanding AI's capabilities as well as its ethical implications in law enforcement is critical for reaping its benefits while ensuring justice and openness.

Keywords: Artificial Intelligence (AI), Criminal Behaviour, Data Privacy, Criminal Justice System, Crime Prevention

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INTRODUCTION

Artificial intelligence (AI) has emerged as a powerful tool with the potential to revolutionize humanity. It is rapidly becoming a part of our daily lives, bringing enormous benefits to the society. It can be defined as a science that seeks to identify the essence of intelligence and create intelligent machines, or as a science that seeks strategies to solve complicated issues that cannot be solved without the use of intelligence.[1] AI is changing the way we live, from phones to cars to finance and medical care, the presence of AI is being felt everywhere. Undoubtedly, AI has revolutionized our lives by not only simplifying our everyday tasks but by also enhancing the efficiency of law enforcement agencies and one of the key applications of AI in law enforcement is the prediction of criminal behaviour.

Criminal behaviour prediction, also known as psychological profiling or criminal risk assessment, is an interdisciplinary field that combines elements of psychology, criminology, and data analysis to make accurate predictions about a person's proclivity for criminal behaviour.[2] This entails assessing an individual's psychological characteristics, such as personality, motivations, and behavioural patterns, to construct a profile that can help predict and prevent future criminal behaviour. This preventive approach enables law enforcement agencies to more efficiently allocate resources and to intervene before crimes have been committed, thus preventing any type of criminal activity and ensuring peace in society. AI in crime forecasting refers to the increasing usage of technology that apply algorithms to massive collections of data to either aid or replace the job of people working in these domains. Law enforcement agencies typically rely on traditional methods like deploying specialised units or individuals trained in criminal profiling, such as proficient law enforcement officers, criminal profilers, researchers, or academicians with expertise in criminology and psychology. These techniques are primarily reliant on human intuition and expertise. However, there are several disadvantages that come along with it which includes lack of precision, underutilization of advanced technology, high human error rate and difficulty in handling big data which can

[1] 'What Is Artificial Intelligence (AI) ?' (*IBM*) <https://www.ibm.com/topics/artificial-intelligence> accessed 30 October 2023

[2] Author(s) T Gabor, 'Prediction of Criminal Behaviour - Statistical Approaches' (*Prediction of Criminal Behaviour - Statistical Approaches | Office of Justice Programs*) <https://www.ojp.gov/ncjrs/virtual-library/abstracts/prediction-criminal-behaviour-statistical-approaches#:~:text=This%20typology%20is%20the%20framework,peer%20influences%2C%20and%20situational%20factors.> accessed 30 October 2023

hinder the effectiveness and efficiency of law enforcement agencies. To lessen these constraints and to make them more visible, fair approaches that emphasize individualized assessments are being explored. AI can help to overcome these limitations by minimizing bias, assessing complex data, generating individualized forecasts, accounting for changing conditions, and assuring transparency. It can provide insights into causal links and constantly learn from up-to-date information. However, ethical considerations, data privacy, model biases, and human oversight remain critical to ensure responsible and equitable use.

RESEARCH OBJECTIVES

1. To study the relevance of Artificial Intelligence in the Criminal Justice System
2. To analyse the legal framework surrounding the use of Artificial Intelligence in Criminal Forecasting
3. To analyse the limitations of using Artificial Intelligence in the anticipating Criminal Behaviour.
4. To study the shortcomings of conventional approaches for forecasting criminal behavior and to offer suggestions for the growing application of artificial intelligence.

RESEARCH METHODOLOGY

To accomplish the research goals of this paper, the authors have examined qualitative data from secondary sources and primary data by conducting in-person interviews. The goal of this primary research is to acquire a better knowledge of the complexities of use of AI in predicting criminal behaviour its influence on all stakeholders involved.

Legal Perspective

We conducted an in-person interview with Justice S.H. Gwalani, Judge of the Special CBI Court, City Civil and Sessions Court, Mumbai, and the Public Prosecutor for CBI, to gain valuable insights into the legal framework surrounding use of AI in predicting Criminal Behaviour in India, and the use of AI made in law enforcement agencies for the same. They assert that the application of AI in anticipating criminal behaviour has not been substantial or uniform, nor has its application been applied consistently across law enforcement agencies. Though the Hon'ble Judge acknowledged that AI can bring about revolutionary improvements

in the field of criminal justice, yet he also noted that "there is no authorized law, and AI is a very disputed concept." Likewise, the Public Prosecutor for CBI thought that AI was still a very new and complicated idea, making it difficult for Indian law enforcement agencies like the CBI to stay up to keep at par with the advancements in the field. As a result, he thought that these agencies were falling behind in the application of AI. They added that, CBI has been deploying traditional methods like Brain Mapping, and Narcoanalysis Test for the purpose of forecasting Criminal Behaviour. They recommended the setting up of training and awareness programs for the purpose of educating law enforcement agencies and the concerned stakeholders.

Theoretical Perspective

In our interview with Dr. Ruchi Sinha, Associate Professor, Centre for Criminology and Justice, Tata Institute of Social Sciences, we asked her about her opinion on the use of Artificial Intelligence in predicting Criminal Behaviour from a theoretical point of view. With respect to criminology, the anecdotal method in her opinion, is the most widely used approach in criminology. She also said that there are no specific factors that can be used to predict criminal behaviour because criminology is a field that involves a variety of factors, such as psychological and social factors, and that each crime assigns a different weightage to different factors involved. With respect to the integration of AI in predicting criminal behaviour, she firmly believed that AI cannot be trusted entirely. She further said that while AI can undoubtedly help and speed up the process of forecasting criminal activity, human intervention will always play a crucial part in doing so. She added that "*AI is overhyped*" and that it is not yet capable of taking an active and meaningful part in complicated domains like crime, and that Deep Machine Learning systems are complex to be comprehended.

Practical Perspective

We conducted an in-person interview with Criminologist Snehil Dhall, the founder of a Criminology firm, "*CRIMEOPHOBIA*". We garnered his valuable insights over the practical use of AI in predicting criminal behaviour. He stated that although AI has the potential to revolutionise the way we view the Criminal Justice System, he emphasised on the importance of "*human touch*" in the realm of Criminology. He talked about the possibility of using AI to forecast criminal behaviour. He made it clear that while AI can offer insightful information and help detect or deter crime, it cannot take the place of human judgement and intervention. He added that the Supreme Court of India has signed a Memorandum of Understanding (MOU)

with IIT Madras to investigate the potential applications of artificial intelligence (AI) in forecasting criminal behaviour.[3] The acknowledgement of AI's potential in the criminal justice system is demonstrated by this collaboration. But he also emphasised how crucial human knowledge is to criminology. Artificial intelligence (AI) can make data-driven predictions, but individuals still need to understand and evaluate the data in a larger context. Making educated decisions on criminal behaviour require human judgement, empathy, and knowledge of social dynamics. India is proving its commitment to ensure responsible and ethical use in the area by actively working on crafting an act or law particularly addressing AI use.

CRIMINOLOGY THEORIES

In the realm of criminal law and criminology, understanding the complexity of criminal behaviour is a never-ending pursuit. Questions like reason or factors behind engaging in unlawful acts have captivated the minds of many criminologists, psychologists and legal professionals. Dr. Ruchi Sinha in her interview also stated that no single element can be used to predict criminal conduct because criminology is a multidisciplinary study that considers social and psychological aspects, among others, and that the weights assigned to these factors vary depending on the specifics of each crime. Building on this, it becomes important to delve into the realm of criminal behaviour theories.

Decades of comprehensive study into the complexities of criminal psychology have given rise to three major theories that shed light on the fundamental variables that trigger criminal behaviour. [4]

1. **Psychodynamic Theory:** This theory is based on the research of the prominent psychologist Sigmund Freud, who suggested that people have instinctive urges known as the " *instinctive drives*" that seek satisfaction. These urges are controlled by moral and ethical norms known as the "*superego*," while the development of a rational personality, known as the "*ego*," serves as a link connecting the id and the superego. According to Freud, criminal behaviour is primarily attributed to a failure of the

[3] 'SUPREME COURT SIGNS MOU WITH IIT MADRAS FOR COLLABORATING ON USAGE OF ARTIFICIAL INTELLIGENCE & TECHNOLOGY' (*Office of Alumni & Corporate Relations*) https://acr.iitm.ac.in/iitm_in_news/supreme-court-signs-mou-with-iit-madras-for-collaborating-on-usage-of-artificial-intelligence-technology/ accessed 30 October 2023

[4] 'Psychological Theories of Crime | Criminal Justice' (*Point Park University Online*) <https://online.pointpark.edu/criminal-justice/psychological-theories-of-crime/#:~:text=After%20three%20decades%20of%20research,in%20Criminal%20Justice%20degree%20program> accessed 31 October 2023.

superego. In a clearer sense, psychodynamic theory claims that criminal behaviour is a result of a conflict between the id, ego, and superego. This inner conflict has the ability to give rise to dysfunctional behaviour and criminality.

2. **Behavioural Theory:** Behavioural theory focuses on how an individual's perception of the world influences their behaviour. This theory is based on the notion that human behaviour is shaped through personal encounters. More specifically, behavioural theory emphasizes the concept that individuals develop patterns of behaviour in response to the reactions of those around them. Such conditioning involves the acquisition and reinforcement of behaviour through the use of rewards or punishment. Behavioural Theory is best summed up by the following quote from Watson, who is often considered the father of behaviourism: "*Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors.*"[5]
3. **Cognitive theory:** Cognitive theory is concerned with how humans perceive the world and how this view influences their actions, ideas, and emotions. Most cognitive theorists divide the process into three stages of "*moral development*." Criminals, according to cognitive theorists, do not develop moral judgment above a pre-conventional level.

(i) Pre-conventional level: This is about children and how they learn about the repercussions of their behaviour.

(ii) Level conventional. This affects teenagers and young adults, who begin to base their behaviour on the beliefs and expectations of society.

(iii) Post-conventional level: Over the age of 20, the emphasis is on determining the moral worth of society principles and rules, as well as how they connect to the values of liberty, human welfare, and human rights.

[5] Learning L, contributors W and Lang D, '1920s: Watson' (*Parenting and Family Diversity Issues*, 18 May 2020) https://iastate.pressbooks.pub/parentingfamilydiversity/chapter/watson/ accessed 30 October 2023

USE OF AI IN CRIMINAL FORECASTING

Artificial intelligence (AI) is transforming the Criminal Justice System through Machine Learning and Neural Networks. Machine Learning uses data and algorithms to acquire knowledge, while Neural Networks simulate human thought process.

Without being particularly programmed for a task, machines can "*learn*" it through experience through machine learning. In essence, machines pick up knowledge autonomously without human guidance. They are first fed high-quality data, after which the machines are trained by creating various models and employing various techniques. The kind of task we are aiming to automate will determine which algorithms we use.

Neural network instructs computers to analyses data in a manner modelled after the human brain. This employs the use of deep learning programme, a sort of machine learning process that employs interconnected neurons or nodes in a layered framework to mimic the human brain. It develops an adaptive system that computers utilize to continuously learn from their errors and improve. Artificial neural networks therefore make an effort to more accurately tackle challenging problems. [6]

These technologies are used in predictive policing, facial recognition, and crime prevention, shaping the future of law enforcement.

Predictive policing entails the use of algorithms to analyze huge volumes of data to forecast and prevent potential future crimes. The most extensively used method is place-based predictive policing which often analyses pre-existing crime data to identify places and periods with a high crime risk. Another method which is used is person-based predictive policing which seeks to identify individuals or groups who are likely to commit a crime or potential victims of a crime by examining risk variables such as prior arrests or victimization trends. This data is then used to choose relevant features for feature engineering.

Facial Recognition and Image Analysis is being used by law enforcement agencies to identify suspects and track criminals in crowded areas. By feeding an image of the crime doer into an AI-powered surveillance system, cameras scan the city, analyze and compare all detected faces. If any match is found, an alert goes off, allowing police officers to apprehend the criminal.

[6] Larry Hardesty, 'Explained: Neural networks' (*MIT News | Massachusetts Institute of Technology*, 14 April 2017) <https://news.mit.edu/2017/explained-neural-networks-deep-learning-0414> accessed 31 October 2023.

Real-time facial recognition has the potential to prevent crime but requires access to diverse databases with diverse faces, settings, and lighting environments. [7]

AI also possesses the capability to identify complex patterns that may be challenging for humans to detect. As a result, this enhances accuracy and efficiency in the prediction of criminal behaviour. Some of the machine learning models commonly used for understanding human behaviour and psychology to predict criminal behaviour include:

1. **Random Forest:** This machine learning method functions by compiling information regarding criminal activity and building several decision trees. Every tree produces a forecast, and the total of all these predictions yields the ultimate prediction. Researchers at the National Institute of Justice and Richard Berk developed a risk prediction tool for the Adult Probation and Parole Department in Philadelphia using Random Forest.[8]
2. **Logistic Regression:** This statistical model is used to estimate the likelihood of criminal activity and is employed in categorization and predictive analytics. To train the model, it makes use of gathered data, including demographic and criminal histories. After training, it can forecast fresh information by estimating the likelihood that a given instance would belong to the criminal class.[9]
3. **Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs):** CNNs and RNNs are machine learning models used in criminal behaviour prediction. CNNs are used for image and video analysis, while RNNs handle sequential data. CNNs can analyse surveillance footage and criminal activity data, while RNNs can analyse criminal records and social media posts. Relevant data is gathered and trained to

[7] Vedavalli P and others, 'Facial Recognition Technology in Law Enforcement in India: Concerns And ...' (*Facial Recognition Technology in Law Enforcement in India: Concerns and Solutions*) <https://www.idfcinstitute.org/site/assets/files/16530/facial_recognition_technology_in_law_enforcement_in_india.pdf> accessed 30 October 2023

[8] Gabor T, 'What Is Random Forest Modeling?' (*National Institute of Justice*, 1986) https://nij.ojp.gov/topics/articles/what-random-forest-modeling accessed 30 October 2023

[9] 'Logistic Regression in Machine Learning' (*GeeksforGeeks*, 14 July 2023) <https://www.geeksforgeeks.org/understanding-logistic-regression/> accessed 30 October 2023

identify patterns. Once deemed satisfactory, the model can make predictions on new data to identify potential criminal behaviour. [10]

4. **Natural Language Processing (hereinafter NLP):** Law enforcement organizations use Natural Language Processing (NLP) to analyse and handle massive amounts of data to predict criminal behaviour. These models analyse data, including spoken or written language, to detect language patterns, attitudes and threats in various contexts. They also perform psychological profiling, interview analysis, threat detection, mental health and sentiment analysis, and criminal network analysis. NLP models can help identify individuals at risk of engaging in criminal activities, such as gang members or organized crime groups, through sentiment analysis, topic modelling, and language style analysis.[11]

LEGAL FRAMEWORK FOR ARTIFICIAL INTELLIGENCE IN INDIA

AI's rapid growth necessitates India to enact laws to prevent data mishandling, privacy invasion, undue advantage, and other potential harm to others' interests. India lacks codified laws, statutory rules or regulations, or even government-issued recommendations that govern artificial intelligence. Although India lacks a particular legal framework for AI systems, working papers from the Indian Commission NITI Aayog from 2020, 2021, and 2022 indicate a shift towards AI regulation. The central proposal is to establish a supervisory authority to establish responsible AI principles, give recommendations, and coordinate authorities across different AI sectors. Mr. Snehil Dhall also mentioned that the Supreme Court of India has signed a Memorandum of Understanding (MOU) with IIT Madras to investigate the potential applications of artificial intelligence (AI)[12] in forecasting criminal behaviour.

[10] 'Introduction to Convolution Neural Network' (*GeeksforGeeks*, 24 March 2023) <https://www.geeksforgeeks.org/introduction-convolution-neural-network/> accessed 30 October 2023

[11] Nay J, 'Natural Language Processing and Machine Learning for Law and Policy Texts' (*SSRN*, 18 December 2019) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3438276 accessed 30 October 2023

[12] 'Supreme Court Signs MoU With IIT Madras For Collaborating On Usage Of Artificial Intelligence & Technology | Indian Institute of Technology Madras' (*Indian Institute of Technology Madras*, 12 October 2023) <www.iitm.ac.in/happenings/press-releases-and-coverages/supreme-court-signs-mou-iit-madras-

collaborating-usage> accessed 31 October 2023.

Information Technology Act 2000

The Information Technology Act of 2000, as well as the rules and regulations developed under it, outline the requirements on the integration of AI. Recently, the Ministry of Electronics and Information Technology (MEITY) established a few committees and published a strategy for the introduction, application, and integration of AI into the mainstream[13]. The IT Act, 2000, and Section 43A & 72A of the Information Technology Act, 2000 outline provisions for AI use, including liability under IT Act, criminal law, and cyber law.

Governing and Regulating AI under Indian Evidence Act 1872

The admissibility of AI-generated evidence in court proceedings is another significant aspect. Although, Indian courts have been acknowledging for a long period of time, that reliable, relevant and admissible evidence is necessary for any criminal trial, how courts will assess the evidence produced by these technologies is still unclear. AI-generated information must adhere to the requirements for authenticity and legitimacy in a court of law for it to be accepted as evidence under the Indian Evidence Act of 1872.

According to the Indian Legal System, the admissibility of evidence obtained using predictive analytics and AI should be governed by the rules laid by the law. According to these standards, the evidence must be relevant to the subject at hand, the technology used to generate evidence must be both scientifically reliable and widely respected in the field, and the evidence must be collected in accordance with the accused's constitutional and legal rights.

There have been cases in India that provide guidance on the admissibility of evidence obtained through predictive analytics and AI. For example, In the case of Anvar P.V. v. P.K. Basheer (2014)[14], The Apex Court has ruled that electronic evidence, such as emails and text messages, can be admissible in court if it is relevant, authentic, and not tampered with. The person producing the evidence must provide the necessary infrastructure and expertise to prove its

[13] 'AI & Emerging Technologies Division: Ministry of Electronics and Information Technology, Government of India' (*AI & Emerging Technologies Division | Ministry of Electronics and Information Technology, Government of India*) <https://www.meity.gov.in/emerging-technologies-division> accessed 30 October 2023

[14] Anvar PV v PK Basheer [2014] 10 SCC 473.

authenticity. Similarly, In the case of State of Maharashtra v. Praful Desai[15], the court ruled that scientific evidence, like fingerprint analysis, can be admissible in court if it is reliable, relevant, and conducted by a qualified expert.

Commissions and Policies made to regulate AI

In 2018, the planning commission proposed the National Strategy on Artificial Intelligence (NSAI), which aimed to establish IP regimes for AI upgrades and introduce legal networks for data protection, security, and privacy.[16] The Ministry of Electronics and Information Technology introduced the Digital Personal Data Protection Bill 2022, which replaced IT rules, 2011 and existing laws for handling sensitive personal data. NITI Aayog established AIRAWAT, an AI Research, Analytics, and Knowledge Assimilation platform, to better utilize AI[17]. In 2020, NITI Aayog drafted documents to establish an oversight body and enforce responsible AI principles, including safety, rehabilitation, equality, inclusivity, non-discrimination, privacy, security, transparency, accountability, and human values. The recently implemented New Education Policy emphasises teaching coding to students' rights beginning in Class VI. In the coming years, India will be a centre for emerging AI technologies. Cyril Amarchand Mangaldas is India's first law practise to apply artificial intelligence (AI), which is largely used to assess and improve contractual and other legal texts.[18]

International Framework for regulating AI

[15] STATE OF MAHARASHTRA -VS- DR. PRAFUL B. DESAI (2003)4 SCC 601

16 'National Strategy For Artificial Intelligence' (*INDIAai*, 21 August 2019) <https://indiaai.gov.in/research-reports/national-strategy-for-artificial-intelligence/> accessed 31 October 2023.

[17] 'AIRAWAT- Establishing an AI Specific Cloud Computing Infrastructure in India' (*INDIAai*, 27 January 2020) <https://indiaai.gov.in/research-reports/airawat-establishing-an-ai-specific-cloud-computing-infrastructure-in-india/> accessed 31 October 2023.

[18] 'Legaltech & Als' (*Legaltech & ALS – Cyril Amarchand Mangaldas*) <https://www.cyrilshroff.com/legaltech-als/> accessed 30 October 2023

1. Brazil has released a draft AI law, focusing on users' rights and categorizing AI systems based on societal risk. The law requires AI providers to provide information about their products, explain decisions, and allow users to contest or demand human intervention. AI developers must conduct risk assessments before bringing products to market, with high-risk implementations prohibited. The law also outlines potential "high-risk" AI applications, including healthcare, biometric identification, and credit scoring. All AI developers are liable for damage caused by their systems.[19]

2. In China, the State Council introduced the "Next Generation Artificial Intelligence Development Plan" in 2017.[20] This was followed by the implementation of ethical guidelines in 2021 and the enactment of two AI laws in January 2022. Since March 2023, Algorithm Provisions have been in effect for algorithmic recommendations of internet information services. Additionally, Draft Deep Synthesis Provisions are currently in the draft stage. [21]

3. Japan, the second-largest IT sector in the OECD, is utilizing AI to tackle social issues like aging. The government has adopted the Social Principles of Human-Centric AI, which include human-centricity, education, data protection, safety, fair competition, fairness, accountability, and transparency. The AI Utilisation Guidelines and Governance Guidelines for Implementation of AI Principles provide action goals and hypothetical implementation examples. Japan's approach aligns with the OECD AI

[19] Tahira Mohamedbhai | York Law School G, 'Brazil Lawmakers Approve Bill Regulating Artificial Intelligence' (*Jurist*, 2 October 2021) <https://www.jurist.org/news/2021/10/brazil-lawmakers-approve-bill-regulating-artificial-intelligence/> accessed 30 October 2023

[20] 'China's New Generation of Artificial Intelligence Development Plan - Foundation for Law and International Affairs' (*Foundation for Law and International Affairs*, 8 July 2017) <https://flia.org/notice-state-council-issuing-new-generation-artificial-intelligence-development-plan/> accessed 31 October 2023.

[21] Alex Roberts and Roger Li, 'China's Algorithm Regulation – reshaping the Tech Sector' (*Passle*, 12 May 2022) <https://techinsights.linklaters.com/post/102hofo/chinas-algorithm-regulation-reshaping-the-tech-sector> accessed 31 October 2023.

Principles, focusing on inclusive growth, sustainable development, and societal well-being. [22]

India is recognizing the need for a robust legal framework to govern and regulate AI systems. Despite the absence of specific legislation, significant progress has been made, including the proposal to establish a supervisory authority and the introduction of commissions and policies. A comprehensive legal framework is essential to address concerns like data mishandling and privacy invasion.

LIMITATIONS OF USING AI FOR PREDICTING CRIMINAL BEHAVIOUR

Biasness: Artificial intelligence carries the potential of perpetuating pre-existing biases and discriminatory practices because the technology is only as good as the data it is provided by the humans themselves. This has the potential to sustain inequalities in the criminal justice system and result in unfair outcomes for marginalized communities. Therefore, the possibility of bias constitutes one of the main concerns in using AI for predicting criminal behaviour.

Analyzing historical criminal data is one of the practices which might cause biasness while deploying AI systems for criminal behaviour prediction. Discriminatory practices, over policing in some neighbourhoods, and differences in arrests and convictions on the basis of race or socioeconomic status, might result in the statistics being skewed, and training AI models with this kind of data can intensify these prejudices. For instance, let's take USA's example, law enforcement agencies in USA have been using digital technology to predict and prevent crimes, thinking it would make policing more efficient, however, civil rights advocates and other observers, have argued that these techniques are based on skewed statistics that supports increased police presence in Black and Latino neighbourhoods. University of Chicago Professor Ishanu Chattopadhyay, who is working on a tool that forecasts crime by spotting patterns among vast amounts of public data on property crimes and violent crimes also said that "*Previous attempts at crime prediction were frequently based on false assumptions about*

[22] Ryan Budish and Urs Gasser, 'What are the OECD Principles on AI?' (*Berkman Klein Center*, 11 June 2019) <https://cyber.harvard.edu/story/2019-06/what-are-oecd-principles-ai> accessed 31 October 2023.

crime and its causes and failed to take systemic biases in law enforcement into account."[23] These algorithms, he claimed, outweighed considerations such as the presence of graffiti, and he also stated that because authorities focused on certain "hot spots", they failed to examine the intricate social systems prevalent in cities or how law enforcement influences crime. As a result, the police sometimes over-patrolled specific neighbourhoods based on forecasts. Pred- Pol, a contentious predictive policing programme that predicted where property crimes may occur throughout the city, was halted due to financial restrictions during the corona outbreak. The programme was severely criticized since it resulted in increased policing of minority neighbourhoods, i.e. the Black and the Latino neighbourhoods.[24]

AI models may not be able to predict criminal behaviour in certain communities with accuracy if they are trained on inadequate data, which may result in under-policing or under-reporting of crimes in a particular region, which can further cause biasness in AI. Dr. Ruchi Sinha, in her interview gave an example of the same, *take neighbourhood A and neighbourhood B as two examples of neighbourhoods. Since residents of neighbourhood A trust the police, they usually report crimes with diligence. In contrast, because of a lack of confidence in the police or apprehension about reprisals, neighbourhood B, a community with lesser income, reports fewer crimes. AI algorithms include biased and partial data when they are trained using previous crime data. As a result, the model can mistakenly indicate that neighbourhood B is safer than neighbourhood A. Due to this, neighbourhood B experiences under-policing due to insufficient police resources, whereas neighbourhood A experiences over-policing as a result of exaggerated reported crime rates.*

Data Privacy & Ethical Considerations to Privacy: The collection and analysis of enormous volumes of personal data is necessary for the employment of AI in criminal justice system. In India, the gathering, storing, and handling of personal data is regulated under the Information Technology Act, 2000, and the Personal Data Protection Bill, 2023. These regulations seek to uphold the rights of individuals to privacy and place duties on organizations that handle

[23] 'Researchers Use AI to Predict Crime, Biased Policing in Major U.S. Cities like L.A.' (*Los Angeles Times*, 4 July 2022) <https://www.latimes.com/california/story/2022 -07-04/researchers-use-ai-to-predict-crime-biased-policing> accessed 30 October 2023

[24] 'LAPD Will End Controversial Program That Aimed to Predict Where Crimes Would Occur' (*Los Angeles Times*, 21 April 2020) <https://www.latimes.com/california/story/2020 -04-21/lapd-ends-predictive-policing- program> accessed 30 October 2023

personal information. To protect privacy, AI systems must be made sure to abide by these regulations.

Concerns regarding possible violations of fundamental rights, such as privacy, can be raised while using AI and predictive analytics in the criminal justice system. The public's right to privacy may be violated if information utilized for predictive analytics is gathered by invasive or surveilling means. Furthermore, if decisions about a person's liberty, such as preventive detention, are made using these technologies, it can harm that person's right to a fair trial. Several cases have addressed relevant issues of new technology and basic rights, even if there aren't any cases in India that address these concerns.

In the case of Justice K.S. Puttaswamy (Retd.) and Another v. Union of India and Others (2017) [25], the Apex Court has ruled that privacy is a fundamental right under the Indian Constitution which includes the protection of personal autonomy and human dignity. The use of predictive analytics and AI in the criminal justice system may potentially violate privacy if it involves the collection and processing of personal data without informed consent. The data used to train these technologies may perpetuate prejudices and discrimination, violating the right to equality. Additionally, the use of these technologies may lead to pre-trial detention or pre-sentencing decisions based on automated algorithms, potentially leading to arbitrary or discriminatory outcomes and violating the right to a fair trial. Obtaining the informed consent of the individuals whose information is being gathered is a basic ethical need. It guarantees that people are informed about the usage, storage, and sharing of personal data. Laws and regulations pertaining to privacy must be followed when collecting data for AI in criminal activity. It is essential to uphold people's right to privacy, make sure that their personal data is safely preserved, and limit its usage to appropriate uses.

Other Implications: Legal professionals face challenges in establishing accountability for technology-related errors, as AI systems can have significant implications on individuals' lives. Proactive measures can be taken by legislators and industry experts to establish clear lines of responsibility and ensure accountability. AI should complement lawyers' work, but it cannot replace strategic decision-making, complex legal analysis, or legal counsel. Lawyers must protect their clients' interests and ensure AI does not replace their expertise and experience.

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[25] K.S. Puttaswamy and Anr. vs. Union of India ((2017) 10 SCC 1)

RECOMMENDATIONS FOR ENHANCING THE USE OF AI IN CRIMINAL BEHAVIOUR PREDICTION

The implementation of artificial intelligence (AI) in forecasting criminal behaviour holds the potential to completely change the criminal justice system. However, with this commitment comes an absolute need for artificial intelligence systems being used judiciously and ethically, and to achieve this, numerous proposals and subsequent strategies must be explored. Transparency in the design and implementation of AI systems, as well as frequent audits and evaluations to minimise prejudice and discrimination, constitute some of the recommendations. Furthermore, professionals from different academic fields must be consulted to provide a fair and thorough view on the potential use of AI in criminal justice. Additionally, constant research and association between artificial intelligence (AI) researchers and law enforcement professionals is crucial to boost both the precision and efficiency of these algorithms while safeguarding principles of ethics.

Training and Education: For better implementation of AI-based technologies in criminal behaviour forecasting, promoting education for law enforcement agencies and public awareness is essential. Law enforcement agencies must be educated on the positive and negative aspects of artificial intelligence (AI) technology, for this, workshops and training sessions should be organised to familiarise the officials with the technical features of AI and make sure they possess the skills needed to properly understand and apply predictions made by AI. Public awareness regarding the positive and negative aspects of using AI in this field, in addition to the necessary and existing ethical and legal protections, is crucial. Developing forums and conversation starters amongst the public, scholars, practitioners, legislators is crucial. Addressing confusion, clarifying the restrictions of artificial intelligence (AI) systems, and seeking the general public's opinions on expectations and concerns, will help in fostering the creation and application of AI systems for predicting criminal behaviour, and having open conversations will also ensure that the systems are consistent with social norms and values. Short-term courses on AI skills can be offered by vocational institutes, allowing learners to gain practical skills for careers in AI-based industries. Specialised AI programmes and courses inclusive of AI algorithms, machine learning, data science, and the ethical and societal elements of AI should be offered by universities and colleges. This could involve discussing how artificial intelligence is employed in social media algorithms, search engines, virtual assistants, and other applications.

Formulating AI- specific Laws: India can create a thorough legislative framework to supervise the use of AI in criminal forecasting, to ensure the responsible and ethical use of AI in the criminal justice system. These include the passage of legislation requiring the application

of ethical AI principles, with a special emphasis on fairness, openness, and accountability. Furthermore, it is critical to strengthen data protection legislation, aligning them with the worldwide standards such as the General Data Protection Regulation (GDPR), to protect the privacy and rights of individuals whose data is used in AI systems. This can be done to prevent violating any basic rights and to solve ethical concerns that are impeding the implementation of Artificial Intelligence in this industry. Bias reduction and fairness legislation must be devised to ensure that AI systems used in criminal behaviour prediction undergo mandatory bias evaluations and audits, with methods implemented to correct any biases and improve the fairness of the AI algorithms. Transparency and explainability criteria should also be enforced, mandating agencies to provide detailed explanations of how AI systems arrive at their forecasts, particularly in criminal situations. Effective oversight and regulation can be done by establishing a separate regulatory organization or commission concerned with overseeing the use of AI in the criminal justice system, which may have the authority to establish standards, perform audits, and ensure compliance with AI-related regulations. For the purpose of deploying AI for criminal behaviour prediction it is essential to ensure transparency and community alignment to mandate community engagement and public consultation. Finally, whistleblower laws should be adopted to protect persons who uncover corruption or unethical practices involving AI in the criminal justice system, thereby creating a culture of transparency and accountability.

Practical Use of AI: Although India is at a nascent stage of integrating Artificial Intelligence in Criminology, it has initiated its efforts by developing a few AI tools which help with Criminal forecasting. The Odisha Police uses CCTNS to guide investigation procedures[26], while the Indraprastha Institute of Information Technology in New Delhi has established a Centre for Technology and Policing to aid in cyber policing,[27] social media analysis, and image processing. AI, biometrics, big data, and network forensics are used to identify offenders, manage traffic, and combat terrorist operations. Rajasthan Police uses a Facial Recognition System to monitor potential miscreants in crowded areas. However, these tools are still in their

[26] Srivastava S, 'Odisha Police to Use AI and Mobile Computing to Analyse Crime Data' (*Analytics Insight*, 6 July 2019) <https://www.analyticsinsight.net/odisha-police-to-use-ai-and-mobile-computing-to-analyse-crime-data/> accessed 30 October 2023

[27] 'IIIT-D to Give Cops an Edge in Tech' (*The Hindu*, 4 December 2018) <https://www.thehindu.com/news/cities/Delhi/iiit-d-to-give-cops-an-edge-in-tech/article25666935.ece> accessed 30 October 2023

early stages, and their coverage is limited. During our conversation with the Hon'ble Judge Justice S.H. Gwalani, and the Public Prosecutor for CBI, we learned that the Mumbai Police Department does not currently use AI tools, and they are unaware of any substantial advances in other states. One of the primary goals of training programmes is to educate concerned stakeholders about the use of Artificial Intelligence in the Criminal Justice System and to demonstrate the actual application of these tools, hence spreading their coverage. Artificial intelligence (AI) systems rely on data gathering and learning to improve their performance over time and uses progressive learning algorithms to recognize patterns and consistencies within data by enabling algorithmic learning. AI systems also automate routine tasks, using sophisticated algorithms and machine learning capabilities, to streamline internal operations, which saves time and resources, allowing humans to focus on more strategic tasks. User feedback helps identify areas for improvement and pinpoint issues, while AI's automation of routine tasks allows organizations to automate operations, saving time and resources. Therefore, encouraging the practical use of AI systems in the realm of criminal behaviour prediction may ease the burden on the law enforcement agencies, and increase their efficiency.

CONCLUSION

In conclusion, it is indisputable that artificial intelligence is changing many facets of our life, including the legal system. The use of AI for psychological profiling, or the prediction of criminal behaviour, has enormous potential to improve the efficacy and efficiency of law enforcement. Though useful, traditional approaches to criminal profiling frequently include drawbacks like subjectivity, human error, and challenges managing large volumes of data. Artificial Intelligence has the potential to greatly increase the accuracy and fairness of criminal predictions because of its capacity to reduce bias, handle complicated data, and generate customized evaluations. It has the ability to proactively deploy resources and deter criminal activity, which will ultimately lead to a society that is safer and more tranquil.

However, it's crucial to recognise that there are significant ethical questions raised by the application of AI to criminal prediction. To guarantee appropriate and equitable use of this technology, concerns about data privacy, model biases, openness, and human oversight must be carefully considered. As AI develops, it is critical that we find a balance between protecting people's rights and privacy and utilising its potential to enhance law enforcement. AI has the

potential to be an effective instrument in the continuous search of security and justice in our dynamic society, if it is planned carefully and ethically.

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