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Introduction

Welcome to the Indian Journal of Legal Affairs and Research (IJLAR), a distinguished platform dedicated to the dissemination of comprehensive legal scholarship and academic research. Our mission is to foster an environment where legal professionals, academics, and students can collaborate and contribute to the evolving discourse in the field of law. We strive to publish high-quality, peer-reviewed articles that provide insightful analysis, innovative perspectives, and practical solutions to contemporary legal challenges. The IJAR is committed to advancing legal knowledge and practice by bridging the gap between theory and practice.

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Preface

The Indian Journal of Legal Affairs and Research is a testament to our unwavering commitment to excellence in legal scholarship. This volume presents a curated selection of articles that reflect the diverse and dynamic nature of legal studies today. Our contributors, ranging from esteemed legal scholars to emerging academics, bring forward a rich tapestry of insights that address critical legal issues and offer novel contributions to the field. We are grateful to our editorial board, reviewers, and authors for their dedication and hard work, which have made this publication possible. It is our hope that this journal will serve as a valuable resource for researchers, practitioners, and policymakers, and will inspire further inquiry and debate within the legal community.

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Description

The Indian Journal of Legal Affairs and Research is an academic journal that publishes peer-reviewed articles on a wide range of legal topics. Each issue is designed to provide a platform for legal scholars, practitioners, and students to share their research findings, theoretical explorations, and practical insights. Our journal covers various branches of law, including but not limited to constitutional law, international law, criminal law, commercial law, human rights, and environmental law. We are dedicated to ensuring that the articles published in our journal adhere to the highest standards of academic rigor and contribute meaningfully to the understanding and development of legal theories and practices.

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“EXPLORING THE INTERSECTION OF ARTIFICIAL INTELLIGENCE, CRIMINAL PREDICTION SYSTEMS, AND LEGAL CHALLENGES: A COMPREHENSIVE ANALYSIS”

AI AND CRIMINAL PREDICTION SYSTEMS

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ABSTRACT:

The study takes a human-centric approach to unravel the fascinating connection between Artificial Intelligence (AI) and criminal prediction systems by diving into the current scenario, navigating through ethical quandaries, legal considerations, and the striking the fine balance between technological strides and safeguarding individual rights. The exploration shines a spotlight on the touchy subjects of algorithmic bias, concerns about data privacy, and the real effectiveness of AI in foreseeing criminal behaviour, all with the goal of shedding light on the diverse facets of AI integration in law enforcement.

At the heart of AI's impact on criminal prediction systems is its talent for sifting through data intricacies and recognizing patterns. Picture machine learning algorithms as digital detectives, excelling in uncovering hidden connections within a tapestry of information, spanning from crime reports to social media activity and surveillance footage. This analytical prowess empowers law enforcement to be a step ahead.

One standout application of AI is in predictive policing, that uses historical data and algorithms to anticipate where and when crimes might happen. This isn't just about predicting crimes; it's about optimizing resources and enabling law enforcement to proactively tackle criminal activities, transforming the traditional playbook of policing. It adds a layer of sophistication to criminal prediction systems through advanced behavioral analysis, monitoring online activities, and assessing communication patterns to pinpoint potential threats. Think of facial recognition technologies and biometric data as high-tech detective tools that contribute to understanding the intricate web of criminal networks.

However, as AI takes centre stage in predicting crimes, ethical considerations take the spotlight. It's a delicate dance between leveraging technology for public safety and respecting individual rights and privacy.

Through this exploration, we emphasize the importance of ethical guidelines, aligning AI deployment with our values and legal standards, ultimately ensuring responsible and people-centric use in the dynamic world of AI-powered criminal prediction systems.

KEY TERMS - Crime Prediction; Crime Detection; Crime Datasets; Deep Learning; Machine Learning; Smart Policing; Survey.

1. INTRODUCTION:

Imagine a world where Artificial Intelligence (AI) plays a pivotal role in predicting and preventing crime. This isn't science fiction; it's a reality unfolding in law enforcement. AI Algorithms act as digital detectives, with its ability to sift through massive amounts of data and discern patterns with its remarkable ability to predict criminal activity even before its occurrence, is transforming how we approach public safety. Historically, our police forces have responded to incidents after the fact, but thanks to AI, they are now equipped to proactively combat potential criminal activity. Using complex technologies such as machine learning, predictive analytics and data mining, AI processes large amounts of information to identify patterns, predict crime hotspots and optimize resource allocation.

Additionally, machine learning algorithms can also be used to detect correlations between crime occurrences and diverse environmental and demographic variables such as geographical location, weather conditions, and time of day². Utilizing this data, tailored crime prediction and prevention strategies can be formulated to cater to the specific requirements of a particular community.

By using machine learning to analyse crime data, pinpoint crime hotspots, and allocate law enforcement resources optimally, predictive policing improves attempts to reduce crime. Criminal³. By examining crime data over time and place, deep learning techniques like convolutional and recurrent neural networks show promise for precisely forecasting crime patterns⁴. Deep learning also facilitates computer vision and video analysis, which makes it simpler to identify and categorise illegal conduct in surveillance material. Issues like model interpretability and data availability still exist despite their potential. Recent developments in deep

learning and machine learning, however, hold great promise for overcoming these obstacles⁵.

While this appears to improve public safety, the use of AI in criminal prediction systems brings to the forefront a myriad of ethical dilemmas, ranging from concerns about privacy and civil liberties to questions of bias and discrimination. This study addresses both the potential benefits of AI and the ethical issues raised by this breakthrough technological advancement in crime prevention. By drawing on real-world experiences, particularly in cities like New Dehi, Kolkata, Maharashtra, Tamil Nadu, Madhya Pradesh, Karnataka, Kerala, and Telangana, we aim to explain the complex issues surrounding the application of AI in law enforcement and lay the groundwork for its eventual implementation.

2. RESEARCH METHODOLOGY

The research methodology used in this study on crime prediction using machine learning and deep learning techniques includes several key elements. For starters, data collection involves collecting various sources of crime data, including police records, crime reports, social media, and surveillance footage, as well as publicly available datasets. Strict pre-processing steps were performed to ensure the quality and relevance of the data. The selection of algorithms was then carefully considered, focusing on selecting the most suitable algorithms for crime prediction tasks, such as decision trees, random forests, support vector machines support, convolutional neural networks and recurrent neural networks. These algorithms are trained and evaluated using appropriate datasets, with validation techniques used to evaluate prediction performance. Feature engineering techniques are applied to improve model accuracy, including the extraction of spatial and temporal features as well as the incorporation of external factors such as weather conditions and information. demographic information. Ethical considerations are paramount throughout the research process, addressing issues of privacy, bias in data and algorithms, and the potential social impacts of these systems. predictive control system. Recognizing the limitations and assumptions inherent in the methodology, such as limitations in data availability and biases in training data, will further ensure transparency and rigid. Looking ahead, this study identifies future research directions, including exploring new algorithms, improving prediction models, addressing ethical concerns, and conducting research long-term to evaluate the effectiveness of healthcare initiatives.

3. AI IN CRIMINAL PREDICTION SYSTEM

Imagine a world where machines think and learn just like humans do. That's the essence of Artificial Intelligence, or AI. It's like giving computers a brain of their own, allowing them to understand, reason, and solve problems just as we do. AI, or Artificial Intelligence, refers to the simulation of human intelligence processes by machines, especially computer systems. It involves the development of algorithms and computational models that enable machines to perform tasks that typically require human-like intelligence, such as learning from data, recognizing patterns, making decisions, and solving problems.

AI enables machines to mimic cognitive functions associated with human minds, such as reasoning, problem-solving, perception, learning, and language understanding. AI technologies encompass a broad spectrum of approaches, including machine learning, natural language processing, computer vision, robotics, expert systems, and neural networks.

AI aims to create intelligent systems that can perceive their environment, interpret data, learn from experience, and adapt their behaviour accordingly. The goal of AI is simple yet profound: to create machines that can think, learn, and adapt, just like we do. Imagine a robot that can navigate a crowded street, recognize faces, or even hold a conversation – that's the kind of intelligence AI aims to achieve. AI applications span various domains, including healthcare, finance, transportation, education, entertainment, and cyber security, among others.

Overall, AI represents a rapidly evolving field of computer science and engineering that seeks to develop machines capable of performing tasks that traditionally required human intelligence, with the potential to revolutionize industries and society at large. In essence, AI is not just about machines – it's about empowering humanity to achieve new heights of innovation and progress. It's about unlocking the potential of technology to make our world a better, smarter, and more connected place.

Criminal prediction systems are tools or technologies that utilize data analysis and artificial intelligence (AI) techniques to forecast or predict criminal activity. These systems analyse various types of data, such as historical crime data, demographic information, geographic factors, social media activity, and other relevant indicators, to identify patterns, trends, and correlations associated with criminal behaviour.

The primary goal of criminal prediction systems is to assist law enforcement agencies and criminal justice practitioners in preventing and combating crime more effectively. By predicting where and

when crimes are likely to occur, these systems aim to optimize resource allocation, prioritize response efforts, and develop targeted intervention strategies to mitigate risks and enhance public safety.

AI plays a pivotal role in criminal prediction systems, enhancing law enforcement capabilities by utilizing advanced algorithms and data analysis techniques to forecast potential criminal activity.

3.1 Predictive Policing

Predictive policing employs AI algorithms to analyse historical crime data alongside various contextual factors to forecast where and when crimes are likely to occur. This analysis considers a range of data, including crime incident reports, geographical information, socio-economic indicators, weather patterns, and even social media activity. AI algorithms, such as machine learning models, process this data to identify patterns, trends, and correlations that may not be immediately apparent to human analysts. These predictive models generate heat maps or risk scores highlighting areas with a higher likelihood of criminal activity. Law enforcement agencies use this information to allocate resources strategically, such as deploying patrols or conducting targeted interventions in high-risk areas. Additionally, predictive policing systems may employ feedback loops, continuously updating and refining their models based on new data and outcomes to improve accuracy over time.

3.2 Risk Assessment Tools

Risk assessment tools leverage AI algorithms to evaluate an individual's likelihood of engaging in future criminal behaviours. These tools analyse a range of factors, including demographic information, criminal history, employment status, substance abuse history, and mental health indicators. Machine learning techniques are often employed to identify patterns and correlations within this data to generate risk scores or classifications. AI-driven risk assessment tools aim to assist judges and parole boards in making informed decisions related to pre-trial release, sentencing, and parole supervision. By providing objective risk assessments, these tools seek to improve decision-making consistency and efficiency while reducing the influence of human biases. However, it's crucial to ensure that these tools are transparent, interpretable, and regularly validated to mitigate the risk of perpetuating biases inherent in historical data.

3.3 Sentence Recommendation System

Sentencing recommendation systems utilize AI algorithms to assist judges in determining appropriate sentences for criminal defendants. These systems analyse case-specific factors, including the nature of the offense, aggravating or mitigating circumstances, criminal history, and jurisdiction-specific sentencing guidelines. By processing this information, AI algorithms generate sentencing recommendations or sentencing ranges tailored to individual cases. It's essential to emphasize that sentencing recommendation systems are designed to augment judicial decision-making rather than replace it entirely. Judges retain discretion in sentencing and are not bound by the recommendations provided by these systems. Moreover, transparency and accountability are paramount in ensuring that these systems operate fairly and uphold legal principles such as proportionality and consistency in sentencing outcomes.

3.4 Crime Pattern Analysis

AI-powered crime pattern analysis tools examine vast datasets comprising crime incident reports, witness statements, forensic evidence, and other relevant information to identify recurring patterns and modus operandi associated with specific types of crime. Machine learning algorithms analyse these datasets to detect similarities, clusters, and anomalies indicative of organized criminal activity or emerging trends. By uncovering hidden connections and identifying crime patterns, law enforcement agencies can develop proactive strategies to disrupt criminal operations effectively. These strategies may include targeted investigations, surveillance operations, or community outreach initiatives aimed at addressing underlying social factors contributing to criminal behaviour. Additionally, AI-driven crime pattern analysis enables law enforcement to allocate resources efficiently and prioritize response efforts based on the severity and prevalence of different types of crime.

3.5 Behavioural Analysis

Behavioural analysis systems leverage AI algorithms to analyse various forms of data, such as surveillance footage, social media activity, communication patterns, and sensor data, to identify suspicious behaviour or deviations from normative patterns. These systems employ machine learning techniques to recognize behavioural cues, anomalies, and indicators of potential criminal activity. By flagging unusual behaviours or patterns that may indicate a threat, behavioural

analysis systems enable law enforcement agencies to intervene proactively and investigate potential security risks. However, it's essential to balance the use of these systems with privacy considerations and safeguards to prevent unwarranted surveillance or profiling.

4. EMBRACING ARTIFICIAL INTELLIGENCE IN INDIA'S CRIMINAL JUSTICE ADMINISTRATION: A PATH TO EFFICIENCY AND FAIRNESS

According to the National Judicial Data Grid (NJDG), over crores of cases are pending in lower and higher judiciary. Surprisingly IBM robot 'ROSS' which is having data mining and identifying techniques will be used for back-end office work in litigation and arbitration process such as research work, and data storage, this will not only help our legal system in research but also in handling significant pendency of cases plus on counselling clients and taking on complex issues, in keeping track of the work being done by creating invoices which enables transparency to firms, clients, lawyers, and auditing authorities.⁶

In order to successfully combat crime, law enforcement organizations in India are increasingly relying on cutting-edge technology such as artificial intelligence (AI). One prominent participant in this space is Gurugram-based Staqu Technologies, which was founded in 2015 and has been at the forefront of cutting-edge solutions. Staqu's technological stack equips law enforcement with robust APIs for entity detection and summarization, as well as state-of-the-art technologies for text processing, picture analysis, and facial recognition. The release of an AI-enabled application named "Artificial Intelligence-based Human Efface Detection" by Staqu in association with the police forces of Rajasthan and Punjab is a recent development. This tool is essential in helping law enforcement authorities identify criminal identities and locate individuals who have gone missing. Additionally, Staqu's technologies for tracking illegal activity and criminality have been essential in digitizing over 50,000 criminal records, resulting in the resolution of numerous cases. Staqu's facial recognition technology boasts an impressive accuracy rate of 95%, enabling law enforcement agencies to identify individuals based on gender, facial changes, and occlusion. The company has also introduced smart glasses equipped with built-in cameras for facial recognition, as well as drones utilized by the Kerala government for enhanced surveillance in high-security areas and traffic junctions.⁷ Initiative started by various state governments in India includes

the following⁸:

- **Government of Uttar Pradesh:** In Uttar Pradesh, India, law enforcement agencies are stepping up their game with advanced technology to keep communities safe. Teaming up with a robotics startup from Pune, the police have acquired 84 specialized drones that come packed with thermal imaging features for round-the-clock surveillance. These drones are invaluable for uncovering hidden weapons and monitoring suspicious activities, day or night. Meanwhile, the introduction of "Jarvis," an AI-powered video analytics platform, in 70 prisons allows authorities to keep a close eye on inmates and swiftly detect any security threats. It's a testament to Uttar Pradesh's dedication to staying ahead in the fight against crime and ensuring the well-being of its citizens.⁹
- **Government of Telangana:** The Telangana Police unveiled the Smart RoboCop, an innovative addition to their force developed by H-Bots Robotics, in December 2017. With its numerous sensors, GPS, and cameras, this sophisticated robot can aid law enforcement and traffic management like a superhero. Thanks to capabilities like emergency illumination and photographic heat, it can be installed in strategic locations such as airports and retail malls. There, it can do a variety of tasks including processing complaints, detecting explosives, and facial recognition.¹⁰
- **Government of Maharashtra:** In 2015, the Maharashtra government embarked on a bold mission to strengthen cybersecurity across the state. They have donated a whopping amount of ₹800 crore to this initiative to prevent cybercrime. As part of their efforts, they have developed cutting-edge software with artificial intelligence and big data analytics. This smart tool scans the Internet, collects information about cybercrime, and creates a detailed database. This software allows law enforcement to predict where cybercriminals might attack, what form they might take, and who might be behind them, allowing them to quickly respond to threats. potentially in real time.¹¹
- **Government of Haryana:** In October of 2018, CivilCops joined hands with the government of Haryana to enhance the management of public complaints related to traffic information. The aim of CivilCops is to bring the best of AI technology in a new application that is designed to simplify the process. CivilCops wants to use its experience to replace the current application of Harpath with a user-friendly application. The updated application enables citizens to submit complaints via a chat-based and voice-based

interface. AI-based systems help in automating claims, saving time and money. The integration of chat-based interfaces with platforms such as Facebook Messenger allows users to easily report issues and get help.¹²

- **Government of Tamil Nadu:** Making sure our roads are well lit is very important to everyone's safety. This may be the reason why the Tamil Nadu Equipment Management (TNeGA) expert is dealing with smart street lighting by actually looking at the structure. Unlike expensive alternatives, they stuck to a sensible game plan that didn't require significant changes to the existing framework. Using key sensors and open-source development, they emphasize that street light support is not so demanding, but more efficient. The solution will be easy to deploy and low on maintenance.¹³

5. BENEFICIAL OUTCOMES OF INTEGRATING AI INTO CRIME PREDICTION SYSTEM:

Artificial intelligence is at the forefront of everyday conversations in our society, often compared to a digital detective. Its reach extends beyond traditional tasks such as forecasting weather conditions or creating content on various topics. In recent years, artificial intelligence has taken on a new and important role: helping law enforcement agencies detect criminals. These technological advances have changed the way police forces operate, providing innovative tools to fight crime more effectively. Yes, and it is true such that introduction of Artificial Intelligence is no more concept on which there is speculations only as most of the law enforcing agencies like Lapd, Punjab Safe Cities Authority, Mark 43, CPI, OpenFox, Formultyics, Auror etc.¹⁴ are using the most up-to-date solutions to prevent crime.

Not only the use by the agencies helps in providing solutions to prevent crime but the integration of AI also aims at enhancing efficiency, ensuring public safety, and promoting fairness. These advancements in present technology myriad possibilities to assist law enforcement and security work effectively, thereby transforming the landscape of crime prevention and investigation.¹⁵

5.1 Enhanced Efficiency in Investigating Crimes

Leveraging predictive analytics and AI empowers law enforcement to enhance criminal investigations. For example, Mumbai Police utilizes these technologies to forecast crime risks in

specific regions, enabling proactive resource allocation and strategic crime prevention. By analyzing past crime statistics and identifying trends, law enforcement can anticipate and prevent criminal activities, leading to a more efficient and proactive approach to crime investigation.

5.2 Improved Risk Assessment for Enhanced Public Safety

The implementation of AI-based systems such as the Crime and Criminal Tracking Network (CCTNS) by the National Crime Records Bureau (NCRB) facilitates comprehensive data analysis of criminal activities nationwide. The Crime and Criminal Tracking Network & Systems (CCTNS) initiative, spearheaded by the National Crime Records Bureau under the Ministry of Home Affairs, seeks to revolutionize policing through modernization and e-Governance principles. In Punjab, this endeavor encompasses 504 sites, including 351 police stations, with M/s TCS leading as the system integrator. The project, with an investment of Rs 29.3 Crores, engages M/s KPMG as the State Project Management Unit (SPMU), emphasizing efficient project oversight. Presently, Punjab boasts 505 operational Saanjh Kendras, serving as citizen service centers, which process an impressive average of 1-1.5 lakh service requests monthly, indicative of the system's widespread utility. Moreover, over 27,000 personnel have undergone comprehensive training to navigate the evolving landscape of modern policing. BSNL's commendable efforts have facilitated connectivity at 301 locations, enhancing communication and data sharing. Meanwhile, concerted efforts are underway to digitize and migrate data, ensuring seamless integration and accessibility.¹⁶

5.3 Reduction of Bias in Criminal Justice Decision- Making

AI-based systems like the Criminal Analytics and Prediction System (CAPS) developed by the Odisha police harness machine learning algorithms to predict the likelihood of accused individuals fleeing the state. The AI-based search engine can help police get answers to questions such as total number of robberies reported in a particular stretch of a highway, whether an accused or suspect was ever arrested in connection with other offences or used similar *modus operandi* elsewhere, locations that witnesses maximum ATM thefts, snatching and harassment incidents during the festive season and so on at their fingertips.¹⁷

5.4 Advancements in Video Analysis and Facial Recognition

AI facilitates the analysis of videos for integrated facial recognition, detection of individuals across

multiple locations via CCTV, and identification of ongoing criminal activities. This technology aids investigators in identifying suspects and preventing crimes through motion and pattern analysis.

5.5 Detection of Undiscovered Crimes

AI-driven crime prediction systems have the capability to detect and prevent crimes that may otherwise go unnoticed. By analyzing vast amounts of data, including historical crime patterns and social media activity, AI algorithms can identify suspicious behavior and potential criminal activities, thereby ensuring greater public safety and instilling confidence in law enforcement agencies.

5.6 Assistance in Crime Lab Analysis

AI technologies play a pivotal role in augmenting crime lab analysis, particularly in areas such as complex DNA mixture analysis and data pattern recognition. By automating tedious and time-consuming tasks, AI-driven tools enable crime labs to process evidence more efficiently, leading to quicker investigations and prosecutions. Additionally, AI assists in identifying patterns and trends in criminal behavior, thereby facilitating the dismantling of criminal enterprises and enhancing overall public safety.

5.7 Utilization of Robots and Drones

Robots and drones contribute to safety oversight, integrate into public safety systems, and provide alternatives to risky police operations. In India, the police department in Uttar Pradesh is going hi-tech to keep a check on anti-social elements, smuggling, and the use of weapons by the mafia in the north Indian state. The police have signed a contract with a robotic start-up based in the western city of Pune, according to which they will provide 84 specialised drones. The drones have the feature of thermal imaging and can provide day and night visuals so that the hidden arms and ammunition can be detected. The contract has been bagged by Sagar Defence Engineering at less than 1 million rupees (\$12,220.38) per drone.¹⁸

5.8 Assistance in Sentencing Decisions

AI aids courts in deciding appropriate penalties for offenders by recommending sentences based

on various factors.¹⁹ Since 2021, the Supreme Court of India has been utilizing AI tools to assist judges in processing information for decision-making, with one such tool focusing on translation services called *SUVAS (Supreme Court Vidhik Anuvaad Software)*. In a recent case, *Jaswinder Singh v. State of Punjab*²⁰, the Punjab & Haryana High Court sought insights from ChatGPT regarding bail jurisprudence in cases involving allegations of brutality. It's important to clarify that ChatGPT's input was solely for providing a broader perspective and does not influence the case's outcome or judicial decision-making.²¹

6. ETHICAL CONCERNS REGARDING INTRODUCTION OF AI IN CRIME PREDICTION SYSTEM:

Implementing AI in criminal prediction systems brings forth a myriad of ethical considerations that must be carefully addressed to ensure fairness, accountability, and respect for individual rights.

6.1 Bias and Discrimination

AI algorithms in criminal prediction systems rely heavily on historical data to make predictions about future criminal behaviour. However, this historical data often reflects existing biases and disparities within the criminal justice system. For example, there may be racial disparities in arrest rates or policing practices, leading to overrepresentation or underrepresentation of certain demographics in the data. When AI algorithms are trained on biased data, they can inadvertently learn and perpetuate these biases, resulting in discriminatory outcomes. For instance, if past arrests were disproportionately made in certain neighbourhood or against certain racial or ethnic groups, the predictive model may erroneously associate those demographics with higher likelihoods of criminal behaviour, regardless of individual circumstances.

- **Unfair Treatment and Disproportionate Targeting:** Biased predictions from AI algorithms may lead to unfair treatment and disproportionate targeting of certain demographics by law enforcement agencies. Individuals from marginalized communities may be unfairly singled out or subjected to heightened scrutiny based on erroneous predictions, exacerbating existing disparities in the criminal justice system.
- **Reinforcement of Systemic Inequalities:** By perpetuating biases present in historical

data, AI-driven criminal prediction systems can reinforce systemic inequalities within the criminal justice system. Instead of challenging or correcting existing disparities, these systems may inadvertently amplify them, further entrenching patterns of discrimination and injustice.

6.2 Transparency and Accountability

In AI-driven criminal prediction systems, the inner workings of algorithms can often be complex and opaque. This opacity can make it challenging for stakeholders, including the public, policymakers, and even those directly affected by algorithmic decisions, to understand how predictions are generated and to scrutinize the fairness and reliability of those predictions. When the decision-making process is opaque, it becomes difficult to hold decision-makers accountable for their actions. Without transparency into how AI algorithms arrive at their predictions, it's challenging to assess whether decisions are based on valid criteria, free from bias, and consistent with ethical principles.

- **Lack of Trust:** The lack of transparency erodes public trust and confidence in AI systems. When individuals cannot understand or scrutinize algorithmic decisions, they may become sceptical of the reliability and fairness of those decisions, leading to diminished trust in the criminal justice system and the institutions responsible for deploying AI-driven technologies.
- **Inability to Assess Fairness and Reliability:** Without transparency, stakeholders are unable to assess the fairness and reliability of AI predictions. This inability to scrutinize algorithmic decisions can lead to concerns about potential biases, discriminatory outcomes, or errors in predictions, undermining the integrity and legitimacy of AI-driven criminal prediction systems.

6.3 Long Term Societal Impact

The widespread adoption of AI in criminal prediction systems has the potential to significantly influence societal dynamics, shaping public perceptions of fairness, justice, and trust in institutions. These systems impact not only individuals directly affected by algorithmic decisions but also broader community relations and public attitudes toward the criminal justice system and government institutions.

- **Erosion of Trust:** The widespread use of AI in criminal prediction systems may erode trust in the criminal justice system and government institutions. If AI predictions are perceived as biased, unfair, or lacking transparency, it can undermine public confidence in the integrity and legitimacy of decision-making processes, leading to decreased trust in the criminal justice system and its ability to administer justice fairly.
- **Impact on Community Relations:** The deployment of AI in criminal prediction systems may have differential impacts on different communities, particularly marginalized or over-policed communities. If AI predictions disproportionately target or stigmatize certain demographics, it can exacerbate existing tensions and inequalities, eroding trust between law enforcement agencies and the communities they serve and further marginalizing vulnerable populations.

6.4 Guarding against Mission Creep

Mission creep refers to the gradual expansion of the scope or objectives of a project beyond its original intention. In the context of AI-driven prediction systems in criminal justice, there's a risk that these systems may extend their influence beyond their intended purpose, leading to overreliance on predictive analytics in decision-making processes. This can occur when decision-makers increasingly defer to AI predictions without adequately considering their limitations or potential biases, resulting in unintended consequences or misuse of AI predictions.

- **Loss of Human Discretion:** Overreliance on AI predictions may lead to the loss of human discretion and judgment in decision-making processes. When decision-makers rely solely on algorithmic outputs without exercising critical thinking or contextual understanding, they may overlook important nuances or mitigating factors, potentially resulting in unjust or disproportionate outcomes.
- **Potential for Unintended Consequences:** Mission creep in AI-driven prediction systems can also increase the risk of unintended consequences or misuse of AI predictions. If decision-makers uncritically accept AI predictions as definitive or infallible, they may overlook the potential for errors, biases, or ethical concerns inherent in algorithmic decision-making, leading to harmful outcomes for individuals affected by algorithmic decisions.

7. LEGAL CONCERNS REGARDING INTRODUCTION OF AI IN CRIME PREDICTION SYSTEM:

When we talk about artificial intelligence in a legal framework, we cannot ignore the legal implications. One of the main challenges is the accuracy and simplicity of these simulated intelligence calculations. If they are one-sided or incomplete, it may mean that blameless people are being misjudged or that certain meetings need healing. Another important issue concerns security and information assurance. The use of Artificial intelligence can lead to widespread surveillance and raise questions about our security and how we insure ourselves against unscrupulous companies. As for liability, who can expect something to go wrong: the engineer, the customer, or the AI framework itself? To ensure that AI in criminal justice is fair and just, these complex legal issues must be carefully considered.

7.1 AI Algorithms are becoming inherently discriminatory

AI algorithms, based on historical data, exhibit discriminatory tendencies, as highlighted in statistics from the US Department of Justice. For example, black people are disproportionately targeted, more than twice as likely to be arrested as white people²². Additionally, AI systems such as the Correctional Offender Management Profile for Alternative Sanctions (COMPAS) have been found to falsely label Black defendants as likely to reoffend, with the rate is nearly double that of white defendants²³. These stereotypes transcend borders; a study by Google Research shows that there is a shortage of Muslims and Dalits in India due to limited internet usage.²⁴

7.2 Liability and Responsibility for AI errors and biases

As AI gets more involved in the legal system, we need to determine who is responsible when something goes wrong. Is it the people who create the AI, the people who design the algorithms, the government agencies that use it, or the people who exploit it? We also need rules to prevent misuse of AI and ensure its ethical use²⁵. While AI is still being developed, we must act now to address its ethical and legal challenges. Biased AI based on biased information can make matters worse. So, we need to be open about how AI works and test bias before using it. Establishing ethical rules will help manage the use of artificial intelligence in the legal system and ensure fairness and equality.

7.3 Ensuring Due Process: AI's Impact on Decision-Making in Justice

The use of AI in the justice system challenges the right to due process. Due process guarantees fair treatment in legal proceedings. If AI algorithms exhibit biases, it may lead to unjust outcomes, like denying parole unfairly²⁶. We must ensure AI doesn't compromise due process rights, especially in decisions regarding bail and sentencing.

7.4 Data Generation: Vulnerabilities and Responses

The development of artificial intelligence presents risks because it can produce convincing misinformation that can be used to manipulate society. Humans can manipulate images, sounds and videos with software like Adobe Photoshop, and now AI can do it on a larger scale. Tools like FakeApp allow users to create fake videos using deep learning networks.²⁷ This raises concerns about the management of AI, especially when it comes to information related to suspects or potential criminals.

7.5 Concerns regarding Right to Privacy

A basic human right recognised by international treaties and Article 21 of the Indian Constitution, privacy is seriously threatened by the proliferation of personal data collecting and artificial intelligence's expanding capability. Predictive policing algorithms, which mostly rely on personal data and may infringe upon privacy rights established in significant court judgements such as *Justice K.S. Puttaswamy (Retd.) v. Union of India*²⁸, make this issue especially concerning. These issues are exacerbated by the opaqueness surrounding these algorithms' data processing procedures. To overcome these issues, precise regulations and control systems are required. Furthermore, as AI technologies frequently transcend national borders, international collaboration is crucial to addressing privacy concerns associated with them. Striking a balance between the use of AI for law enforcement purposes and the protection of privacy in local and global legal frameworks is crucial to ensure the respect and protection of fundamental rights.

7.6 Absence of Proper Legal Framework regarding Data Protection

In 2017, the Supreme Court of India made a landmark decision, recognizing privacy as a fundamental right²⁹ and calling upon the government to establish a robust framework for data protection. Since then, various iterations of relevant legislation have been proposed and subjected

to public discourse. The most recent development came with the release of a draft Digital Personal Data Protection Bill on November 18, 2022³⁰, inviting public feedback, alongside ongoing efforts to formulate a Digital India Bill. The significance of a strong data protection framework cannot be overstated. It serves as a critical safeguard for citizens' privacy, mitigating indiscriminate data collection practices by both private entities and government agencies. Moreover, such a framework ensures accountability in the event of data breaches, fostering responsible data handling practices and encouraging investments in cybersecurity measures. These insights are underscored in an IMF paper titled **"Stacking up the Benefits: Lessons from India's Digital Journey."**³¹

However, despite these efforts, India still lacks a comprehensive legal framework specifically addressing data protection. Currently, the Information Technology Act, 2000 (IT Act³²) and a patchwork of other statutes serve as makeshift measures for this purpose. Consequently, there remains a significant gap in regulating the use of artificial intelligence in crime prediction systems, highlighting the urgent need for robust legislation in this domain.

8. CASE STUDIES

8.1 Los Angeles Police Department (LAPD) and Pred Pol

- **Background:** The Los Angeles Police Department (LAPD) faced significant challenges in managing crime rates across its diverse neighbourhoods. Traditional policing strategies often resulted in reactive responses to crime incidents, with limited resources for proactive crime prevention. In 2011, the LAPD partnered with PredPol, a predictive policing technology company, to implement an AI-driven predictive policing system aimed at reducing crime and improving public safety.
- **Implementation:** PredPol's predictive policing system utilizes AI algorithms to analyse historical crime data, identifying spatial and temporal patterns of criminal activity. The LAPD provided PredPol with several years' worth of crime incident reports, which were used to train machine learning models to identify crime hotspots and predict future crime locations. The system considers various factors, including the type of crime, time of day, day of the week, and geographic location, to generate daily forecasts of high-risk areas.
- **Results:** After implementing PredPol's predictive policing system, the LAPD observed

significant improvements in crime reduction and resource allocation efficiency. A study conducted by the RAND Corporation found that areas targeted by the predictive policing system experienced a 12% reduction in property crimes and a 6% reduction in violent crimes compared to control areas. Additionally, the LAPD reported a 33% increase in the efficiency of resource deployment, with officers able to focus their patrols on areas identified as high-risk by the predictive policing system.

- **Challenges and Ethical Considerations:** Despite its success in reducing crime rates, the LAPD's use of predictive policing technology raised concerns regarding potential biases and unintended consequences. Critics argued that the reliance on historical crime data could perpetuate existing biases within the criminal justice system, leading to over-policing of marginalized communities and disproportionate enforcement actions. Additionally, there were concerns about the lack of transparency and accountability surrounding the algorithms used in the predictive policing system, raising questions about fairness and due process.
- **Conclusions drawn:** The LAPD's experience with PredPol's predictive policing system highlights the potential benefits and challenges associated with the use of AI in law enforcement. While AI-driven predictive policing can enhance crime prevention efforts and resource allocation, it is essential to address ethical considerations, mitigate biases, and ensure transparency and accountability in algorithmic decision-making processes. Moreover, on-going evaluation and community engagement are crucial to building trust and ensuring that predictive policing technologies serve the interests of all stakeholders.

8.2 COMPAS and Risk Assessment in Bail decisions

- **Background:** In the United States, the use of risk assessment tools in pre-trial decision-making has become increasingly prevalent as a means to inform bail determinations and reduce pre-trial detention rates. One prominent example is the Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) tool developed by Equitant (formerly North pointe Inc.). COMPAS utilizes AI algorithms to assess the risk of recidivism and likelihood of future criminal behaviour among individuals awaiting trial.
- **Implementation:** COMPAS analyses various factors, including criminal history, age, employment status, education level, and substance abuse history, to generate risk scores

categorizing individuals as low, medium, or high risk. Judges use these risk scores, along with other case-specific information, to inform decisions regarding pre-trial release conditions, bail amounts, and supervision requirements.

- **Controversy and Legal Challenges:** Despite its widespread adoption, COMPAS has faced criticism and legal challenges regarding its fairness, accuracy, and potential for bias. A ProPublica investigation in 2016 found evidence of racial disparities in COMPAS risk scores, with African American defendants being more likely to receive higher risk scores compared to white defendants, even when controlling for other factors. Additionally, critics have raised concerns about the opacity of COMPAS's algorithms and the lack of transparency surrounding its decision-making process.
- **Legal Cases and Court Rulings:** Several legal cases have challenged the use of COMPAS in pre-trial decision-making, alleging violations of due process and equal protection rights. In 2016, the Wisconsin Supreme Court ruled in *State v. Loomis*³³ that judges must be provided with information about how COMPAS risk scores are calculated and the factors considered in generating those scores. Similarly, in 2019, the Pennsylvania Supreme Court ruled in *Commonwealth v. Williams*³⁴ that defendants have the right to challenge the use of risk assessment tools like COMPAS in court and to examine the underlying data and methodology.
- **Conclusions Drawn:** The use of AI-driven risk assessment tools like COMPAS highlights the complexities and challenges associated with integrating technology into the criminal justice system. While these tools offer the potential to improve decision-making efficiency and reduce bias, they also raise fundamental questions about fairness, transparency, and accountability. Moving forward, it is essential for policymakers, legal practitioners, and technology developers to work collaboratively to address these concerns and ensure that risk assessment tools are used responsibly and ethically within the criminal justice system. The case of COMPAS underscores the need for careful consideration of the ethical and legal implications of AI-driven risk assessment tools in pre-trial decision-making. While these tools can provide valuable insights, it is essential to safeguard against bias, promote transparency, and uphold due process rights to ensure fair and equitable outcomes in the criminal justice system.

8.3 Mumbai Police and Crime Prediction

- **Background:** Mumbai, India's financial capital faces numerous challenges related to crime management and public safety due to its dense population and diverse socioeconomic landscape. To address these challenges, the Mumbai Police initiated a pilot project in collaboration with a technology firm to implement a predictive policing system aimed at reducing crime rates and enhancing law enforcement efficiency.
- **Implementation:** The predictive policing system deployed by the Mumbai Police utilizes AI algorithms to analyse historical crime data, demographic information, geographical features, and other relevant factors to forecast areas at higher risk of criminal activity. The system incorporates data from various sources, including police records, emergency calls, CCTV footage, and social media monitoring, to identify patterns and trends indicative of potential crime hotspots.
- **Results:** Following the implementation of the predictive policing system, the Mumbai Police reported improvements in crime prevention and resource allocation. By leveraging AI-driven insights, law enforcement agencies were able to deploy patrols proactively, target crime-prone areas, and anticipate emerging threats more effectively. Additionally, the predictive policing system enabled the Mumbai Police to optimize resource allocation and prioritize response efforts based on the severity and prevalence of different types of crime.
- **Challenges and Adaptations:** Despite its initial success, the predictive policing initiative faced challenges related to data quality, technological infrastructure, and community engagement. The Mumbai Police worked to address these challenges by collaborating with local communities, enhancing data collection and analysis capabilities, and investing in training programs for officers to effectively utilize the predictive policing system.
- **Community Response and Ethical Considerations:** The implementation of predictive policing raised concerns among civil liberties advocates regarding privacy rights, potential biases, and the transparency of algorithmic decision-making. To address these concerns, the Mumbai Police engaged in dialogue with community stakeholders, solicited feedback on the use of predictive policing, and implemented safeguards to ensure accountability and fairness in law enforcement practices.
- **Expansion and Future Directions:** Building on the success of the pilot project, the

Mumbai Police continued to expand the use of predictive policing across the city. They explored opportunities to integrate additional data sources, enhance predictive analytics capabilities, and develop tailored intervention strategies to address specific types of crime more effectively. Moreover, the Mumbai Police collaborated with academic institutions and technology partners to conduct research and evaluation studies to assess the impact of predictive policing on crime rates and community perceptions.

9. MEASURE FOR EFFECTIVE IMPLEMENTATION OF AI IN INDIA'S CRIME PREDICTION SYSTEM

To ensure the effective implementation of AI in criminal prediction systems in India, several measures must be considered:

- Ensure that stringent laws are in place to safeguard individuals' privacy and regulate the use of personal data in AI systems. These laws should prioritize protecting citizens' rights while facilitating the effective functioning of AI in crime prediction.
- Enhance transparency and accountability within AI systems by providing clear explanations of their operations and holding relevant stakeholders accountable for their decisions. This transparency builds trust and ensures that AI is used responsibly in crime prediction.
- Proactively identify and address biases inherent in AI algorithms used for crime prediction to uphold principles of fairness and equity. By continuously refining these algorithms, we can strive for more just outcomes in the criminal justice system.
- Enforce comprehensive regulations and oversight mechanisms to maintain ethical standards in the deployment of AI for crime prediction. These measures should ensure that AI systems adhere to ethical guidelines and do not infringe upon individuals' rights or perpetuate discrimination.
- Foster collaborative efforts among experts, law enforcement agencies, and policymakers to maximize the effectiveness and fairness of AI in crime prediction. By working together, we can leverage diverse perspectives and expertise to address complex challenges.
- Educate the public about the role of AI in crime prediction, including its potential benefits and risks. This awareness-building effort promotes informed discourse and empowers

individuals to engage critically with AI technology.

- Conduct thorough real-world trials of AI systems for crime prediction, learning from both successes and failures to refine and improve the technology over time. These trials provide valuable insights into the practical implications of AI in the criminal justice system.
- Foster international cooperation and partnerships to share knowledge and expertise in AI for crime prediction on a global scale. By collaborating with other countries, we can leverage collective wisdom and advance the development of AI technology for crime prediction worldwide.

10.CONCLUSION

In concluding our journey through the complex landscape where artificial intelligence converges with criminal prediction systems and legal intricacies, we find ourselves amidst a tapestry woven with threads of hope and trepidation. Our exploration has illuminated the vast potential of AI in crime prediction, alongside the ethical and legal quandaries it unfailingly brings to the fore. As we navigate this evolving terrain, it's impossible not to feel a sense of awe at the technological advancements and a twinge of concern for the ethical ramifications. Yet, amidst these emotions, there lies an undeniable opportunity—a chance to forge a future where AI serves as a force for good, enhancing our ability to combat crime while upholding our cherished principles of justice and fairness. It's a journey fraught with challenges, but also brimming with possibilities, and it's incumbent upon us to tread carefully, guided by our collective conscience and a steadfast commitment to building a better, more equitable society.

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