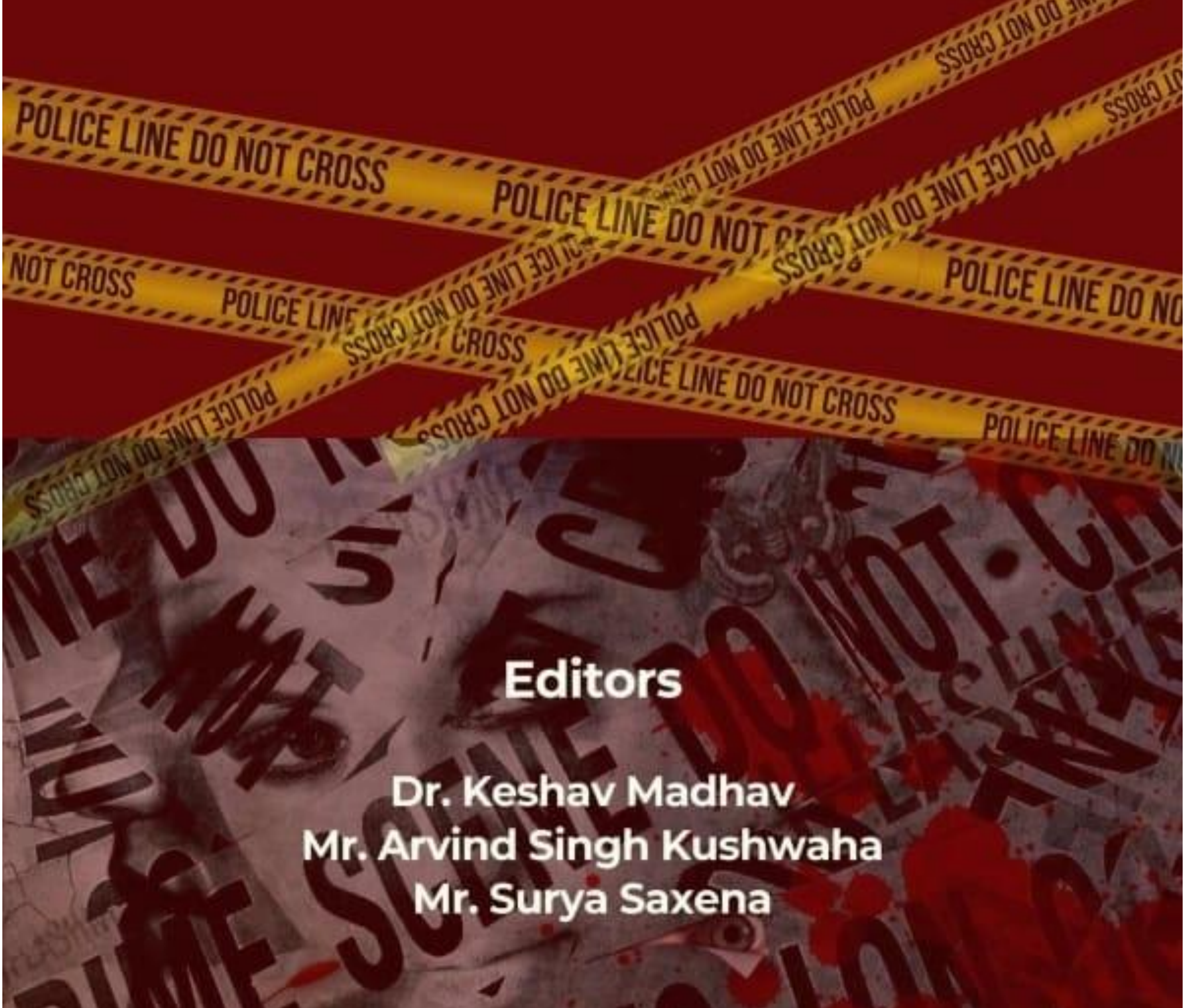
Exploring the Depth of CRIMINOLOGY in the Contemporary Era



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PREFACE

Criminology, as an academic discipline, has evolved profoundly over the years, mirroring the intricate and ever-changing nature of crime and the multifaceted societal responses it demands. In today's world, criminology extends far beyond the analysis of criminal behaviour and the justice system, embracing a myriad of interdisciplinary approaches. The swift advancements in technology, the forces of globalization, and significant socio-political transformations have redefined the contours of crime, compelling a more comprehensive and nuanced exploration of contemporary criminology.

"Exploring the Depths of Criminology in the Contemporary Era" embarks on an exhaustive examination of the modern developments within this dynamic field. This edited volume integrates the latest theoretical frameworks, empirical research, and practical applications that are shaping the contours of contemporary criminology. By synthesizing insights from diverse fields such as sociology, psychology, law, and forensic science, this book offers a panoramic understanding of the complexities of crime in the present age.

A salient feature of this work is its dual emphasis on both global perspectives and the distinctive context of India. Although criminology is underpinned by universal principles, the manifestation and ramifications of crime can diverge markedly across different regions and cultures. Through detailed case studies, policy analyses, and research findings from both international and Indian contexts, this book highlights the diversity and specificity of criminological challenges. It provides readers with a comparative framework, enhancing their comprehension of how local and global dynamics interplay in shaping crime and justice.

This edited book caters to a diverse readership, including students, academics, practitioners, and policymakers. For students, it serves as an indispensable resource, encompassing the breadth and depth of contemporary criminology. Academics and researchers will find the exhaustive reviews and discussions of current trends and debates invaluable for their scholarly endeavours. Practitioners in the criminal justice field will benefit from the practical insights and case studies that illustrate the application of criminological theories in real-world settings. Policymakers will gain a nuanced understanding of the current challenges and opportunities in crime prevention and justice administration.

This book assembles the expertise of preeminent scholars and practitioners, each contributing a distinct perspective. Collectively, these contributions weave a coherent narrative that encapsulates the essence of contemporary criminology. We aspire that this book will stimulate

critical thinking, foster informed debate, and ultimately contribute to the progression of knowledge and practice in the field of criminology.

Lastly, we extend our deepest gratitude to all contributors, reviewers, and supporters who have made this book possible. Their dedication and insights have been instrumental in bringing this project to fruition. As we delve into the depths of criminology in the contemporary era, we invite readers to engage rigorously with the content, challenge their preconceptions, and explore the possibilities for a safer and more just society.

Inconsistency in Crime Prevention Amidst the Emerging Technological Trend in Crime Prevention and Intervention: A Study in Indian Perspective

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Introduction

Crime is a deliberate and aberrant behaviour that arises from a combination of several social, economic, and environmental causes. Global criminal activity generates trillions of dollars annually, elevating crime to the status of one of the world's top 20 economies, as estimated. The process of collecting data from many sources, preparing it, and exchanging information can be challenging. However, the main obstacle faced by law enforcement organisations is the analysis and extraction of valuable insights from their extensive database of crime data. Utilising data-driven methods on this type of data helps establish a scientific basis for creating efficient tactics to reduce and prevent crime. This can be achieved by analysing the spatial decision-making of offenders and their social status. Crime prediction approaches are based on the premise that crime does not occur randomly, but rather follows discernible patterns. The primary objective is to support law enforcement in apprehending criminals and reducing crime by conducting a methodical analysis of criminal activity[63].

In the field of the justice system, Predictive Analytics and AI come together to predict criminal behaviour, identify possible offenders, and guide decision-making processes. Their extensive impact spans throughout the law enforcement, legal processes, and penal systems. The integration of technology into the criminal justice system is not a new trend, but rather a continuous and evolving process. In January 2020, Himachal Pradesh implemented a comprehensive CCTV surveillance system by installing hundreds of closed-circuit television cameras. Jharkhand enhanced its information technology infrastructure through the acquisition

[63] Dr. Pronab Mohanty, "Data Science and Predictive Policing", 2 CMR University Journal for Contemporary Legal Affairs 230 (2020).

of funds from the Ministry of Home Affairs. The Jharkhand police allocated the sum of 18.5 crore rupees for the implementation of predictive policing in collaboration with the public group on e-governance and the National Informatics Centre (NIC)[64]. In a similar vein, numerous state governments have proactively embraced the use of analytical methodologies, especially within the realm of law enforcement, to pre-emptively address and resolve criminal activities. The Delhipolice initially utilised the Crime Mapping, Analytics, and Prediction System (CMAPS) in 2015 toestablish predictive policing in the city. CMAPS is a tool that can access real-time data[65]. Furthermore, states such as Madhya Pradesh, Uttar Pradesh, Punjab, and Rajasthan have also embraced the utilisation of technology, particularly for facial recognition. Predictive Analytics and Artificial Intelligence (AI) are two powerful technical forces that are currently transforming the field of criminal justice[66]. Predicted analytics utilises past data to generate predicted insights regarding future occurrences or human behaviours. AI utilises intelligent machines that mimic cognitive procedures used by humans to perform tasks without requiring direct human involvement.

Methodology of research:

The main objective of the research is to determine the effectiveness of predictive analysis in reducing crime rates. In this evaluation, we have considered all the key phrases used in the publications that concentrate mainly on predicting crimes. The primary objective of this study is to assess all the current research endeavours in the field of crime prediction. We eliminate irrelevant studies by applying different criteria to our queries for searches. We have chosen 30 papers to be included in the primary text based on their relevance and originality. During the final stage, we meticulously examine the full paper to curate a collection of documents about the fields of machine learning and deep learning. Google Scholar was utilised to verify the inclusion of significant articles or papers and enhance our collection of literature. This was achieved by doing searches for textbooks and (edited) chapters of books that also address the topic of predictive policing. To ensure their high standard, only texts and papers from academic publishers were included. Articles on predictive policing are published in a diverse range of journals, with no single journal containing several articles on the topic. There exists a multitude of criminological publications, as well as journals that focus on big data and information science.

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64 Rohan George (24 November 2015), available at: https://cis-india.org/ (last visited on May 17, 2024).

65 Manoj Meena and Aishvarya Joshi, "AI Policing in Criminal Justice Methods & Concerns in crime detection and prevention in India", 2 Journal of Law & Artificial Intelligence 8 (2023).

66 Mugdha Dwivedi, "The Tomorrow of Criminal Law: Investigating the Application of Predictive Analytics and AI in The Field of Criminal Justice", 11 International Journal of Creative Research Thoughts a501 (2023).

Predictive Policing:

Predictive policing encompasses policing strategies and tactics that utilise information and advanced analysis to inform proactive crime prevention. This approach requires the integration of various disciplines to establish rules and create models. The objective of predictive policing approaches is to analyse crime trends using past data at both large and small sizes to forecast and prevent future crimes. This methodology employs data-driven technologies that leverage data mining and machine learning approaches to forecast the locations and temporal patterns of criminal activity. Predictive analysis for police can be categorised into four distinct classes[67]:

1. Anticipating perpetrators. The objective is to forecast future offenders by analysing the historical data of individuals, including their living environment characteristics and behavioural tendencies.

2. Anticipating potential targets. This pertains to the identification of persons who have a higher likelihood of becoming victims and the prediction of risky scenarios for potential victims.

3. Anticipating criminal partnerships. Anticipating the probable future cooperation of criminals and the corresponding criminal activities.

4. Anticipating the geographical areas where crimes are likely to occur. The objective of this work is to forecast the occurrence of future crimes, both at an individual level and in aggregate.

Why predictive policing is needed?

Law enforcement resources worldwide are facing mounting pressure, as police oversight bodies and governments grapple with the growing demands of frontline patrolling and the complex financial and societal consequences of organised crime. In addition to these challenges, the field of intelligence collection has maintained a pretty steady and consistent approach in utilising human source information to provide law enforcement authorities with knowledge about the whereabouts and spread of organised crime operations in our communities. This text presents research that showcases an alternative evidence-based method for enhancing law enforcement's ability to prevent organised crime. This approach improves the identification of criminal groups that were previously undetected using traditional law enforcement intelligence-gathering techniques. The application of conspiracy networks and geographical analysis offers an impartial scientific approach to the intelligence process, which, when combined with human source

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[67] Dr. Pronab Mohanty, "Data Science and Predictive Policing", 2 CMR University Journal for Contemporary Legal Affairs 234 (2020).

techniques, enhances the efficiency and responsibility of law enforcement resources in identifying and assessing the power of organised crime groups. Predictive policing enables early recognition and identification of these groupings, allowing police and communities to take proactive measures in engaging and mobilising local initiatives to disrupt and eliminate the threat of organised crime on society.

The primary objective of crime analysis is to decrease the occurrence of criminal activities. Several mainstream policing tactics can be identified that utilise the established methods of conventional crime analysis.

1. The conventional framework of law enforcement: The conventional policing paradigm responsively employs enforcement agencies. Crime analysis facilitates the optimal distribution of police resources based on geographical and temporal factors.

2. Implementation of community policing: Community policing tactics are enhanced by the active participation and cooperation of community members to comprehend and resolve issues. The primary function of analysis of crime in these techniques is to furnish information to citizens.

3. Policing focused on maintaining law and order: Disorder policing, also known as broken window police, involves the implementation of stringent law enforcement measures for small violations to deter the occurrence of more severe crimes. Crime analysis is beneficial for assessing the efficacy of law enforcement strategies in maintaining public safety.

4. Problem-Oriented policing: The objective of problem-oriented policing is to identify and analyse issues within the community, and thereafter formulate effective strategies that address the root causes of these problems. Crime analysis is employed across all stages of a problem-oriented policing approach, encompassing scan, analysis, reaction, and assess.

5. Implementation of hotspots policing: Hotspots policing is a targeted approach to law enforcement where police resources are distributed to certain locations based on the relative level of criminal activity in each area. Crime analysis is employed to discover areas with high crime rates.

Crime analysis has been a valuable tool in guiding police decision making at all three tiers for many years. However, traditional crime analytics has primarily concentrated on analysing crime patterns once the crime has been officially recorded. It is evident that this is insufficient, as the individuals who have been victimised by these crimes would derive minimal comfort from the production and display of a scientific examination of their pain. The current imperative in police

work is to effectively anticipate criminal activity and minimise its consequences. The expansion of the field of data science and its integration to law enforcement in the previous decade has led to the development of an innovative approach in this subject known as predictive policing, which addresses the needs of citizens.

There exist diverse categories of predictive police models, each designed to cater to unique objectives in preventing crime:

1. Hot Spot Analysis: AI algorithms utilise previous information on crimes to identify geographical areas with an elevated probability of criminal activity. Law enforcement might thereafter allocate resources to these areas of high criminal activity, intensifying patrols and surveillance in order to discourage unlawful behaviour.

2. Crime Trend Analysis: AI algorithms can predict the escalation or recurrence of certain kinds of crimes in specified places by finding trends and patterns in crime data. This understanding allows for proactive intervention and focused preventative efforts.

3. Repeat Offender Identification: Artificial intelligence has the capability to analyse data to identify individuals who have a history of doing several criminal crimes. This data enables authorities to closely surveil those at high risk and act before the commission of further offences.

4. AI algorithms aid in optimising the distribution of resources, such as patrolling routes and recruiting, by prioritising regions and periods with the greatest likelihood of crime. This guarantees that law enforcement authorities optimise the utilization of their resources[68].

Furthermore, the incorporation of artificial intelligence in predictive policing has other significant benefits:

1. AI enables law enforcement to engage in proactive crime prevention by utilising predictive analysis to identify prospective crime hotspots and patterns, allowing them to take pre-emptive actions to thwart criminal activities.

2. AI-powered resource allocation enables law enforcement authorities to optimise manpower, time, and finances, hence maximising the effectiveness of crime prevention endeavours.

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68 Indiaai.gov.in, available at: https://indiaai.gov.in/article/predictive-policing-and-crime-prevention-the-role-of-ai (last visited on May 17, 2024).

3. Real-Time Insights: AI consistently examines fresh data, equipping law enforcement with current and effective insights to promptly address evolving crime patterns.

4. AI models are created to make decisions based on facts and without subjective influences, hence minimising the risk of individual prejudice in crime prevention techniques.

Worldwide Best Efforts:

Surveillance technologies based on artificial intelligence are rapidly expanding to more nations than most people realise. On a worldwide scale, 75 out of 176 nations are currently employing some form of artificial intelligence for spying. The following are included: smart policing (52 nations), face recognition systems (64 countries), and smart city/safe city platforms (56 countries).

In a similar vein, some nations are rapidly embracing technology, including China, the United States, the United Kingdom, Japan, Brazil, and Singapore. Based on a report by the Georgetown University Centre on Privacy and Technology, US towns such as Detroit, Orlando, and Washington DC are experimenting with face recognition footage for security purposes[69]. With one camera for every 4.1 people, China's city surveillance networks outsell the US market, while India's biometric database is the biggest in the world, allowing for easy scanning of iris scans, fingerprints, and pictures of inhabitants. One of the main forces behind AI monitoring on a global scale is China. There are 63 countries that use AI surveillance technology supplied by Chinese corporations like Huawei, Hikvision, Dahua, and ZTE. 36 of these countries have joined China's Belt and Road Initiative (BRI). At least 50 nations throughout the globe rely on Huawei's artificial intelligence spying technology. There is no comparable business. Almost fourteen nations get its artificial intelligence surveillance technology from Japan's NEC Corporation, making it the second-largest non-Chinese supplier[70].

V. a. UN on AI in Law Enforcement[71]

AI technologies are being developed to predict crimes and criminal behaviour, potentially revolutionising the police in our legal system. This technique is employed in the analysis of extensive datasets and the field of robotics to predict elevated levels of criminal activity. This is also posing an imminent danger to the global community by infringing upon their fundamental

69 Clare Garvie & Laura M. Moy, 'Face Surveillance In The United States' America Under Watch, available at: https://www.americaunderwatch.com/ (last visited on May 17, 2024).

70 Steven Feldstein, 'The Global Expansion of AI Surveillance', available on: https://carnegieendowment.org/research/2019/09/the-global-expansion-of-ai-surveillance?lang=en (last visited on May 16, 2024).

71 Iraki Beridze & Summer Walker, 'Artificial Intelligence in Policing', available on: https://globalinitiative.net/analysis/artificial-intelligence- in-policing/ (last visited on May 17, 2024).

freedoms and privacy. State authorities may employ racial or ethnic profiling to selectively target specific groups or enhance surveillance capabilities through the utilisation of technologies such as facial or fingerprint recognition. Most countries are currently in the growing phase and are keen to learn from each other, especially from business industries that are implementing AI and robotics. In 2017, the United Nations Interregional Crime and Justice Research Institute (UNICRI) established a centre dedicated to criminal justice, crime prevention, and overall security. This suggests that artificial intelligence (AI) methods are still in the early stages of development. This inaugural assembly in the region was organised by the United Nations and INTERPOL to explore advancements, potentialities, and apprehensions surrounding artificial intelligence and robots, as well as to address emerging challenges. The topic encompassed both the utilisation of artificial intelligence for apprehending criminals and the exploitation of artificial intelligence by criminals. The function of the UN with the implementation of such surveillance technology would have three main aspects:

1. To begin with, greater public awareness of AI will be fostered through increased dialogue and deliberation, especially in developing countries where AI engenders adverse social and economic consequences.

2. Secondly, they may maximise the benefits of AI-powered technology while keeping the SDGs and other UN initiatives in mind.

Furthermore, the United Nations will deliberate on these comprehensive issues and classify any hazards as minor or major.

V.b. US in AI Policing

The United States is one of the leading users of artificial intelligence (AI), where discussions revolve around AI applications for opposition, job opportunities, security of data, privacy, legal enforcement, and sectoral growth. Recognition of faces recording devices and predictive policing are also significant factors in this context. However, considering public concerns, legislative changes are being implemented to ensure the AI enforcement system maintains data privacy. While there are no universally applicable rules for implementing AI, the White House Office of Science and Technology has outlined 10 principles that should be considered when developing regulatory and non-regulatory procedures. Some key principles include employing open risk evaluation and risk management methods, considering all social expenses, benefits, and external factors when deciding to develop and implement AI, considering the ethical implications of AI usage, adapting to the changing nature of AI during development, utilising performance-based

and adaptable techniques, and determining appropriate levels of disclosure and openness to gain public trust. The United States consistently maintains a strong focus on investments in artificial intelligence (AI) and associated technologies. However, there is a possibility that China could surpass the US in this area due to the US not effectively using its abundant resources.

V.c. China in AI Policing

Many Chinese companies have made applications which employs AI to sort and organise data on people by making their tools better. This makes China a world champion in surveillance through AI. China has put cameras all over the towns and plans to carry out the same thing in the countryside. Handan, a city in China, just released three futuristic robots that have AI and face recognition technology. These robots help with surveillance, managing traffic accidents, and providing relevant information. They also have a navigation system. They have a record that can help them figure out if the individual in question has been sought by the police. If there is any kind of resistance, the robot in question can help police catch and kill the bad guys by hitting them. A part of the 13th Beijing Five-Year Plan[72] was to use big data technology to help all of them. In 2017, the cops in Zhengzhou got smart glasses to help them find criminals faster by searching through 10,000 identification databases in 100 milliseconds. In the same way, 20 million CCTV cameras were put up throughout China just to use facial recognition data from their database to find criminals. China keeps growing by putting more effort into its goal of becoming the world champion in AI technology[73]. The US still has more AI forces than any other country, but China will soon pass the US if it can put its plans and tactics into action well. We can see how artificial intelligence, data analysis, and machine learning would grow in this way.

V.d. UK in AI Policing

Since 2014, facial recognition and predictive policing powered by AI have been prominent trends in the UK. These technologies aid in identifying criminals by comparing their photographs with a stored database. The Metropolitan Police and South Wales forces have primarily utilised these tools. A recent survey from 2019 has revealed that seventy percent of the general population is in favour of conducting investigations using this technology. Additionally, 55% of the respondents expressed their preference for limiting its use to specific situations. All territorial police in the United Kingdom have access to their history by using the shared Police National Database, which

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[72] Bryan Ke, 'China Deploys First AI Robot Police That Tackles Criminals and Now We're Living in 'Black Mirror', available on: https://nextshark.com/china-ai-robot-police (last visited on May 17, 2024).

[73] Holly Chik, 'Surveillance State: 18 of the World's 20 Most Monitored Cities are in China, https://www.scmp.com/news/china/society/article/30946 available on: (last visited 0n May 17, 2024).

contains a substantial quantity of information, including photos and prior criminal histories[74]. The concern here is that AI enables cost savings in several areas, which may diminish other quantifiable advantages such as community and relationship development. Additionally, this may lead to false efficiency gains, resulting in unforeseen outcomes. Furthermore, the usage of previous data may exacerbate racial and gender discrimination due to an absence of transparency, potentially undermining the concept of monitoring by consent.

Predictive Policing in India:

VI.a. AI Implementation

According to the National Judicial Data Grid (NJDG), there are millions of pending cases in both lower and upper judiciary. The IBM robot 'ROSS', equipped with data mining and identification techniques, will be employed for backend office tasks in the litigation and arbitration process. These tasks include research work and data storage. The utilisation of ROSS will not only assist our legal system in conducting research, but also in managing the substantial backlog of cases. Additionally, ROSS will aid in counselling clients and addressing complex issues. It will also facilitate transparency by creating invoices to track the work being done, benefiting companies, customers, advocates, and auditing authorities. There are 15 states in India that have been identified as the most surveilled cities. These states include Delhi, Indore, Chennai, and Hyderabad, which have the highest number of closed-circuit television (CCTV) cameras. According to the most recent research from IHS Markit, Delhi ranked first on the list, with Chennai and Mumbai following closely behind. In 2021, the Kolkata police declared their intention to deploy 2500 closed-circuit television (CCTV) cameras to identify motorcyclists wearing helmets and automobiles engaged in unauthorised parking. Based on the growing adoption of face recognition technology, it is projected that by 2024, this figure will increase six-fold and approach the level of China's surveillance system. Telangana is currently developing an integrated police centre in Banjara Hills, which would cost 800 crores. The purpose of this centre is to enhance law enforcement capabilities by allowing them to monitor CCTV footage throughout the city in real-time.

VI.b. AI Enforcement Agencies

Indian law enforcement organisations are increasingly utilising artificial intelligence (AI) tools to identify and resolve criminal activities. Staqu Technologies, a company based in Gurugram and

74 Will Grimond & Asheem Singh, 'A Force for Good? Results from FOI requests on artificial intelligence in the police force', available on: https://www.thersa.org/globalassets/reports/2020/a-force-for-good-police-ai.pdf (last visited on May 17, 2024).

established in 2015, has created a technological stack that encompasses advanced analysis of images, recognition of faces, and language processing tools for APIs that can recognise entities and provide summaries. The company has recently introduced an AI-powered application called 'Artificial Intelligence-based Human Efface Detection' in collaboration with the Rajasthan police. This programme is designed to determine the identities of criminals and gather information on missing persons. The state of Punjab has also utilised this technology. Crime and criminal surveillance systems facilitate the search for applications using biometric information such as fingerprints and facial recognition. As a result, they have digitised over 50,000 records of criminal activity and successfully resolved 100 cases. The facial recognition system achieves a 95%accuracy rate in identifying gender, detecting facial changes, and handling facial occlusion. Staqu Technologies also developed smart glasses. The glasses are equipped with an integrated camera that utilises face recognition technology to identify individuals within a group. Additionally, the glasses have the capability to display photos of things onto the screen of the user through data feeds. In addition to this, the Kerala government employs drones equipped with AI software for recognition of faces and identification purposes. These drones are mostly deployed in high-security areas such as airports and traffic junctions to identify individuals suspected of criminal activities[75].

VI.c. Government Initiative

Artificial intelligence (AI) has the capacity to enhance citizen safety by enabling advanced surveillance, expedited resolution of complaints, and intelligent law enforcement. Government agencies are utilising state-of-the-art technology to implement these measures and safeguard individuals from criminal activities and other associated risks. Here are some active AI projects[76]:

The Government of Uttar Pradesh has recently collaborated with Staqu Technologies to install 700 video analysis cameras in 70 prisons. This initiative aims to provide round-the-clock surveillance and gather data on prison visitors, crowd analysis, violence and fights within the prison, recognition of faces and analysis, behavioural analysis, and unauthorised intrusion. Police officers can effortlessly visualise real-time insights using a smartphone application.

In 2017, the Telangana police introduced a technologically advanced law enforcement robot equipped with integrated recording devices, Geo-location detectors, sensors for temperature, and

[75] Abhishek Baxi, 'Law Enforcement Agencies in India Are Using Artificial Intelligence to Nab Criminals', available on: https://www.forbes.com/sites/baxiabhishek/2018/09/28/l/?sh=6d3de10514e3 (last visited on May 17, 2024).

[76] INDIA ai, 'Five AI Initiatives for Public Safety in India', available on: https://indiaai.gov.in/article/five-ai-initiatives-for-public-safety-in- india (last visited on May 17, 2024).

ultrasonic scanners. The Hyderabad-based company H-Bot has developed a device to aid police officers in upholding law and order. This device is equipped with emergency flashlights, charging points, and thermal imaging technology, which can be used for security purposes, interacting with people, handling complaints, and resolving queries.

In 2018, the government of Haryana agreed with the city police to create a new application to replace the existing Harpeth application. This new application is designed to handle complaints related to roads, analyse them, and ultimately reduce the need for manpower and the associated costs.

The Government of Maharashtra allocated a budget of Rs 800 crore in 2015 to implement a comprehensive strategy aimed at enhancing cyber-security measures. The objective of this plan is to proactively avoid, forecast, and promptly identify cybercrimes in real time. This project focuses on utilising big data and algorithms to gather information on criminal activities from various web sources[77].

India ranks third in the Asia Pacific region, following Singapore and Hong Kong, and 19th globally. While the Indian government provides significant support for AI technologies, the country lacks the level of creativity and innovation seen in developed nations. India is actively working to foster a tech-savvy environment by promoting emerging start-ups and attracting highly qualified individuals in AI, language processing, and machine learning[78].

Horizon of Predictive Policing

The implementation of predictive policing methods brings about a substantial shift in the approach to crime management, transitioning from a reactive stance to a proactive one by forecasting the probability of criminal activity and allocating resources to prevent and address such incidents. This new predictive strategy enhances its skills in intelligence-led policing, community-led policing, and hotspot policing, building upon the existing traditional approach. This capability has empowered professionals to do more advanced analysis, get a deeper comprehension of the factors that drive criminal behaviour, and deliver more accurate predictions of the locations and timing of crimes. It utilises analytical models and computational capabilities to predict criminal events and offer actionable intelligence. Predictive analytics can specifically

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77 'Maharashtra government to come up with `predictive policing policy', PTI, available on: https://indianexpress.com/article/india/maharashtra-government-to-come-up-with-predictive-policing-policy-5097896/ (last visited on May 17, 2024).

78 Manoj Meena and Aishvarya Joshi, "AI Policing in Criminal Justice Methods & Concerns in crime detection and prevention in India", 2 Journal of Law & Artificial Intelligence 8 (2023).

target variables such as locations, individuals, collectives, or occurrences. Moreover, it can also aid in examining demographic patterns, parolee populations, and economic circumstances that might impact crime rates in specific regions. Various models are employed in conjunction with previous criminal records to provide the police with information regarding potential interventions that can be implemented to ultimately decrease the frequency of events. Crime, regardless of location, incurs significant expenses for society on a national, community, and individual scale. Estimating the societal cost of various crimes is of utmost significance, as it aids in the economic assessment of numerous social programmes. GIS, or Geographic Information System, has significant promise for cost reduction in crime prevention. In the United States, property crimes committed against individuals are less frequent and include lower-value items compared to car crimes. Property crimes typically involve taking items such as mobile phones, wallets, or bicycles worth a few hundred dollars, but automobile crimes sometimes involve destruction or theft of vehicles costing several thousand dollars. The utilisation of GIS solutions, such as forecasting crime hotspots and expanding police patrols in certain areas, along with rapid and precise responses to instances of vandalism and thefts, can greatly cut crime expenses. As a result of excessive workload, the law enforcement agency in India frequently encounters health and social problems, highlighting the necessity for improved resource allocation. Police officers typically work a full week, consisting of seven consecutive days, and frequently endure extended shifts. Any technology or policing system that improves the distribution of resources is highly desirable. Predictive policing employs hotspots, risk terrain analysis, and near-repeat theories to analyse readily available data. This analysis enables law enforcement organisations to effectively identify specific individuals and areas for focused police. An example of the use of predictive law enforcement in the future could be the integration of reading machines into mainstream society by the mid-2040s. This technology will have significant implications for the functioning of courts and the establishment of innocence or guilt. Additionally, this will have a similarly substantial effect on our ability to predict and anticipate criminal activity[79].

The application of predictive analytics and artificial intelligence (AI) in the field of criminal justice has significant potential to bring about dramatic changes, both in India and beyond. As these advances in technology continue to develop and expand their uses, they give rise to important ethical and legal issues that require careful scrutiny. Current trends and potential future use[80]:

[79] Dr. Pronab Mohanty, "Data Science and Predictive Policing", 2 CMR University Journal for Contemporary Legal Affairs 238 (2020).
[80] Mugdha Dwivedi, "The Tomorrow Of Criminal Law: Investigating The Application Of Predictive Analytics And AI In The Field Of Criminal Justice", 11 International Journal of Creative Research Thoughts a507 (2023).

1. Predictive policing is utilised in India and other countries to identify areas with high criminal activity and efficiently deploy law enforcement resources. This is the skilful use of previous crime data to predict the specific locations and times whereby criminal activities are likely to occur in the future[81].

2. Risk Assessment: Predictive analytics can be used to assess the likelihood of repeat offences among criminals, not just in India but also in other countries. This complex undertaking involves a thorough examination that includes an offender's criminal history, socio-economic background, and several factors to predict the probability of them committing another crime.

3. Sentencing: The integration of AI into the system of criminal justice, both in India and worldwide, is evident in its function of aiding judicial authorities in determining fair and appropriate penalties for criminals. This involves the careful analysis of facts regarding an individual's past criminal activities, the specific nature of the offence committed, and various other factors in order to provide well-informed recommendations for sentence.

4. Pretrial Detention and Bail: Predictive analytics plays a crucial part in deciding whether an offender should be held in pretrial detention, both in India and other places[82]. This complex procedure relies on the careful assessment of an offender's prior criminal history, socio-economic background, and other factors to predict the probability of fleeing or committing another offence.

5. Biometric identification, driven by AI, is becoming increasingly important in India and worldwide in the field of criminal justice. Precise identification of suspects and defendants is achieved through the utilisation of modern recognition of faces and other biometric technology.

6. The significant possibilities and controversial puzzles: The deep impact of predictive analytics and AI on the field of criminal justice is significant. Advocates argue that these technologies have the potential to improve the effectiveness and fairness of the justice system in general. To do this, they can reduce inherent biases, improve risk assessment methods, and ensure careful allocation of resources. However, detractors argue that these technologies have the potential to maintain and perpetuate institutional biases, violate person's privacy rights, and provide

[81] Rigano C, policy). MT(see reuse and About the author Christopher Rigano is a senior computer scientist in NIJ's Office of Science and Technology., "Using Artificial Intelligence to Address Criminal Justice Needs" (National Institute of Justice) accessed February 16, 2023.

[82] Use Of AI And Facial Recognition Technology In Policing In India, available on: https://www.humanrightspulse.com/mastercontentblog/use-of-ai-and-facial-recognition-technology-inpolicing-in-india (last visited on May 17, 2024).

arbitrary or prejudiced results[83]. Furthermore, the development of predictive analytics and AI in the field of criminal justice, whether in India or worldwide, is strongly influenced by the continuous discussions about the ethical and legal use of these technologies. It is extremely important to carefully create strong legislative frameworks and establish effective oversight procedures. These processes are crucial for ensuring the principles of openness, accountability, and adherence to constitutional norms in the use of these disruptive technologies[84].

Ethical and Legal Considerations

Artificial intelligence has the potential to forecast, avert, and identify crime in real-time. Law enforcement organisations worldwide have begun employing artificial intelligence-powered instruments for investigating crimes and, at times, even endeavour to predict them. In order to find the ultimate goal of law enforcement, which is to prevent crime before it happens, the police are utilising predictive policing strategies that involve the use of data analytics, advanced computers, and intuition.

Artificial intelligence algorithms will inevitably make errors. When the police use them, they have the potential to be ineffective or unfair. There are questions over the appropriate methods and timing for utilising these technologies. The following concerns are highlighted:

1. Confirmation Bias: The utilisation of AI by the police is expected to enhance their ability to anticipate and identify a higher number of crimes in a specific location compared to their previous methods.

2. The majority of predictive technology and forecasting software, along with their algorithms, are proprietary. Individuals in positions such as judges or police officers lack access to the technical expertise required to understand algorithms. If there is no means to evaluate these algorithms and understand how they arrive at their results, the accused individual may be deprived of a fair trial and their fundamental rights[85].

3. The vast majority of judges' endeavour to maintain impartiality in courtrooms, but, evidence constantly indicates their involvement in discriminatory practices. Judicial ethics require that a judge's decision must be devoid of any racial, gender, or class prejudices. For example, the

[83] Zavrnik A., "Criminal justice, artificial intelligence systems, and human rights", 20 ERA Forum 567583 (2020).

[84] Chetan G Wadhai, Tiksha P Kakde, Khushabu A Bokde, Dnynaeshwari S Tumsare, "Crime Detection Technique Using Data Mining and K-Means", 7 International Journal of Engineering Research & Technology (2018).

[85] Danielle Keats Citron, 'Technological Due Process', WASH. U. L. REV. 1249 (2008), available on: https://openscholarship.wustl.edu/cgi/viewcontent.cgi?arti cle=1166&context=law_lawreview (last visited on May 17, 2024).

parties would expect judges to be capable of thoroughly assessing the entire case, considering both the advantages and disadvantages, before reaching a decision when granting bail.

4. Facial recognition technologies raise significant concerns about the potential for erroneous identification. The repercussions of erroneous identifications can have serious implications for individuals who have been misidentified as a suspect or accused.

5. Goals: When law enforcement or any organisation chooses to adopt and employ artificial intelligence as a regulatory tool for crime, it is crucial to establish clear priorities. Is it effectively maintaining the lowest possible crime rate? or giving priority to the release of the innocent? Which fraction of oneself would you sacrifice to enhance the other?

6. Violation of persons' privacy resulting from the implementation of predictive policing.

By employing AI for proactive policing, law enforcement aims to predict high-crime regions, anticipate potential offenders, and determine appropriate pretrial release options. Rowena Rodrigues[86] asserts that the utilisation of artificial intelligence in law enforcement presents several legal challenges. Some of these pertain to: The architecture and composition of AI itself, Issues with the execution, and Utilising AI. These challenges are interrelated and are inherent to all computer technology, including privacy/data protection, openness, fairness, and accountability[87].

Gaps in Legal Framework

India currently lacks a robust data protection legislation. Furthermore, the regulatory requirements for the utilisation of AI by authorities have yet to be implemented[88]. While many police agencies and academics are optimistic about the potential of predictive policing, some academics express reservations about the use of data mining and algorithms to anticipate criminal activity. There is a scarcity of empirical evidence in academic literature regarding the practical challenges associated with the use of predictive policing tactics. The primary emphasis in the small number of empirical evaluation studies is on assessing the achievement of desired results, rather than examining any potential negative consequences that may have arisen as a result.

[86] Rowena Rodrigues, "Legal and human rights issues of AI: Gaps, challenges and vulnerabilities", 4 Journal of Responsible Technology (2020).

[87] Manoj Meena and Aishvarya Joshi, "AI Policing in Criminal Justice Methods & Concerns in crime detection and prevention in India", 2 Journal of Law & Artificial Intelligence 14 (2023).

[88] Manoj Meena and Aishvarya Joshi, "AI Policing in Criminal Justice Methods & Concerns in crime detection and prevention in India", 2 Journal of Law & Artificial Intelligence 15 (2023).

Empirical research is required to determine whether the alleged limitations of predictive policing truly manifest during its implementation.

Measures

India currently lacks a robust data protection legislation. Furthermore, the regulatory requirements for the utilisation of AI by authorities have yet to be implemented. While many police agencies and academics are optimistic about the potential of predictive policing, some academics express reservations about the use of data mining and algorithms to anticipate criminal activity. There is a scarcity of empirical evidence in academic literature regarding the practical challenges associated with the use of predictive policing tactics. The primary emphasis in the small number of empirical evaluation studies is on assessing the achievement of desired results, rather than examining any potential negative consequences that may have arisen as a result. Empirical research is required to determine whether the alleged limitations of predictive policing truly manifest during its implementation.

Prior to the implementation and utilisation of the system by law enforcement authorities, it is imperative to address issues such as data bias, profiling, and the right to a fair trial. The majority of technology systems are developed by private enterprises, and the government's agreements with these corporations are veiled in secrecy. When carrying out these contracts, government organisations and departments should include stipulations that achieve a balance between protecting intellectual data and trade secrets while also ensuring openness[89].

The Delhi Police disclosed that 137 out of the total 1800 arrests related to the Delhi riots were facilitated through the utilisation of recognition of faces software. To guarantee a fair and impartial hearing, the police must provide transparent and explicit information regarding the impact of AI technology on their decisions in cases involving arrest or detention. That which is not known is beyond dispute. India could consider implementing the following measures[90]:

1. It is crucial to establish norms and regulations that clearly outline the procedures and utilisation of algorithmic technology by law enforcement.

   Police forces must comply with a regulatory framework when using algorithmic tools. This framework should include requirements related to data protection regulations, the

[89] Predictive Policing — A Threat to Legal and Constitutional Rights?, available on: https://medium.com/@opiniolegal.india/predictive-policing-a-threat-to-legal-and-constitutional-rights-fc071d9cc879 (last visited on May 17, 2024).

[90] A. Babuta, M. Oswald, & C. Rinik, 'Machine Learning Algorithms and Police Decision-Making: Legal, Ethical and Regulatory Challenges'. Whitehall Reports, no. 18, vol. 3, 2018, Royal United Services Institute, London.

transparency and comprehensibility of the AI system, and respect to administrative laws andhuman rights standards.

2. It is necessary for every public procurement agreement to have a provision that mandates the retrospective reconstruction of the algorithm to assess the elements that influenced the model'sestimates.

3. In order to ensure compliance with this regulatory framework, it is necessary to establish a specific system of inspection and oversight, such as a commission, taskforce, committee, or board. The composition of these ethical panels should be interdisciplinary, consisting of experts, subject-matter experts, academics, and potentially those from non-expert backgrounds.

In order to ensure the inclusion of all experts and individuals involved, it is essential for the strategy to be collaborative and able to connect different disciplines. This entity should provide guidance to individual law enforcement agencies regarding optimal methods, approaches, and overarching principles related to the use of algorithms.

Conclusion

Ultimately, the incorporation of predictive analytics and AI can profoundly transform India's criminal justice system, offering increased effectiveness, precision, and a decrease in crime rates[91]. However, this progress is not without significant difficulties and inherent dangers, such as the possibility of prejudice, unreliability, and violations of basic rights. Therefore, it is crucial to finda balanced approach that guarantees the use of predictive analytics and AI in the criminal justice system is a model of openness, accountability, and adherence to constitutional principles. To maintain this balance, it is essential to develop appropriate legal frameworks and implement strong oversight mechanisms to regulate the use of predictive analytics and AI in the field of criminal justice. Artificial intelligence is increasingly being integrated into police operations through the implementation of well-fitted body cameras and the utilisation of AI to provide crimereports and predictions. However, a more controversial and wide-ranging utilisation of this kindof technology is its use in determining the occurrence of a crime. Artificial intelligence is employed in the emerging field of predictive policing to forecast future crime hotspots, specifically identifying the location and timing of a certain type of crime with high probability. To tackle all the moral, social, and legal concerns arising from the implementation of AI in law enforcement, the government should devise technological in nature, legal, and algorithmicremedies.

[91] Mugdha Dwivedi, "The Tomorrow of Criminal Law: Investigating the Application of Predictive Analytics and AI in The Field of Criminal Justice", 11 International Journal of Creative Research Thoughts a508 (2023).

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