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Role Of Advance Technologies In Criminal Justice System In India: A Legal Study

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Abstract

Technology basically means the use and application of science in everyday and ordinary activities. Technology allows the criminal investigator to apprehend the perpetrators of crime and bring justice to society. It plays a vital role in detecting organised crime and fighting terrorism. With the support of effective communications networks and numerous other tracking devices, it plays a vital part in catching criminals. In this paper author aims to analyse various advance technologies which are used in India's criminal justice system i.e. Global Positioning System (GPS), Global Information System (GIS), CCTVs, robots, drones thermal imaging cameras, gunshot detection technology, big data, electronic breath alcohol test, body-worn cameras, forensic photography, Artificial Intelligence and biometrics. The study provides how these technologies play an important role in identification of prospective suspects and suspicious activities and fighting terrorism which is a global issue. These advance technologies also play major role in surveillance, patrolling, search and rescue, locating missing people, crime investigation, monitoring large rallies and parades, collection of evidence, investigation process and court proceedings. Technological advancements have become a key instrument for improving efficiency, promoting transparency, accountability and serving justice to society. As today society is more moving towards digitization, incorporation of advanced technologies into criminal justice system has led to a redefinition of traditional approaches towards criminal justice system.

KEYWORDS: Advance technologies, criminal justice system, crime.

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INTRODUCTION:

Criminal Justice System refers to the agencies of government charged with enforcing law, adjudicating crime, and correcting criminal conduct. Every government should abide by the rules and regulations in the community. These are primary tasks that are performed through "criminal justice system".

Therefore, the criminal justice system is that series of functions performed by the legislature, police, prosecutors, courts, probation and correction personnel, private security personnel, and other relevant agencies inside and outside the government, with the purpose of execution, management of the criminal law. Each entity or agency with criminal justice responsibility has its own role. When these roles are combined, these roles form a coherent system or group of roles and agencies to provide criminal justice services. The ultimate purpose of providing these services is to ensure that the criminal law performs the functions of social order. In general, the criminal justice system refers to a set of different components that work together to bring justice to individuals and prevent crime in society. The system can operate effectively only when all components of the system are working properly. If any component fails at any level, it will also automatically affect other components. As a result, the entire system will be affected[2].

The criminal justice system has previously relied heavily on the evidence of eyewitnesses to the offence. However, relying solely upon eyewitnesses did not seem to be very effective, because witness usually became hostile for various reasons, weakening the prosecution case and thereby giving the offenders the benefit of the doubt, posing a severe threat to effective criminal justice. The criminal detectives subsequently reverted to third-degree interrogation methods in order to obtain the facts, despite the fact that many innocent persons were physically and mentally harmed in the process. In the interim, a lot of advanced technology and scientific breakthroughs occurred, prompting the realisation that advanced technology and scientific breakthroughs could bring speedy solutions to the problems of many persons in the process of investigating the crime.

OBJECTIVE:

To analyse various advance technologies used in criminal justice system in India.

METHODOLOGY: The present study was based upon secondary sources like articles, books, newspapers, websites, journal, publications.

RESULT & DISCUSSIONS:

Technology allows the criminal investigator to apprehend the perpetrators of crime and bring justice to society. With the support of effective communications networks and numerous other tracking devices, it plays a vital part in catching criminals. Today's technology plays a vital role in detecting organised crime and fighting terrorism, which has become a global phenomenon today.

Advance technologies which are used in Criminal Justice System in India are as follows:

[2] International Journal of Innovative Research and Advanced Studies (IJIRAS) Volume 4 Issue 3, March 2017.

A. **Global Positioning System (GPS):** GPS is a satellite-based technology that displays information about the location, speed, and direction of target objects. In order to solve the crime or prevent suspects from attacking more victims, the police utilise "GPS" devices to follow their movements and locations. Police can use GPS to monitor criminals via their mobile phones and identify their whereabouts, as well as perform raids, which are an important aspect of police investigations, and sting operations. For courts and prison systems, GPS can help track the movements of people under house arrest, parole, or parole. GPS is becoming important in assisting scientists in earthquake prediction[3].The military and business sector aren't the only ones who care about and rely on GPS technology. Many of the domestic activities of the central and state governments have also included it. Tracking stranded motorists and anticipating natural disasters like earthquakes, tsunamis, and hurricanes are just a few examples. GPS technology helps investigation agency to identify crime location[4].

B. **Geographic Information System** (GIS): Geographic information systems (GIS) use geographic and computer-generated maps as human-machine interfaces to integrate and access large amounts of location-based information. GIS can also be used to offer important information to emergency responders during dispatch or incident response to improve tactical planning and reaction. When there are no visible indications, GIS aids in the identification of prospective suspects, broadening the scope of the investigator's suspicions. By assessing complicated, seemingly unconnected standards and displaying them together in graphics, layers, spatial interfaces, or maps, GIS aids criminal investigators in identifying possible crime hotspots. It is a system for capturing, storing, manipulating, analysing, managing, and presenting spatial or geographical data.

C. **CCTV:** CCTV play an important part in criminal justice system. CCTV cameras on roads and toll booths also help solve crimes by checking the activities of suspects. The same is true for closed-circuit television coverage of markets and other areas, which can identify suspects, including suspicious activities such as the placement of bombs or improvised explosive devices[5].

D. **Robots**: Hyderabad has unveiled the Smart Robocop, the country's first smart policing robot. The robot is capable of moving, recognising individuals, taking complaints, detecting bombs, identifying suspects, interacting with people, and responding to questions. In its beta version, it is equipped with cameras and a variety of sensors linked to GPS. It was created by H-Bots Robotics, a robotics technology company based in Hyderabad[6].

[3] GPS.gov: Public Safety & Disaster Relief Applications (Last visited on 24 Nov, 2024 at 6:43 pm).
[4] https://www.spslandforces.com/story/?id=535&h=Role-of-Technology-in-Law-Enforcement (Last visited on 24 June at 6:45 pm).
[5] https://www.spslandforces.com/story/?id=535&h=Role-of-Technology-in-Law-Enforcement (Last visited on Nov 24 at 6:56 pm).
[6] DR. K Jayanth Murali "Rise of the police robots" Deccan Chronicle.

E. **Thermal Imaging Cameras:** Thermography is simply the process of converting infrared (IR) radiation (heat) into visible images that represent the spatial distribution of temperature differences in the scene observed by the thermal imager or the process of turning infrared (IR) radiation (heat) into visual images that reflect the spatial distribution of temperature differences in a scene observed by a thermal camera is referred to as thermal imaging. Uses of Thermal Camaras in safety and law enforcement are:

- ✓ Surveillance: Police helicopters often use thermal scanners to search for hidden thieves or track people escaping from crime scenes.
- ✓ Firefighting: Thermal cameras can instantly determine whether a spot fire or stump is indeed out or about to rekindle.
- ✓ Search and Rescue: The advantage of a thermal imaging camera is that it can penetrate smoke.
- ✓ Road Safety: Infrared cameras can see people or animals that cannot be reached by automobile headlights.
- ✓ Drug Busts: Thermal scanners can quickly detect unusually high temperatures in homes or buildings. A residence with a unique heat signature could reveal the existence of illegally utilised grow lights.
- ✓ Counter-Surveillance: Counter-surveillance refers to the act of spying on someone. Surveillance technology that isn't visible, such as listening devices or covert cameras, uses electricity. These gadgets emit a little amount of waste heat that can be seen using a thermal camera (even if hidden inside or behind an object).
- ✓ Air Quality: Thermal cameras are used to identify whether or not a domestic chimney is in use (and therefore using wood for heating).

F. **Drones/Unmanned Aerial Vehicle (UAVs):** It can provide police and crime analysts the essential details about ongoing offences and threatening circumstances as they are occurring. It can help the police better plan response measures and save lives. Drones can record or even stream videos and images when crimes occur, providing important evidence for future court proceedings. UAVs have replaced helicopters for surveillance and surveillance. Drones can be used for rescue missions, border patrols, search and rescue, locating missing people and animals, crime scene investigation, monitoring large rallies and parades, collecting evidence that can be difficult to reach from the ground, etc[7].

G. **Gunshot Detection Technology**: Gunshot Detection Technology, is used to identify gunfire. The gunshot locator can distinguish between sniper rifles, pistols, and automatic assault weapons like the AK-47. It can recognise various gun sound signatures. It detects, locates, and alerts the authorities to the gunshot. The device can provide police with information on the number of rounds fired, the direction in which they were fired, and the number of weapons involved within its coverage area. A

[7] https://www.spslandforces.com/story/?id=535&h=Role-of-Technology-in-Law-Enforcement (Last visited on Nov 24 at 6:56 pm).

system of sensors that work together to calculate the position of a gunshot is used in gunshot detection technology.

Centre for Development of Advanced Computing (CDAC) in India has built a low-cost system on its own. In India, the acoustic gunshot detection system developed by CDAC is the first indigenous product tested in the field. Making it more cost-effective to instal in big numbers in places like borders. It can be used for counter-insurgency and combing operations, as well as monitoring of high-security locations and forensic evidence collection following gunfire occurrences[8].

H. Big data: Big data is creating an impact in practically every aspect of our life where technology plays a significant role, such as digital communication, social media, education, and work. Large-scale statistical analysis of data designed to identify different patterns of human activities helps governments around the world maintain various types of records to ensure smooth management. Big data simplifies and expands the storage of information acquired in the criminal justice system, making it easier and more efficient. Big data has proven to be a huge help in this regard, as it allows for the storage of records of illegal activity from all over the world in the tiniest of places. The police, detectives, and private investigators can all benefit from big data in their investigations of crimes like, DNA and fingerprints can be maintained in databases and used to rapidly identify criminals. Data can also assist law enforcement in recognising and responding to criminal trends. When presiding over trials of criminals, big data also assists judges in determining the most equitable penalties. The proper study of all essential data obtained about the accused in a certain case is given due consideration.

Some of the examples of Big Data in India are:

- ✓ **CCTNS**:

  CCTNS is an e-governance project under the Digital India mission that aims to use information and communication technology (ICT) to improve citizen-centric services, connect roughly 14000 police stations across the country, and promote investigation, detection, and prevention of crime. States have decided to use predictive policing technology. The idea is to build on existing structured data based on geographic location and the nature of crime at the location, as well as the database of historical records and police reports, and other alternative data[9].

- ✓ **E-Prisons**:

  The goal of this project is to computerise and integrate all prison and prisoner administration functions in the institution. This application suite provides important information about inmates imprisoned in prisons to prison officials and other entities involved in the Criminal Justice System in a real-time context. It also makes online visit requests and grievance resolution easier. The NIC-developed e-Prisons application package is a cloud-based software with an intuitive user interface and strong security features.

[8] Jayanth Murali, "A Snapshot of gunshot detection technology", Deccan Chronicle.
[9] Elonnai Hickok, Sumandro Chattapadhyay, et.al. (eds.), Bid Data in Governance in India: Case Studies pg. 4

- ✓ **Unique Identity Project/Aadhar**:

  India's unique identity project Aadhaar reportedly has over 1 billion registrants. It is a paperless, digital, online identity system that can be used as a platform for many digital services, all of which generate a large amount of valuable, Government and Private Sector data. Residents will have a consistent identity number and technology that can be used across a variety of services, allowing service providers to rely on this system rather than having to go through the verification process themselves. Furthermore, having a digital identity allows large number of services to go online, as well as facilitating massive transaction-generated data, which is useful behavioural big data. We look at some of the project's core aspects and how we envisage Aadhaar manifesting as big data.

- ✓ **Khoya Paya Portal**:

  The Khoya Paya portal is a citizen-driven website that allows people to share information on children who have gone missing or who have been located. It was developed by the Ministry of Women and Child Development and the Ministry of Electronics and Information Technology. The website serves as a resource for those who want to report missing children and their whereabouts quickly. This page also allows you to report "lost" children. Text, photographs, videos, and other methods of transmitting and uploading information to the website can all be used to create reports.

- ✓ **Nirbhaya App**:

  It is an Android emergency application that can send a distress call or emergency message to a specific contact or group in an emergency faced by women or any other person.

I. **Electronic Breath Alcohol Test**: It is one of the most important information and communication technologies in the world today, widely used, so it can prevent reckless and negligent driving. The task of home guards and traffic police is to monitor people who drink and drive at night to avoid accidents. These people are usually located on the roads and accident-prone areas of the states[10].

J. **Body-Worn Cameras**: A body-worn camera (BWC), is a wearable audio, video, or image recording equipment used by law enforcement officials to document occurrences. Law enforcement agencies use body camera (BWC) to record your interactions with the public or collect audio, video evidence at the scene of a crime[11].

Kerala Police is only the third state police force in the country to adopt body-worn cameras, following Delhi and Rajasthan. When it was first launched, it was intended to be utilised for better traffic management, with the usage of body-worn cameras eventually being expanded to other police departments.

[10] Mitra, A. (2012) Cyber Crime and the Police: Insinuations to the Police Commissionerate of Bhubaneswar and Cuttack, Orissa Law Review pp. 52 – 57.

[11] https://en.wikipedia.org/wiki/Police_body_camera (Last visited on Nov 25 at 4:45 pm).

In the first phase, 25 cameras were installed in the police limits of Thiruvananthapuram City and Kochi City. These cameras could be valuable in criminal investigations, law enforcement, and house searches since they will assure police accountability. The main control unit at the Police Control Room will be in charge of the cameras (PCR)[12].

These cameras will be placed on police officers to check for offenders as they are being challaned. These will provide additional documentation of a violation of road safety regulations, as well as a guarantee that "no police misconduct" has occurred.

The Railway Protection Force (RPF)[13] is now using body-worn cameras to combat crimes like eve-teasing, chain snatching, molestation, and child trafficking on railway property. It is predicted that the camera system will cut crime rates. According to Indian Railways, people are less inclined to engage in illegal activity if they are aware that they are being observed.

K. Forensic photography:

Forensic photography is also known as forensic imaging or crime scene photography. Photographing a crime scene or accident creates permanent evidence of the incident, exposing the initial appearance of the crime scene as well as critical evidence. (Dead bodies, weapons, trace evidence, blood splatter, and so on), as well as allowing for the reconstruction of the incident. Photographs of a crime scene that have been prepared in advance play an important part in court hearings and in the investigation process. In forensic medical situations, photographically recording wounds and injuries is critical, especially in forensic odontology situations where teeth restoration and bite marks are photographed. Regardless of whether videotaping or sketching is used, images provide precise measurements and distances between items, which are not available with sketches. Photographing entails keeping records ranging from photographing the crime scene to criminal profiling (in which law enforcement agencies record the identities of offenders in order to track them down when they are released into the public), among other things. Photographing the offender/criminal, including the identification markings observed, is used in criminal profiling. Photography has aided in questioning in an inquiry since the dawn of forensic science. Traditional cameras lacked high resolution, precise focus, date and time on images, and optimum exposure, which modern cameras provide. Light adjustment, exposure basics, colour, focus, white balance, filters, and colour illustration are all essential skills for a photographer. A Forensic Photographer also needs to be able to identify tool marks, trace evidence, tyre markings, developing latent fingerprints and biological stains, vehicle photography, and post-mortem, among other things. Photography plays a crucial role in investigating the crime because it captures the crime scene at the time that investigation.

[12] "Body-worn cameras provide eagle eye to state police", The News Indian Express.

[13] https://www.financialexpress.com/business/railways-new-initiative-by-indian-railways-body-worn-cameras-to-prevent-chain-snatching-eve-teasing-and-other-crimes-1880525/ (Last visited on Nov 25 at 5:03 pm).

Better camera images make it easier for investigators to see the precise location of each item and the kinds of evidence around it. Better photos may also be crucial when the matter gets to trial, and the judge has the authority to sentence the guilty party[14].

L. Artificial Intelligence:

Broadly speaking, artificial intelligence refers to a machine that can reflect human reasoning when making any choice, so as to automate the decisions people make[15]. AI is not a technology, but is more regarded as a field, it has many sub-fields, such as machine learning, robotics, language processing and deep learning.

The fourth industrial revolution led to the development and use of powerful artificial intelligence technologies. Artificial intelligence is used by companies to make better managerial decisions, and judges utilise it to establish bail bonds[16].

AI for crime detection[17]: Artificial intelligence can help in detecting criminal and illegal activity.

- **Detecting gunfire:** With the help of artificial intelligence technology, the police can reach the place where the shooting happened without anyone calling or no police officer witnessing the shooting. The gunshot locator can distinguish between sniper rifles, pistols, and automatic assault weapons like the AK-47. It can recognise various gun sound signatures. It detects, locates, and alerts the authorities to the gunshot. The device can provide police with information on the number of rounds fired, the direction in which they were fired, and the number of weapons involved within its coverage area. A system of sensors that work together to calculate the position of a gunshot is used in gunshot detection technology.
- **Detecting clues on the crime scene**: When cops arrive at a crime spot, they take photographs of the crime scene. The photos will be used to look for any suggestions or evidence that could lead to a new connection to the murder. Artificial intelligence (AI)-enabled technology can assist in the discovery of indications in police photographs. If a toy or weapon from the crime scene is photographed, for e.g., the police database can be searched to check if the same toy or weapon was used in any previous murders. It may not establish definitively that the previous crime was done by the same person, but it does open up a line of inquiry that should be pursued further.
- **Detecting bombs**: A single bomb can cause the death of hundreds. AI-enabled robots can quickly detect bombs without endangering security personnel's lives.

[14] "The Role of "Digital Forensic Photography"- In the Indian Criminal Justice System" JETIR c246, Vol 8, Issue 5 (2021).
[15] Eileen Donahoe & Megan Metzger, Artificial Intelligence and Human Rights, 30(2) J. OF DEMOCRACY 115, (2019).
[16] Sejal Chandak, "Artificial Intelligence and Policing: A Human Rights Perspective", 7(1) NLUJ Law Review 43 (2020)
[17] Naveen Joshi "The rise of AI in crime prevention and detection" Available at: https://www.allerin.com/blog/the-rise-of-ai-in-crime-prevention-and-detection

M. Biometrics: One of the most remarkable approaches for detecting crimes is biometrics. Physical fingerprints, face, hand/finger geometry, iris, retina, ears, and other physical and behavioural traits are used to verify personal identity (signature, voice, gait, smell, etc.). By linking traces with people in a database, identifying people's identities, and selecting subdivisions of people from whom the traces can come, biometrics technology aids in crime detection. The biometric system is a pattern recognition device that collects physical or behavioural data from people, extracts a collection of notable features from the data, and compares them to a set of criteria. The biometric system is a pattern recognition device that collects physical or behavioural data from people, extracts a set of significant features from the data, compares these features to a database of features, and gives comparisons[18].

Maharashtra government has implemented Automated Multimodal Biometric Identification System (AMBIS). AMBIS is an advanced crime detection system that can perform crime detection based on available fingerprints, palmprints and iris scan data of registered criminals, as well as accidental fingerprints/palmprints collected from crime scenes. Maharashtra is the first state to implement this system in its police unit[19].

Police of Telangana has shifted from its pre-existing system of Papillon Automated Fingerprint Identification System (AFIS) into Automated Multimodal Biometric Identification System (AMBIS)[20]. This system is in line with The Criminal Procedure (Identification) Act, 2022 which broaden the scope of biometric data collection.

CONCLUSION:

In today's world we cannot imagine a day without the necessary technologies. The current era has seen a progressive development in technology and policing has evolved to meet the needs of the time. Technology plays an essential role in detecting organised crime and countering terrorism, which has now evolved into a global issue. Technology also aids in the rapid registration and disposition of cases, as well as criminal prevention and investigation. The use of technology in day-to-day tasks leads to increased precision, consistency, and reliability. Because to technological advancements, the entire criminal investigative process has become more transparent.

[18] Monika Saini and Anup Kumar Kapoor, "Biometric in Forensic Identification: Applications and Challenges, J Forensic Med, ISSN:2472-1026, Vol 1. Issue 2.1000108, (2016).

[19] Nadeem Inamdar "Maharashtra police launch new tech to help check crimes" Hindustan Times (Available at: https://www.hindustantimes.com/cities/pune-news/maharashtra-police-launch-new-tech-to-help-check-crimes-101652554109930.html

[20] U Sudhakar "Telangana cops shift to multimodal biometric tracking system", The Times of India (Available at: https://timesofindia.indiatimes.com/city/hyderabad/telangana-police-to-upgrade-to-automated-multimodal-biometric-identification-system-ambis/articleshow