“FORENSIC CRIMINOLOGY: A REVOLUTIONARY PARAMETER FOR LEGAL FRATERNITY”

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Abstract

Today's socioeconomic activity takes place in new areas made possible by pervasive digital framework. Various sorts of criminal networks evolve as a consequence of such changes. They are more universal, have a greater dimension, are more complicated, responsive, and hard to comprehend. The progress of technologies has revolutionized crime up to such a level that it is now as easily approachable as blinking eyes. The same eyes, on the other hand, can aid in the investigation of the crime. Forensic science is a constantly evolving branch of information and training that can be extremely beneficial and effective in investigations. It is also a weapon comprised of multiple notions such as genetics, social science, criminal behavioral science, DNA analysis, science, fluid interpretation, cursive interpretation, and data science, among others, that allows for a more effective approach of criminal investigation and prosecution administration. Science and justice make unusual natural allies. They have, however, banded with each other to guarantee that justice prevails. Investigation and adjudication of civil and criminal matters are aided by forensic science. Evidence discovered in a criminal investigation or elsewhere is taken to laboratories and analysed using various tools and methodologies. Forensics and its various divisions enable this type of evidence processing. Classic responsive techniques predicated on case-by-case criminal justice and trial cannot operate in this unfamiliar setting any longer. In this paper, we'll look at how scientific progress can aid both criminology and the criminal justice framework in answering analytical concerns. This is referred to as "forensic criminology."

Keywords: Forensic Science, Criminal Investigation, Digital, Evidence, Criminology and Criminal Justice.

1. Introduction

While the general masses bifurcated the field of Science from Law, both the studies converge to assist in civil and criminal investigations. The word ‘forensic’ comes from the Latin term “Forensis” which means forum. ‘Forensic Science’ is the process of using scientific methodology to help in investigations to dispense justice in the eyes of the law. Experts of this fraternity lend their hand in analysing the evidences, even so to gather evidence when required and back the testimony given by witnesses or the parties of a case. The bridge between these two disciplines developed over time which took an unexpected turn to break through the norms of a normal criminal or civil investigations.
Shockingly, the foundation of forensic sciences dates back to as old as to the ancient civilizations. Basic protocols like ‘Autopsy’ has its first instance witnessed during the Egyptian civilization\(^1\) when the people performed in religious ceremonies of death during which the internal organs of deceased were extracted and examined. One of earliest literatures based in China during 13\(^{th}\) century discussed the use of entomology to reveal the cause of death from a murder by studying the murder weapon.\(^2\) The modern forensic criminology soon started to mould into an advanced form such as matching evidences in rationalized method, fingerprint analysis’ major finding during 1880 due to its uniqueness etc. Even the rise of forensic ballistics can be seen in 1800s when Scotland Yard’s Henry H. Goddard connected the dots between a bullet to the murder weapon via forensic analysis.\(^3\) This led to professionals encouraging bullet examination with the help of microscopes and detecting gunshot residues.

The famous principle, ‘Locard’s Exchange Principle’ dispenses the thought that there is always a trace of evidence left behind by anything and anyone that is present during a crime scene which can be extracted through the means of forensic science in crime scene investigation.\(^4\) Though these methods of forensic science have been highly appreciated, like the DNA Testing, many have also opposed to joining hands with such procedures to solve crimes or produce evidences.

In India, several courts have resisted to application of DNA testing despite its strong proofing. This is because of the possibilities of impeding the right to privacy which is inherent within Article 21 of the Indian Constitution. Application of forensic science for criminal investigation and trial has faced a setback and the limitation of the law in India, putting up questions with regards to its veracity, feasibility and to what extent it can be applied. According to Article 20(3) of the Indian Constitution, no person who is accused of an offence shall be compelled to be a witness against himself. It guarantees the right against self-incrimination and protects the persons against testimonials compelled over them which may incriminate him or her against themselves.\(^5\)

The Supreme Court of India had put a ban on the “Virginity Test” also called as the Two-finger test in Laloo @ Rajesh & Anr v. State of Haryana\(^6\) which was used to check the victim’s activeness in sexual activities by inserting two fingers into the vagina of the female victim and observe the vaginal muscle laxity. This forensic test was conducted on the victims without their consent or when they were unable to give their consent. Objections were raised regarding this principle: Recent developments in forensic trace evidence analysis. Analytical chemistry, 91(1), pp.637-654.

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\(^3\) Sameen, M., Cyber Forensics and Cyber Crime: A multidimensional Study of Techniques and issues.


\(^6\) Laloo @ Rajesh and Anr v. State of Haryana, (2013) 14 SCC 643
controversial practice as it violated the victim’s right to privacy and her dignity. After the ban, the issue of using this illegal procedure has resurfaced recently in September, 2021 in a case in which a woman at the Indian Air Force College in Redfields, Coimbatore was raped by a flight lieutenant. The survivor was subjected to the two-finger test during her medical examination despite a stringent ban on this illegal forensic practice.

In Selvi & Ors v. State of Karnataka & Anr, the Supreme Court of India had raised its doubt in the legitimacy of administration of certain forensic techniques in assisting investigations but of involuntary nature. Usage of narco-analysis, brain-mapping, FMRI and polygraph test were rendered as unconstitutional as it infringed the right to privacy and right safeguarded under Article 20(3) of an individual in question. The Hon’ble bench held that polygraph tests and brain-mapping were indecisive and their compulsory usage would be unconstitutional. It has been suggested by the courts that forensic crime investigation should be taken as a last resort after using the traditional methods of investigation.

2. How Forensic Criminology Works in Crime Investigation

One of the most crucial components of any criminal probe is forensic criminology, which can help investigators accomplish anything including definitively recognizing a culprit to pinpoint when and how a crime happened. As per the National Institute of Justice, forensic criminology is a treatment of scientific to legal issues, and it can be used to compare DNA to a specific person, decipher bloodstain patterns, and figure out what an unexplained substance is made of. Investigators can use criminology to assess material proof and build confidence in nearly every action they take in a criminal investigation. A forensics study's findings can also be used in a criminal court to assist evidence allowed in prosecution.

Forensic Criminology is incredibly precise, and if they can verify that you were at the site of the incident or were involved in any manner with unlawful conduct, you could be sentenced to prison for a long time.

In crime scene investigation, there are three fundamental factors of forensic criminology:

2.1 Principle of Individuality

In the domain of finger prints, the individuality concept has proven to be extremely effective. In this area, a significant chunk of study was conducted. There are no twin prints that are alike in the universe. Despite the fact that millions of fingerprints have been examined under magnification, no two are same. Fingerprints from the same hand do not have the same characteristics. This concept is critical in the field of forensic criminology. This notion is supported by every element and minute nuance.

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8 Selvi & Ors v. State of Karnataka & Anr, AIR 2010 SC 1974
9 Jaishankar, K., 2010. The Future of Cyber Criminology: Challenges and

“Every substance, biological or constructed, has a distinct identity that cannot be copied in any other artefact; neither environment nor humans can imitate themselves.”

The principle of individuality is comparable to a microeconomics theory in that there are scarce funds with diverse business options, yet each bit of a substance may only be utilized to make one distinct product. For example, a chair or a tabletop can be made from a single chunk of hardwood. Both, however, cannot be made from the same chunk of hardwood. As a result, the products made in a smith's factory will have a distinct personality.

If a ‘blade’ is used as an object to commit murder, this particular blade will be distinct from others in terms of contour structure, the type of material utilized in its fabrication, and the degree of edge it exhibits. This blade should be linked to the culprit in some capacity, and it is the investigator gathering evidence's responsibility to gather all of the material.

2.2 Principle of Exchange

Locard's Principle of Exchange states whenever a criminal exits from scene of the crime, he tends to leave behind a residual, knowingly or unknowingly, that will treat as proof against him, generally as verifiable evidence, and that it cannot be managed to escape, leading to the assertion that every interaction by a criminal leaves behind a residual that will be examined by the forensic branch and the crime scene investigator. The forensic branch also assists in the linking of offenses that have identical residue left by the culprit or if they believe it is linked to another offense, allowing them to better understand the suspect's characteristics and narrow down the possibilities, making it simpler to discover the culprit. This makes it difficult for the lawyer to gather evidence in order to discover the proper culprit and for the court to prosecute him and uphold fairness. As a result of the Locard concept, the forensic branch was created to aid in the triumph of justice in society, and it still continues to contribute significantly in identifying the appropriate culprits.

2.2.1 Trace Evidence

Evidence collected is something that a culprit leaves behind and that officials must find. Evidence collected can take many forms, including hair, fingerprints, glass, and other spontaneous fragments of material such as soil. Hair or fingerprints are frequent material that can be recovered in a criminal investigation, and if the culprit is sufficiently attentive, the evidence collected should be there someplace, and no one can

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Since all criminals are now extremely cautious in what they do, criminologists keep breaking their heads to find some inkling at site of crime, but as per the Locard Theory of Exchange, each person tends to leave a vestige, and forensic experts must find the cut and the proof, which can be potential evidence to aid prosecute the culprit. The types of trace evidence span from any actual evidence to a strand of hair, and the capabilities have developed to the point where criminologists may sift the suspected based on the evidence collected at the crime site in order to identify the culprit.

The forensic experts must take a few fundamental things from the criminal investigation in order to begin the case and find the culprit based on the trace evidence. It will be easier for the forensic experts if they discover comparable or the same forensic analysis in two separate crime scenes, and the same will assist us to identify the culprit based on the forensic evidence. As a result, as per this concept, evidence collected plays a significant part and is a fundamental for this theory to exist, and so are forensic experts.

2.3 Principle of Progressive Change

It has been very well said, transition is imminent or unavoidable, the very same quote also pertains to things or objects, and a specific element varies over time, such as a specimen of DNA degrades over time, a victim's body begins to decompose over time, wheel scars begin to fade over time, etc. If the forensic evidence is not handled appropriately, the culprit who committed the crime may make numerous alterations in the crime site over time. All crime site has its own enigma. So that the enigma may be unraveled, the crime site must be carefully maintained and the evidence gathered must be carefully kept. Traced evidences, as well as their quantity and quality maintenance, play an important part in investigating crimes or convicting the culprit. Inability to do so may result in the guilty person's deportation.

Things varies overtime, according to the rule or theory of Progressive Change, hence the crime site or location where the crime occurred also alters or fluctuates. The shift or difference in forensic evidence, crime site, and so on, is exactly proportionate to the changes or difference in duration. In forensic criminology, this theory has a huge significance.

One of the most important aspects of the criminal investigation structure is forensic criminology. It is primarily concerned with the investigation of technical and material proof acquired at the crime site. The uniqueness (who) of the criminal who committed the crime is explained by forensic science. The essence (what) of the crime committed is explicitly indicated in the proof.

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The reasonable suspicion also speaks to the incident's timeframe (when). The site of the crime (where/crime scene) is established through forensic evidence. The criminal's technique (how) is also observed throughout the forensic inquiry. Lastly, the cause behind the conduct is determined.

3. DNA Analysis

The boom of DNA technology has brought an enormous amount of positive outcome for both civil and criminal investigation as it aids the court of law to identify the “what, how, when and who?” of the criminal act and serve justice in its most accurate form. The forensic scientists accumulate the DNA present in the crime scene and compare it with DNA samples collected from the suspects or/and of the victim to identify the culprit behind such criminal conduct. With the help of DNA Profiling, investigators have figured out ends of various cases which could have not been possible if forensic science hadn’t come to play.

In Bhabani Prasad Jena v. Convenor Secretary, Orissa State Commission for Women, the appropriate conduction of Paternity test was questioned and it had to be justified as to whether the DNA test of the child and the Appellant (putative father) is valid. The court looked into the provisions of Orissa (State) Commission for Women Act, 1993 only to conclude that the Commission does not hold the authority to pass an order for Paternity test. It was held by the Supreme Court that in order to serve justice and to reveal the truth, it is important to weigh the necessity between DNA testing and the Right to Privacy associated with the person undergoing such test. Where it is observed by the court that without DNA analysis, justice cannot be dispensed accurately, it is a must to undergo the procedure for the ends to meet. There should be a balance when it comes to imparting justice and the society.

3.1 Types of DNA Analysis

3.1.1 DNA Phenotyping

The process of predicting or identifying an individual’s physical or biochemical characteristics by using the DNA samples for genetic information is known as ‘DNA Phenotyping’, also called the Molecular Photo-fitting. This method of forensic science is used in investigations to narrow down the list of suspects or to identify the person through their body part remains.

One of the cases in Florida, USA had taken assistance of this forensic technology to recognize the criminal who sexually assaulted a woman in broad daylight. With the help of a DNA Phenotype company, physical composition of a male suspect was obtained through which the assaulter was arrested after his voluntary DNA sample testing. Another case based in South Carolina in 2015, the murderer was caught and charged in 2017 for murdering a woman and her daughter, all with the help

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26 Bhabani Prasad Jena v. Convenor Secretary, Orissa State Commission for Women, AIR 2010 SC 2851
of DNA phenotyping to acquire the physical composition.\textsuperscript{28}

DNA Phenotype technique has brought advantage to departments investigating the crime scenes as the samples are picked from the area of crime and evaluates the criminal’s characteristics, safeguarding anyone else’s dignity or right from unnecessary hindrance. Though, a lot of times, it may be possible that a person with similar physical features to that of the criminal has to be interrogated during the investigation. This may lead to harassment of such people with similar characteristics as they will be seen as a suspect in the eyes of the investigating authorities and so, their confidentiality and safety should be the utmost priority to maintain the viability of the investigation and to preserve the person’s dignity.

3.1.2 DNA Fingerprinting

As it is known, DNA patterns differ from one person to another except for identical twins. Because of this very reason, the forensic technology uses the DNA Fingerprinting method to identify criminals. The concept of using fingerprints to catch culprits was first brought to spotlight by Sir William Herschel. It not only establishes the criminal act of the culprit but also saves the innocent if it’s proved that there is no connection between the DNA sample acquired from the crime scene and the person’s fingerprints.

In the murder case of Nitish Katara\textsuperscript{29}, DNA fingerprinting was used to determine the body of the deceased whose only identifiable body part was one unburnt palm with fingers. This helped in matching with the DNA profile of the parents of the victim and led to the conviction of the accused.

The infamous case of double murder by a star athlete, OJ Simpson of his wife and her friend was cracked through the process of DNA Fingerprinting with the help of the trail left behind by the accused.\textsuperscript{30}

3.2 Bacterial Signature

It is also known as ‘Microbial signature’. In order to identify a person, it is enough to use the epidermal cells shed from the body of the person to extract bacterial DNA. These cells can be found on almost all the surfaces which have come in contact with the individual present in the site at some point of time. It comes in handy when fingerprints cannot be recovered from certain surfaces and a deep level of forensic analysis is done to get DNA bacterial samples. The use of microbial DNA analysis has been observed to be in practice in many fields which also include criminal investigations.\textsuperscript{31} This approach is still in its developing stage and requires more research in order to clarify its veracity. Bacterial signature can also be done when a specific kind of soil, dust or particles are present on an individual’s belongings or clothe leading to gather information of this geological analysis.


\textsuperscript{29} Vishal Yadav v. State of Uttar Pradesh (2014) SCC Online Del. 1373


This often helps in conviction of accused or corroborate his or her alibi. It should be kept in mind that geological analysis will be viable only if the characteristics of such soil or dust particle is rare to that place.\(^{32}\) Apart from the identification and geological analysis of the person, this technique determines the lifestyle of the person in question and the setting they live in. This indicates the advancement in the area of forensics and their importance for the law enforcements.\(^{33}\)

4. Microfluidics & Explosives

Microfluidics is the study of the behaviour of various fluids with the help of micro-channels and is a forensic technology to analyse micro particles such as explosive residues, drugs and other molecules, proteins etc. This is one of the recent developments in the field of forensic science with its never-ending expansion of research and advancements. Microfluidic chips have come into play in the need of hour for detecting the compounds of explosive residues in various sites like the military bases where such instruments can be carried easily. Forensic technology has evolved to bring quick solutions to processes which may take a lot of time if followed in a traditional, physical manner.

One of the research-based analysis through microfluidic chips was done in which a mixture of four explosives of TNT, 2,4-DNT, 2,6-DNT and 2,3-DNT were detected and analysed within 130 seconds. Certain chips of such nature can also be reused and even be reproduced with the probability of 3% over 80 days.\(^{34}\) Microchip CE was the first chip used for microfluidics demonstrations in various researches and so it is more developed than other similar instruments and has been universal for microfluidic methods.\(^{35}\) Since there is wide scope of exploration in vision of the researchers with respect to microfluidics, it will tend to grow more complex and devices with better development.

Variety of explosive compounds are used in the making of explosive devices and a great concern has been put forth by the law enforcements due to alternate methods used by criminals for making Improvised Explosive Devices.\(^{36}\) For onsite detection of low explosives, the required instruments have to be easy to use and not bulky. An alternative device for presumptive testing of such explosives is the paper-based microfluidic devices (μPADs) to determine low and high explosives on site. Paper microfluidic instruments can detect five or more components concurrently.\(^{37}\) This μPAD successfully detected metallic components present in the low explosives and pyrotechnic


\(^{33}\)https://www.dtnext.in/News/City/2021/03/140406 4/1280571/Microbial-signature-new-tool-in-law-enforcements-arsenal.vpf


devices which was its main goal. The progression of forensic sciences can be significantly observed and how it assists the law enforcements to carry out investigations.

5. Judicial Pronouncements

Originally, only healthcare practitioners' opinions were taken into account by criminal justice in some circumstances. The dearth of understanding in the domain of criminology is the cause behind this. The forensic criminology has progressed to a certain level. In other circumstances, such as cases of rape, forensics have figured out prominently.

In the case of Tandoor Murder (1995), it was the first criminal proceeding in India to be investigated using forensics. Sushil Sharma (husband) murdered his wife with three gunshots in this instance. He killed her because he suspected she was having an affair with Matloob Karim, a friend and colleague congressman. Mr. Sharma murdered his wife and then burned her body in the Bagiya eatery with the assistance of the hotel manager, Keshav Kumar. The pistol and soaked in blood garments were discovered and taken to the crime laboratory on Lodhi Road. They then ran a DNA test on the murdered wife's parents to ensure that the dark spots of blood on the fabric belonged to her. According to the laboratory report, "The doctor kept a blood sample and traces of blood from dead Naina (wife) during the postmortem examination. Nonetheless, Naina's death has been verified. According to the DNA findings, "Mr. Sushil Sharma was convicted after the results proved beyond a possible suspicion that the burnt corpse was that of Naina Sahni."

6. Deception Detection Test (DDT) in Forensic Criminology

Deception Detection Tests, often known as DDTs, are technical and psychological tests that are designed to track deception or collect data. Besides that, DDTs are often used on criminals to get a breakthrough in the investigation or when a possible testimony is unable to collect data. DDTs on criminals might have varied results. Narco-Analysis, Polygraph Screening, and Brain Mapping are examples of DDTs. The need of DDTs in investigations poses a number of important clinical, ethical, and legal issues. As a result, the use of DDTs in investigations should not be considered an independent occurrence, but rather as a linked action and reaction occurrence that has ramifications in other domains.

6.1 Narco-analysis

6.1.1 Background

Narco Analysis is a diagnostic and psychotherapy procedure that uses psychiatric drugs, typically sedatives, to generate an oblivion in which cognitive components with intense concomitant sensations rise to the fore, where they can be explored by the psychotherapist. Horselley coined the term Narco Analysis. Since the first documented use of judicial narcoanalysis in 1922, the procedure has been scrutinised, with unfavourable outcomes. Narco Analysis was relatively unknown in India until recently. Nevertheless, in the last year, it has been in the headlines as a major investigation approach used by many Indian research organisations.

6.1.2 How Narco-Analysis is conducted?

Three grams of Sodium Pentothal or Sodium Amytal solubilized in 3000 ml of deionized water is used in the Narco-analysis test. Only after a thorough physical evaluation of the suspect is narco-analysis performed. Only if the suspect is observed physically suitable to undergo treatment it will be carried out; or else, it will not.

The practice of providing sedatives or certain other pharmacological compounds, most commonly Pentothal Sodium, to reduce a person's barriers in the hopes of allowing the person to openly communicate facts and sentiments is known as a narcotic test. By employing his vision, an individual can deceive others.

The person's defenses are decreased in the narco-analysis examination by interacting with his neurological mechanism at the molecular scale. It becomes more challenging for an individual to deceive, and his responses will be limited to things he is familiar with. The suspect's comments are captured on sound - visual tapes, and the professional's analysis aids in the gathering of material.

6.2 Polygraph or Lie-Detector Test

6.2.1 Background

A whole other significant scientific instrument for investigative process is the polygraph. Polygraph is also known as "psycho-physiological" detection and is sometimes referred to as a "lie detector". It is a device that detects and registers biological effects of the human body, such as the person's hypertension, heart rate, respiratory system, and skin temperature, while the person is questioned about the offence and responds. During questioning, the polygraph tests measure all of the natural changes caused by the autonomic nervous system. Because serotonergic modifications are more than a person's effective control or influence, sympathetic nervous system reaction

transitions happened when the person attempts to keep a secret.51

The concept behind the polygraph methodology is that the culprit is afraid of being caught lying, thus he or she induces anxiety in the individual, which causes physical effects that are recorded by numerous sensors. The assumption behind a polygraph examination is that when someone tells a lie, they get uncomfortable and shaky. Physical transitions occur in the subject's body as a result of this stance.52

6.2.2 How Polygraph Examination is conducted?

A polygraph examination is a set of cognitive examinations. Vital signs, heart rate, breathing, muscular motion, and skin response (gsr) are all measured during this exam. The necessary process will be assessed by a professional and competent examiner.:53

1. as an indication of the examiner's psychological condition;
2. examination's physiological competence;
3. Tailored examinations will be undertaken to examine extremely responsive behaviour;
4. a regulatory question will be asked to test the responsiveness of the test;

5. to conduct a comprehensive study of gathered information; and
6. to conduct an initial discussion and a full overview of the questions that will be asked.

Elements of human physiology are examined in polygraph, including as:54

1. Tracking a Pneumography,
2. Tracking electrodumal function, and
3. tracking of the cardiovascular system

The first is concerned with breathing, the next one with skin temperature or resistance, and the last with arterial blood and heart rate. Sweating occur when an individual wants to cover physical changes such as a gain or reduction in blood flow, a fluctuation in pulse rate, or alteration sin breathing. If the individual is telling the truth, the parts that are experiencing such physical changes will continue to operate normally.55

6.3 Brain Mapping

6.3.1 Background

Another useful scientific technique for criminal investigations is brain mapping. "Late Positive Complex, P3 or P300" is another name for brain mapping. It's one of the estimated neural candidacies' components.56 The culprit is not made polygraph process, and construct validity. International Journal of Psychophysiology, 95(1), pp.3-13.


to answer any questions during this whole examination. He is forced to sit in an induced prospective recording equipment while being exposed to objects related to the crime site or hearing audio related to the crime site. Only if the individual has been at the crime site may the detectors in his brain start picking up incident associated possibilities in the way of Brain Mapping. Brain Mapping has a near-perfect predictive performance.\(^{57}\)

When the mind detects a face or a voice, it generates "P30028", a specific electromagnetic pulse. Detectors are affixed to the individual's forehead in this examination, and the individual is placed in front of a computerised screen. The receptors sense electrical impulses and collect the "P300 pulse", which is only created if the individual has some association with the images and audio presented to him.\(^{58}\)

6.3.2 Procedure to Perform Brain Mapping

When a person is given details pertaining to past facts or experience in his mind about a certain behaviour or occurrence, p-300 waves are produced. Up to 800 milliseconds of impetus reaction might also be seen. P-300 is an intrinsically positive component with a maximum frequency of 300 to 800 milliseconds in the head's centreline undivided portion. Using MERMER, Dr. Farewell decided to examine not just the p-300, but also a low conductive material located in the central front portion with an average delay of 800 to 1200 milliseconds. The central undivided portion of the brain is where the brain's recognition response to action or occurrences occurs.\(^{59}\)

"The MERMER (Memory and Encoding Related Multifaceted Electroencephalographic Response)" system records the mind's recognition responses to action or occurrences. A distinctive head ring integrated with sensing devices is placed on the scalp to measure "EEG (Electro Encephalograph)" from various locations on the scalp, and the exam is displayed with a sequence of accurate and inaccurate phrases, images, indications, Bounds, and other impulses, and reactions to the two distinct kinds of sensations are quantifiable to determine if the important information is recognised by the brain or otherwise.\(^{60}\) When the brain is presented with sensations that it already has stored in its memory, it will generate p-300 at a frequency of 300 milliseconds. The testing does not need to respond to questions because such reactions are collected EEG signals. The device is based on cognitive brain reactions rather than feelings. The contrast between a lie-detector and mental profiling is significant.\(^{61}\)

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6.4 Case Laws in which DDTs has been conducted

These examinations were not previously used in India, but they have recently been performed on a large number of people.

6.4.1 Narco-Analysis

1. In the case of, Rojo George v. Deputy Superintendent of Police,62 thereby permitting the narco-analysis testing to be performed. The court believes that offenders have begun to employ clever and advanced ways to perpetrate crimes in recent years. As a result, traditional methods of inquiry and interrogation of offenders will not be effective in solving the problem, and technological innovations such as polygraph, brain mapping, and narcoanalysis will be required.63

2. In the case of, Dr. Rajesh Talwar & Ors. v. Central Bureau Investigation through its director & other,64 also popularly known as Arushi Murder Case. It was held in this case that, On May 16, 2008, Arushi, a 14-year-old girl, was discovered dead in her house. The police department received the information from Arushi's parents. In this matter, Hemraj, a household helper in Arushi's home, was charged of Arushi's murder. However, Hemraj's body was discovered on the rooftop of Arushi's residence soon afterward. Arushi's parents were apprehended by the cops. The suspect was subjected to a narco-analysis examination, a polygraph test, and a brain mapping test in this matter. Court heard the results of these tests could not be used as evidence in trial of court.65

6.4.2 Polygraph

In the case of, Selvi v. State of Karnataka,66 the court was posed with a question about the usefulness of a polygraph exam. In this instance, the court must determine whether or not performing a polygraph examination on the individual without his or her agreement is legally permissible. The Supreme Court stated that Article 20(3) preserves a person's right to speak or stay quiet, regardless of whether later testimony is incriminatory or conclusive. Article 20(3)'s major goal is to prohibit coercive "transference of intimate information pertinent to the facts of the case." The results of each of the challenged tests are "personal anecdote" in nature and cannot be classified as "verifiable evidence." The Supreme Court has also established some criteria for polygraph tests in this matter. The Court went on to say that the suspected individual should not be subjected to a polygraph examination without his or her agreement. It would be an egregious infringement of Article 20(3) of the Indian Constitution if such an exam was undertaken.

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62 Rojo George v. Deputy Superintendent of Police, 2006 (2) KLT 197
64 Dr. Rajesh Talwar & Ors. v. Central Bureau Investigation through its Director & Other, 2013 (82) ACC 303.
66 Selvi v. State of Karnataka, Criminal Appeal 1267 of; 2004 2010(7) SCC 263
without the agreement of the alleged offender.67

6.4.3 Brain Mapping

In case of PUCL v. Union of India68, “Brain-mapping and polygraph do not impinge on a person's privacy rights,” the Supreme Court has held and fairly concluded. The privacy rights was established to safeguard a "private area in which person might become and be oneself." In addition, Articles 22[1] and 22[2] of the Indian constitution give some privileges to those detained and kept in prison under conventional criminal prosecution. The phrase "as early as may be" in Art. 22 (1) imply "as soon as is reasonably necessary of a given situation." By proposing to provide release to those who have been detained, the right to be notified of the reasons of detention is not waived.69

6.5 Judicial Interpretation of Deception Detection Tests

By granting citizens certain freedoms, the Constitution and the courts serve as a principal Protector of the citizens. In addition, the Indian Constitution guarantees safeguards to alleged perpetrators in the form of fundamental rights such as the right to privacy, the right to solitude, the freedom to life and liberty, and the right to be free from arrest and imprisonment.70 The right to silence is also referred as the "right against self-incrimination" or "shield against evidentiary coercion," and it is a core tenet of criminal justice doctrine. The right to refuse to testify is predicated on the notion "Nemo Tenetur Seipsum Accusare".71 The concept of self-incrimination is enshrined in Article 20(3) of the Indian Constitution.

7 Digital Investigations

The practice of discovering and understanding digital evidence is referred to as digital forensics. The technique's purpose is to protect any data in its most natural state while conducting a systematic study by gathering, categorizing, and authenticating electronic data in order to recreate historical occurrences. Forensic evidence is most commonly employed in the aspects of data use in a criminal court, but it can also be used for other situations.72

7.1 Modus Operandi and Technology

Generally, modus operandi refers to a convict's approach for successfully committing the crime. Each Modus Operandi will, at a bare minimal, include the following three components:73

1. Ensuring the crime's completion;
2. Keeping the identification safe; and

3. Enable a timely exit.

For example, in certain cases, criminal conduct can also take the shape of the circulation of pornographic content (one cop reportedly e-mailed a computerized image of his sexual organs to the 17-year-old teenager), which can have major legal ramifications relying on situational factors.74

As an illustration, electronics aided criminal conduct by offering methods for point of encounter between the persons concerned, as well as a way of communicating and unlawful data distribution between them over vast distances. As witnessed, less complicated technology and "instant" technology do prevail that have previously permitted similar conduct.75

From the perspective of the offender, the connection between the growth of crime surveillance technologies in the digital forensics and a convict's awareness of them is a more reactionary part of the interaction between Modus Operandi and technology.76

7.2 Motive and Technology

The phrase "motive" emphasises on the hysterical, mental, or physical desire that drives an activity and is met by it. In practice, criminal intent is unaffected by technological advancements. That is to imply, the behavioural or physical demands that a convict's habit of action nurtures and satisfies are often unrelated to current technology. The same motivations that currently persist have undoubtedly been around across past century.77 Furthermore, it may be asserted that “incentives (e.g., sexual proclivities) can grow as a result of the use of, or identification of, different applications with crime acts. This outlines how a prevalent behavioural incentive paradigm can be extended to technology and Internet-related criminal conduct in order to truly comprehend these challenges.78

Maybe the right approach to wrap up our look at how offenders use and modify digital technology is to look at a few studies. The technology presented are just a tiny part of what a cyberspace thief can use. Only handful of several illicit modifications to this technology are shown.79

7.2.1 Computer Virus

A computer virus is a foreign system that is developed to infiltrate a software network with the intent of performing one or more specific operations without the network supervisor's awareness or agreement. A malware's performance is calculated by its developer. Malwares' illicit implications in the technological space are practically limitless. Generally, they are used to acquire, transmit, and/or destruct data (Sensitive contact details, banking details, and


7.2.2 Public E-mail Discussion List

Anyone can establish and sustain their own open e-mail conversation groups or attend one of the several open e-mail conversation groups accessible on the Web to exchange information and insights from their lifestyles. They’re also a great way to connect and gain from individuals who share your preferences and interests. The subject of an e-mail conversation group and the kinds of postings provided by members determine the scope of the group. Any e-mail conversation group, on the other hand, constitutes a large audience receptive to specific and numerous data transmissions via that group.

8 Apprehending Offenders

8.1 Digital Evidence as an Alibi

The "time and location" are the most crucial aspects in an alibi. When someone uses a computer system or network, the time and location are frequently recorded, resulting in forensic data that can be used to corroborate or dispute an alibi. Respondents in a number of matters, for instance, have asserted to be somewhere else at the time of the offence while using a laptop or gaming on a gaming platform. The presence or absence of operations on gaming devices may assist in establishing or disprove their alibi.

In case of, People v. Durado, 2001, notwithstanding his assertion that he was working in Boeing's Long Beach offices 300 miles away, Jerry Durado was convicted of murdering his parents. The only action on his laptop at the moment, according to a forensic investigation of his office's operations, was the outcome of a standard malware sweep.

Take into account that laptop timings and IP addresses can be changed, enabling a culprit to manufacture a false alibi, while coping with an alibi associated with forensic data. Changing the time or the creation time of a document on many systems takes just rudimentary computer abilities. Users can also configure a system to perform certain tasks at a prescribed time, such as delivering an e-mail note. In several circumstances, timing activities is a normal component of the computer system that does not involve any coding skills. IP addresses can also be modified, letting people to appear to be linked to a system from a separate place. As a result, while investigating an alibi, authorities must seek for a connected cyber-

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trail rather than relying on a single aspect of forensic evidence.⁸⁶

8.2 Sex Offenders on Internet

For a plethora of ways, sex offenders are drawn to the online platform. The Online world offers a substantial quantity of data about possible targets, in addition to offering offenders with increased accessibility to targets by expanding their operations from a specified territory to targets all over the globe.⁸⁷ Online dating sites (e.g., Tinder, Hinge, etc.) are the most prominent instance of the types of sensitive information that users share over the Web, such as photos, age, and location. Despite the fact that these matchmaking services were formed for a good reason, they assist a target-rich atmosphere that criminals have taken advantage of.⁸⁸ In 2002, "Japan's National Police Agency" recorded a huge surge in the number of offences associated to Dating apps services, involving rape and assault, and that most of the offenses were committed using cell devices having access to web services. Criminals also utilise dating apps to find other likeminded people, as well as to acquire access to additional targets and child pornography.⁸⁹

In the case of USDOJ, 2010, Michael Speelman, 52, took on the persona of a 16-year-old teenager starting in 2004. Speelman formed a bond with a 15-year-old teenager under the pretense of becoming not only a woman, but also a homosexual, while masquerading as "Lisa Staufferr." This deception was utilised by Speelman to obtain naked and extremely graphic photos of the target.⁹⁰

In 2006, Speelman pretended to be Lisa's mother and told his cyber target that Lisa had attempted suicide. Speelman proceeded to connect with the target while claiming to be Lisa's mother. In conclusion, Speelman confessed to the target that he claimed to be Lisa and misled about her demise before revealing his true self. The FBI apprehended him.⁹¹

8.3 Cyberstalking

Bizarre obsession on targets is one of the most noticeable characteristics of stalker behaviour. Stalkers’ fixation might lead them to perilous limits, making this sort of inquiry difficult and possibly hazardous. While harassers who use the Web to track down targets may try to keep their identity hidden, their fascination with the target often forces

them to reveal their true identity. They might, for example, comment or do something that disclose their connection with or awareness of the target, or they may take chances that allow authorities to track them down and recognize them. Even when harassers have been recognized, efforts to dissuade them often backfire, enraging them and placing sufferers at danger.

In case of South Carolina, 2004, for several years, James Robert Murphy stalked an ex-girlfriend called Joelle Ligon on the web. Murphy stated in his plea deal that he sent abusive e-mail communications to Ligon, disseminated misleading information regarding her on the Web, and e-mailed pornography to her colleagues under the guise of Ligon. Murphy eventually admitted guilty to cyber harassment Ligon and received a five-year probationary period and 500 hours of community service.

Online harassment is similar to traditional stalking in that the Web is simply additional technique that makes stalking easier. Many stalkers, in reality, use the phone and their actual location to accomplish their objectives. Harassers use the Websites to search targets, collect data about them, watch them, conceal their identity, and prevent being apprehended. Despite the fact that stalkers can become fairly good at going digital, prosecutors with a profound comprehension of the Web and a competent forensic approach can typically figure out who a malicious user is.

9. Summary of Main Points

1. Forensic Science can be witnessed since Ancient civilization and in the 1800s, the development of modern forensic criminology emerged.
2. Despite the boons of forensic criminology, several setbacks faced such as in the Indian courts with respect to hindering of right safeguarded by Article 20(3) of the Indian Constitution.
4. DNA profiling assists in criminal investigations to determine the ends of a crime and serve justice. Several DNA Analysis methods like DNA Phenotyping and Bacterial Signature can connect the dots and elucidate the relevancy of forensics science in the field of criminology.
5. Viability of DNA testing to be weighed in comparison to rights of an individual undergoing forensic test as observed in the case of Bhabani Prasad Jena v. Convenor Secretary, Orissa State Commission for Women and Lilu @ Rajesh & Anr v. State of Haryana.
6. First investigation to use forensics in India, Tandoor Murder Case (1995) by running a DNA test to establish the

connection between the bloodstain present on the fabric and the victim’s parents, proving the identity of the victim.

7. Advancement in forensics to be witnessed with the rise of Microfluidics to detect explosives with the help of microfluidics chips which are feasible to use on-site for investigations.

8. Use of DDTs like Narco-analysis, Polygraph Test and Brain-mapping in forensic criminology and landmark judgements discussing veracity, importance and scope of these tests.

9. Data protection to preserve its natural state with the help of Digital investigations to recreate historical occurrences.

10. Establishing relationship of Modus Operandi, Motive with Technology like a computer virus and a public e-mail discussion list.

11. Digital evidences can link the offenders with the crime committed by them through their alibi like observed in the case of People v. Durado (2001). Cyber-trail to be followed rather than relying on one forensic evidence to avoid failure of investigation due to tampering of evidences indicating alibi.

12. Sex offenders over the internet can be nabbed through technology as well.

Cyberstalking being another way of convicting criminals with the help of digital forensics.

10. Conclusion

In latest years, forensic criminology has progressed significantly, particularly in the fields of DNA gathering and processing, as well as the recreation of crime sites. Despite this, there are far too few specialists who are competent of using forensic criminology in court cases. Technological advances have provided the globe with a valuable and accurate instrument for crime prosecution. Currently, forensic criminology plays a critical part in criminal investigation and conviction. The basic tenet of the criminal system is to provide justice and fairness to all people. Video evidence is undoubtedly more vivid than physical investigations. The criminal system benefits from digital forensics as a source of scientific evidence. This is the age of the technology upheaval, and this upheaval has culminated in technical improvement, which has manifested in a quick and dramatic increase in India's crime levels. Following that, the need to enhance the judicial process arose, prompting the creation of forensic criminology to provide rational reasons for instances. Lately, digital forensics provides scientific proof that is required to ensure the culpability or guiltlessness of the accused, assisting in the delivery of legal judgments. Finally, as Wicker of the University of Tennessee College of Law puts it, "if and when solid evidence is provided that is fairly credible, proven ways of revealing untruth are accessible, these procedures should be swiftly deployed by the legal community."

11. Recommendations

The Courts rely on the evidences gathered with the help of forensic methodology to a great extent for which the technology being used has to be credible for efficient catering of justice in the society. The forensic experts practicing their techniques to serve the

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criminal justice system should consider the ethical problems associated with it as it will be for the worse if a person is deprived of his or her right which is the ulterior purpose of law – to preserve the rights of citizens of its nation.

Since the forensic science techniques are yet to grow and undergo constant trials for it to be standardized, it has to be kept in mind that its feasibility should align with the requirements on demand, like improve functions, portability, results, easy-to-use.

While referring to forensic evidences, the judicial system has to be vigilant of the authenticity of such evidences to conduct a just and fair trial. Though, the issue has been a matter of concern from a long time and many changes are taking place, it is still significant and the risks looming over tampering of evidence or inefficiency are persistent. A single blot in investigation can impact an entire court proceeding so all these fallacies should be rectified.

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