

Advancement in Forensic Technology and its utility in the investigation and Administration of Justice

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Abstract

With the rouse of the era of globalization technology has revolutionized the way of living, it has made the lives of people easier, faster and more convenient. The fact cannot be denied with the advancement of technology everything is just a click away from business transactions to teaching and learning. Moreover, the list doesn't sums up over here the advancement in technology has even revolutionized in the field of Forensic Science it is playing its vibrant role in forensic technology and its advancement, this has added and increased the value of forensic science in criminal investigation. Forensic technology being a dynamic field can highly be helpful to detect, Identify and prosecute the offenders or criminal.

The paper provides a brief overview about the advancement in technology and how it has helped the legal world in exercising its duties in more effective and efficient ways. This paper also examines the important role of forensic technology which can be useful in investigating a criminal case and in the practice of law in the era of this 21st century. The paper further aims to give a quick insight about latest advancement in forensic technology which can be analyzed by DNA Sequencer, Drug Testing, and Magnet finger printing automated finger print identification (AFIS). All such technologies are playing a crucial role in providing speedy justice to the people.

The paper concludes with the series of references and possible outcomes and recommendations which is being discussed through an empirical study of the honorable courts in the famous case of *GautamKundu v. West Bengal*³likewise in *Rajiv Gandhi Murder Case*⁴the Indian courts has accepted the role of DNA technology in investigating criminal paternity.

Therefore, it can be said that with the advancement of science and technology, the criminal have adopted new methods and techniques for committing heinous crimes, but on the same

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³1993 3 SC 1448.

⁴AIR 1993 SC.

hand the modern forensic technologies is helping investigating authorities in their efforts to find out the criminals and culprits.

Introduction

Emerging technology has enabled legal aid services to become more efficient than ever before. The advancement in forensic technology greatly improves access to justice and the odds of success. We may consider the case of domestic violence or intimate partner violence, which are affecting more than 38 million women in today's era of increasing crime, the legal remedies to such violence are restraining orders, financial support, etc and it requires filing of certain documents which may either benefit or harm the case, but the advancement in these forensic technologies has enabled to the application of core judicial process, and offer valuable support to those who need justice against such crimes. The technology advancement is leveling up the play field, by offering comprehensive, the in-depth information and tools regardless of the case background, it offers greater insights, which helps to convince the judges regarding the facts of the case, and to identify the provisions related to the law.

Enabling access to justice through technology has automated many low value tasks currently being performed by lawyers, increasing the value for money of current funding for legal aid. These technologies may also help to overcome several non monetary barriers, improving access to justice for all. With the increasing rate of crime day by day the methods of evaluating and investigating such crimes should also be expedient whereas the emergence of forensic technology is proving itself beneficial in facilitating access to criminal justice and crime investigating in providing legal aid. The increased productivity is allowing the lawyers and the legal world to work more effectively and efficiently.

Forensic Technology is an integrated and crucial part of our highly regarded legal technology solution. The reality may be more mundane, but forensic, but forensic scientists do invaluable work like linking evidence from crime scenes- such as fingerprints, injuries, weapons, DNA, computer data, drugs and counterfeit goods to criminals themselves.

Methodology & Objective

Forensic technology has become the most expedient tool nowadays by being a great source of providing legal aid. Forensic technology has eradicated almost all the loopholes to an extent which used to be a time taking process in investigating a criminal case. The paper identifies the three major technologies of forensic science which have been proved to be most applicable and accessible in resolving many cases. Those technologies are elaborated underneath:-

1. DNA Sequencer
2. Drug Testing

3. Magnet Finger Printing Automated Finger Print Identification(AFIS)

DNA Sequencer

For a long time forensic scientist have been interested in using genetic information to match the crime scene evidence with suspects in criminal investigations. However, with the development of molecular genetics since the last decade has changed the scenario and the situation and with the discovery of DNA (Deoxyribo Nucleic Acid) that contains the genetic identity code in all life forms but which is extremely variable in between people.

The word DNA Sequencing means a method which can be used for determining the order of the nucleotides basis adenine, guanine, cytosine and thymine in a molecule of DNA. DNA is the information stored that ultimately dictates the structure of every gene product that delineates every part of the organisms. The order basis of the DNA contains the complete set of instruction alongwiththem that make up the genetic inheritance. DNA can be sequenced by chemical procedure that breaks a terminally labeled DNA molecule partially at each repetition of a base. The DNA sequence can be read by the patterns of radioactive bands. DNA Sequencing technology is very significant in research and forensic science. The main objective of DNA Sequence generation technology is to evaluate and analyze the sequencing with very high accuracy and reliability. Some important applications of DNA Sequencing are;

1. To analyze any protein structure and function.
2. With the study we can understand the function of a specific sequence
3. Sequence responsible for any disease.
4. With the help of comparative DNA Sequence study we can detect any mutation case.
5. Determination of kinship.

DNA sequencing technology and test are highly effective because each individual's DNA is unique. In the famous case of *Rajiv Gandhi murder case*⁵, the DNA Samples of alleged assassin Dhanu were compared with the relatives, which gave conclusive proof about her being involved in the gruesome attack. Similarly in the other famous case *Tandoor murder case*⁶the DNA sample of the victim Nainasahani were compared to that of her parents to establish her identity.

Accordingly, the DNA analysis has been used to create suspect pools based on race, as in the case of a serial killer in Louisiana. Police were looking for a 'white' male, but DNA from the crime scene suggested that the preperator was of "American Indian ancestry", implying that

⁵AIR 1993 SC.

⁶2007 Cri LJ 4008.

such a person could not be 'white'. Further, at the same hand, DNA sequencing technology contains a mandate for examining the ethical, social, and legal implications of mapping the human genome, with specific allocation of resource for examining several aspects.

Drug Testing

Drug testing is a way to evaluate the type and possibly the amount of legal or illegal drugs taken by a person. A drug test is a technical analysis of a biological specimen, for example urine, blood, hair, sweat or oral fluid which determines the presence of particular parent drug or their metabolites. A drug test technology can also be used to evaluate possible accidental or intentional overdose or poisonings, and also determine the presence or absence of drug for medical or legal purposes. Drug testing is extremely accurate and reliable when all aspects of the testing process are done properly.

Drug testing in criminal justice system serves out several purposes such as:-

1. Inform judges for bail-setting and sentencing.
2. Indicates whether specified rules or conditions are being complied or not.
3. Identify persons in need of treatment.

Criminal justice agencies and the agencies which supervises the offenders behind the bars are inclusively drug testing as a means of offender monitoring and control. Drug testing technology can provide relatively inexpensive and highly reliable information about an aspect of offender behavior and other important outcomes. Drug testing alone or in combination with treatment offers several advantages from increasing offender accountability and managing offenders behavior.

Narcoanalysis is an interrogation technique which is classified under drug testing technology under modified mental conditions of the subject whereas in 2010 a bench of Supreme Court commented upon the interrogation through Narcoanalysis;

1. The Narcoanalysis interrogation be done only with the consent of the subject before a magistrate.
2. No one should be forced to undergo this test involuntarily.
3. Direct evidences from Narcoanalysis inadmissible unless supported by other evidence.

In 2005-06, the famous *Nithari serial murder*⁷ took place in Nithari village near Noida U.P. The judge dubbed it as 'rarest of rare cases' during the investigation of the serial murders, the two accused were subjected to Narcoanalysis interrogation. The interrogation gave successful

⁷SurendraKohli v. State of UP, 2011 4 SCC 80.

information and the results of the tests indicated that one of the accused SurendraKohli has done the killings alone by, strangulating the victims. It was also revealed that after killing he would have rape the victims.

Magnet Finger Printing Automated Finger printing identification

The automated finger print technology (AFIS) is a biometric identification methodology that uses digital imaging technology to obtain, store and analyze finger print data which could be helpful in the investigation of the criminal case. With these forensic technologies, crime scene investigators, forensic scientists and police officers can quickly and easily compare a finger print at a crime scene with an extensive virtual database further, the dust and no-touch wandering method of this technology allows investigators to get a perfect impression of finger prints at a crime scene without contamination.

Finger prints are being considered as a full proof method for identification purposes because each finger print is unique. As digital technology is progressing, finger printing is increasingly being used a fraud prevention measure but this kind of technology is being used as a safeguard where our personal information and data is being stored such as passwords and personal identification numbers. Live scanning, which offer real time finger print identification, complements AFIS Technology, this technology is gaining popularity as method used to identify individual user logons. Earlier the management of finger print records was an uphill task the searches and the comparison of fingerprints to the given print were so doubly so and sheer and it was supposed to be highly labour intensive and time consuming process but the advancement of technology has changed the scenario completely. The finger prints are now digitalized which are being introduced in the form of AFIS Technology; this can automatically compel a latent print from a crime scene to a data bank of known finger prints in a short period of time. The digitized data, literally of millions of finger prints is filed and stored systematically and stored automatically for easy retrieval.

Implications and Socio Legal Analysis

Today we see enormous changes brought up by science. The whole context of life is changing the application of science and technology is being used for detection and investigation of crime and in administration of justice in the whole world. The area of forensic science is changing very fast by the new technologies and methods nowadays DNA Sequencing, Drug Testing, Automated Finger Identification Technology are being used by scientist to reconstruct the offense and the mishap. The implications of modern forensic technologies are that it helps to differentiate trace elements and organic materials down to the

level of merely a few hundred molecules. These recent technologies can facilitate to expose concealed offense, convict the guilty and vindicate the innocent if it exercises by care. It further place multifaceted role in recognizing sufferers of offense, mishap, tragedy, conclusion and poignant support for bereaved survivors.

The implication of science and technology in legal world can be observed in the present scenario as the guardian of law is taking help from many techniques and advancements of science for fighting against crime. Whereas if we talk about socio legal analysis the forensic technology which is used to answer criminal questions provides answers through the comparison with, control substance, biological proof that may be found at the sight of offense. In addition to this with the help of trace proof and impression proof such as finger print, tire tracks and footwear impressions, the require answers for such criminal examinations can be found with the help of forensic technology. Apart from this forensic science has other disciplines too such as it is used for solving disputes as in forensic accounting which is the study and understanding of accounting evidence.

Without the use of forensic technologies criminals could not have been convicted of their crimes, ranging from common theft to a homicidal rampage, unless there was an eye witness present at the crime scene where the crime occurred. Fortunately, in today's era science is used in solving crime clues that are left behind by the criminals can be traced to themselves through scientific evidence. Forensic science play a pivotal role in legal system as it deals with application of the knowledge and methodology of various disciplines of science in the legal matters. Forensic technology is that piece without which the puzzle of criminal investigation is incomplete. Criminal profiling through forensic technology has enabled to zero down on suspects by determining a criminal pattern and personality. The legal system widely recognizes the role of forensic science in the trial of criminal offenders and this act as a great emphasis on time efficient and quality management of crime scene. This also ensures that crimes are detected with greater certainty and consequently conviction rates can increase.

Conclusion and Recommendations

Forensic science is a dynamic field of knowledge which can be highly helpful for criminal investigation. Forensic science applies technical skills to detect, identify and prosecute offenders. The application and awareness of forensic technology is growing in law enforcement agencies in India and many parts of the world. The investigation through forensic technology is only possible if police adopts new professional culture, scientific method and tools enhancing training inputs and establishing the forensic laboratories. The

present world the world of advance science and technology and where new researches are taking place in every field these advanced technologies has given the world an effective and precise tool for the purpose of criminal investigation. The area of forensic science is changing very fast by the new technologies and methods on the same hand scientific proof holds out the alluring chance of tremendously precise fact finding and the decrease in the ambiguity that frequently accompanies legal decision making.

The traditional methods have not been proved very fruitful in attaining the required conviction rates but due to the application of knowledge and techniques of forensic technology in the recent years have led to the increase in higher rates in conviction of various crimes and investigating a criminal case for justice. Because of the development of science and technology the pattern of our society has also changed to cope up with day to day development. Although considering the huge necessity and importance of forensic science the government of India has established a few forensic science laboratories in the different parts of the country but an additional recommendation can be made over here is that there shall be establishment of mobile laboratories in the remote areas as well so that it can reach to the scene of occurrence as early as possible. Moreover, the another possible suggestion that could be made our over here is that the basic idea and concepts should be taught to the officers and investigators so that evidences can be collected in order to keep the records of the criminals in the proper manner. The investigator and the police officers should know how to handle the evidences properly and they should be taught to collect a ample evidences in such a manner from the scene of occurrence so that the original state of the sample doesn't gets destroyed till it reaches the forensic laboratory.