



Editorial

Interdisciplinary integration in forensic science with expanding its horizon

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Forensic science is expanding beyond traditional crime investigation into the domain of digital and cybercrime. The forensic science horizon has broadened from simple visual, microscopic, and optical observations to the application of advanced scientific and technological methods for solving criminal cases. Today, the discipline includes DNA analysis, digital forensics, AI-based tools, 3D reconstruction, toxicology, forensic anthropology, forensic psychology, wildlife forensics, environmental forensics, and many other interdisciplinary fields driven by developments in scientific methods and sophisticated instrumental techniques.

Expanding forensic science horizon refers to the continuous growth and development of forensic science through new technologies, new applications, and new interdisciplinary approaches used to solve crimes more accurately and efficiently. The technological development clearly reflects the expansion in all areas that already existing with tremendous widening and the modernizing of forensic science with innovative tools, techniques, novel technologies. The scientific development of forensic science disciplines is enabling investigators, law enforcement agencies and forensic scientists to solve criminal cases more accurately, faster, and in more complex situation.

The expanding forensic science horizon refers to the continuous growth of the field through new technologies, new applications, and emerging interdisciplinary approaches that enhance accuracy and efficiency in crime investigation. In everyday investigative practice, the use of digital forensic science has increased exponentially due to the integration of advanced technologies. Developments in DNA analysis—

including touch DNA, genetic genealogy, DNA profiling, Rapid DNA, automated fingerprint identification, 3D crime scene reconstruction, AI and machine learning, mobile forensics, social media investigations, and cybercrime detection—represent significant components of this broadened forensic landscape. Microbial forensics is also emerging as a new horizon, using microbial signatures to support criminal investigations.

Forensic science is inherently multidisciplinary, encompassing fields such as forensic psychology, forensic anthropology, environmental forensics, and wildlife forensics. In all these field, specific knowledge, training, skill and expertise of all branches of natural sciences, physical sciences, chemical sciences and biological science is being utilised to examine and analysis of various type of criminal cases. Despite these advancements, several global challenges remain, including terrorism investigation, biometric identification, and international crime networks. AI is reshaping modern forensic science by transforming crime detection, evidence analysis, and predictive assessments. The future of crime scene investigation is increasingly focused on 3D scanning and virtual reconstruction.

Forensic chemistry and toxicology continue to evolve due to innovative analytical techniques that detect newer drugs and poisons with greater sensitivity. Environmental forensics is rapidly growing and plays a critical role in investigating pollution, illegal dumping, and chemical spills. Wildlife forensics also contributes significantly to conservation efforts and crime control related to wildlife offences. Forensic psychology and behavioural science also

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play an important role in understanding criminal behaviour and supporting investigative processes.

Nanotechnology represents a highly advanced frontier in forensic science, offering nano sensors and nanoparticles for detecting trace evidence with exceptional precision. Biometric forensics is likewise expanding, with enhanced applications in facial recognition, iris scanning, gait analysis, and other identification technologies.

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