F12 The Application of Virtual Reality in Forensic Science

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Learning Overview: After attending this presentation, attendees will know how to apply the application of Virtual Reality (VR) to the crime scene investigation, reconstruction, and representation in the future court.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by introducing the new technology, VR, applied in crime scene reconstruction. The resulting video and model could be a useful example for judicial education and could be presented at international conferences, showing how forensic science is being used in Taiwan. In the future, more technologies applied in the judiciary may develop a better environment for justice.

Due to the limitations of traditional evidence search tools, crime scene investigations are still using 2D evidence for documenting crime scenes. Compared with real or virtual 3D evidence for crime scenes, critical 2D evidence information may be lost. Solving this problem is an urgent need in forensics. Scanning 3D crime scenes, constructing 3D scenes of VR, and solving the difficulty of traditional 2D images to present the real situation of complex crime spaces with different perspectives allows observers to experience the realism of 3D spaces.

Using science and technology in investigations and trials is a trend in forensic science, leading to judicial reforms that safeguard justice. Advanced inspection technologies could significantly promote the effectiveness of decisions in forensic investigations. However, in the National Conference on Judicial Reform, a frequently mentioned issue is the lack of the education in forensic science in Taiwan. Developing a national committee on forensic science has thus been suggested to lead the promotion of the judicial experts' abilities in criminal investigation, to discover the truth, and to reduce miscarriages of justice. Judicial personnel are also actively cultivating science and technology in the courts, raising the public's trust in justice.

This study presents the application of VR on crime scene investigations, reconstructions, and future presentations in court. This presentation will focus on studying the case of Su Chien-Ho, one of the most famous cases in Taiwan. Three death row sentences were suggested as a miscarriage of justice and redressed because of the key issue: the space of the crime scene was too narrow to bear four criminal suspects' fierce attacks at the same time. This study intends to re-establish the basis of the 3D model crime scene through mapping software and on-site photos at the Taiwan Police College. This study attempts to apply VR and animation to represent the conditions of the crime scene and the scientific evidence. The 3D model and the animation of the crime scene in the case of Su Chien-Ho could effectively demonstrate the space, scientific evidence, and meaning of criminal scene reconstruction.

This research also aims to introduce 3D scanning, modeling, and other technologies to integrate VR into the field of crime scene investigation. By explaining the problems of traditional 2D recording of crime scenes, and emphasizing the use of 3D scanning technology, the effect of 3D comparison of evidence can be enhanced compared with the traditional spatial presentation of 2D crime scenes. There is no need to rely on imagination to build a 3D model quickly. It can also be equipped with VR glasses; if it is not convenient to visit the crime scene in person, investigators can observe various evidence of the crime scene in different perspectives. In the future, investigators can refer to the use of VR technology to reconstruct the scene of a criminal case from a flat file or photos for a VR that can be zoomed in, zoomed out, or moved according to the user's needs. This is more in line with the actual situations for criminal investigations in order to further improve the efficiency of case solutions.

Virtual Reality, 3D Modeling, Crime Scene Reconstruction

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