

Case Report

Reconstruction of Scene by Forensic Animation Two Case Reports

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Abstract

Traditionally, reconstruction of sequence of events of the crime has been in form of sketches, images, pictorial diagrams etc. However the advancement in the technology has helped the Forensic specialists to demonstrate the interrelationship of chain of evidence related to the case using various tools. Forensic animation is a tool having significant application in the investigation of civil and criminal cases. Though this technique has been used in many countries, but in India its use in crime investigation is not well documented in literature. We present two cases of firearm related injuries in which the forensic animation technique was used to demonstrate the possible angle of fire and relative position of the victims while sustaining firearm injuries. The cases are discussed with review of literature. This technique may provide a fresh perspective or new insight relevant to the case/incident under investigation and also helpful to judiciary for better understanding of facts related to the case. However, in India use of forensic animation is yet to withstand judicial scrutiny.

Key Words: Technology, Forensic Animation, Crime Investigation

Introduction:

Historically, static images such as diagrams and charts have been used to explain the complex testimony of an expert witness. [1]

Recent advancements in digital technology have given new dimensions to forensic sciences not only in gathering, exploration and interpretation of evidences but also its demonstration in the court room.

Forensic Animation is a computerized technique of representing the possible likely pattern of a scene or incident. [2] It has two distinct forms. Substantive Forensic animations emphasize on known facts with specially designed computer programmes, while Demonstrative Forensic animation considers visual illustration of happening of things.

Worldwide, it has been increasingly used by investigating and law enforcing agency. It has been used in diversity of civil and criminal situations including reconstruction of scene of occurrence with exploration of multiple possibilities which might have occurred.

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It not only increases persuasiveness of an row but visual demonstration can also aid the judiciary in better appreciation and longstanding retention of the facts related to the case.

However, for courtroom admissibility of evidences, its presentation through digital media requires special caution and consideration. In India, its use in crime investigation is not well documented in literature.

Case One:

A 42 year old male sustained firearm injuries while going to morning walk in a park. He was fired on by the assailant from the window of right front gate while victim was sitting on the driver's seat. One firearm entry wound was present on right side lower part of front of neck, three were on the front of right side chest, one on back of right hand while one entry wound was on the left scrotal region going upwards through abdomen and bullet was recovered from back of right thoracic region.

Doubt was raised by the defence counsel using the expert testimony of defence witness during trial stage that the entry wound from left side scrotal region in below upward direction was unlikely while victim is in sitting position on driving seat until the bullet is fired from the front of vehicle. But there were no signs of fire from front side of vehicle.

The animated reconstruction of bullet trajectory was done (Fig. 1) after considering the anatomical location of injuries on the body of victim and testimony of eye witnesses.

Case Two:

A 45 year old male sustained firearm injuries in an exchange of fire. He was shifted to nearest hospital, where he was operated upon but died during the course of treatment.

The entry and exit wounds on the body of deceased as observed at the time of autopsy were as under

1. Surgical therapeutic incised wound on lt. shoulder and lt. Upper arm of size 12 x 1.5 cm x muscle deep with extravasations of blood in underlying muscular layers. A small area of size 3 x 2 cm of contusion was seen on both sides of wound margin 3 cm lateral to medial end of wound on lt. shoulder. [Entry wound – Explored and debrided].
2. Surgical therapeutic incised wound vertically placed in middle 1/3rd of lt. arm laterally of size 9 x 2 cm x muscle deep with extravasations of blood in muscular layers underneath. The wound was situated 18 cm below lt. shoulder top & 8 cm above left elbow joint. [Exit wound – Explored and debrided].
3. Surgical therapeutic incised wound on left hypochondriac region of anterior abdominal wall of size 4 x 2 cm x peritoneal cavity deep with small area of blackish abrasion collar (1.2 cm).
4. The wound is situated 14 cm below lt. nipple, 117 cm above lt. heel of foot, 55 cm below top of head and 10 cm lateral to midline. [Entry wound–Explored and debrided].
5. Lacerated wound with outward protrusion of tissue through hole of wound of size 1.5 x 1 cm x pelvic bone deep with underneath extravasation of blood, situated on Rt. upper thigh postero-lateral aspect. [Exit wound]. Fracture of right hip bone (upper iliac region).

The case was investigated by police, national human right commission and also examined by highest courts of India.

The animated representation of position of victim while sustaining firearm injuries was prepared. [Fig. 2]

Discussion:

Forms of newer technology used in crime investigation or in court room ranges from video recording showing pieces of evidence on the monitor to computer generated new forms of evidences. [3-5] Forensic animation has its applications in variety of situations such as motor vehicle accidents, accidental air crash, bullet trajectory, fire and smoke spread pattern, anatomical location of injuries and explosions.

This technique includes known information about the scene or incident and other evidences which could be helpful in explaining the facts related to the case and explore all possible different scenarios that might have ensued. Some of the cases wherein computer generated graphical evidence has been used includes Delta flight 191 crash (1985) in USA [6], Bloody Sunday (1972) Inquiry in Northern Ireland [7], Road traffic accident and fatal shooting in UK. [8, 9]

The advanced digital technology is not only helpful in reconstruction of the scene or incident but also helpful in examination and identification of bite marks on various objects like food. [10]

However the issues concerning its acceptance as evidence in Court of Law include:

1. Relevance-It should accurately and objectively represent the evidence, to which it relates to,
2. Accuracy and Authenticity-The testimony of reconstruction expert, use of their data for production of animation and accurate illustrations are important for foundational and authenticity requirements for a forensic animation.

Animation is required to be based on accurate, coherent and authentic information free from contradictions and

3. Full and complete disclosure of underlying data, scientific principles mathematics, physics, programming, hardware, software, supporting documents or studies. [11-13]

In a case Clark v Cantrell (529 S.E.2d 528, S.C. 2000) from South Carolina the trial judge ruled that a forensic animation of a high-speed automobile accident was inadmissible as demonstrative evidence. [12]

Studies have suggested that more research is required for effective presentation of the case through animation. [5]

Inadequate presentation of evidences through animation based on testimony of eye witnesses may lead to rejection of animation as evidence in the courtroom. Higher cost of the production of animation is another most important limiting factor for its frequent use in crime investigation.

Schofield [14] has suggested that number of fundamental implications inherent in the shift from oral to visual mediation and number of facets of this modern evidence presentation technology need to be investigated and analyzed. We have used animated reconstruction of sequence of events in cases of firearm injuries sustained by the victims.

The anatomical location of injuries, statement of eyewitnesses and body positions were used for reconstruction using animation.

However, in our case, animated reconstructions remain confined to investigation and could not be subjected to judicial scrutiny. Portraying of bullet trajectory using animation has earlier been reported [9]

Subke K et al [15] has also used computer enhanced reconstruction (Three dimensional geometric model) in order to get clues concerning the course of the traumatic event in cases of lethal firearm injuries using all relevant anatomical data as well as the careful documentation of the injuries and a three-dimensional model of the characteristic outlines of the weapon true to scale.

A series of simulation sequences is created by variation of the body positions and the grasp of the weapon.

They also observed that, anatomically impossible positions in view of the physical characteristics of the victim and the site and direction of the bullet path are automatically excluded from the reconstruction.

Conclusion:

The use of technology in Forensic science has significantly contributed in advancement of investigation.

In India, the animated reconstruction of sequence of events which are now more often used to illustrate the incident in various television news channels is required to be demonstrated in the courtroom environment.

However, appropriate and careful consideration of the confirmed facts and views of reliable witnesses related to the case are the key factors for its preparation by the experts and

more so, interpretation and acceptance as evidence by the prosecutors and judiciary.

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Fig. 1
Animation of Case one

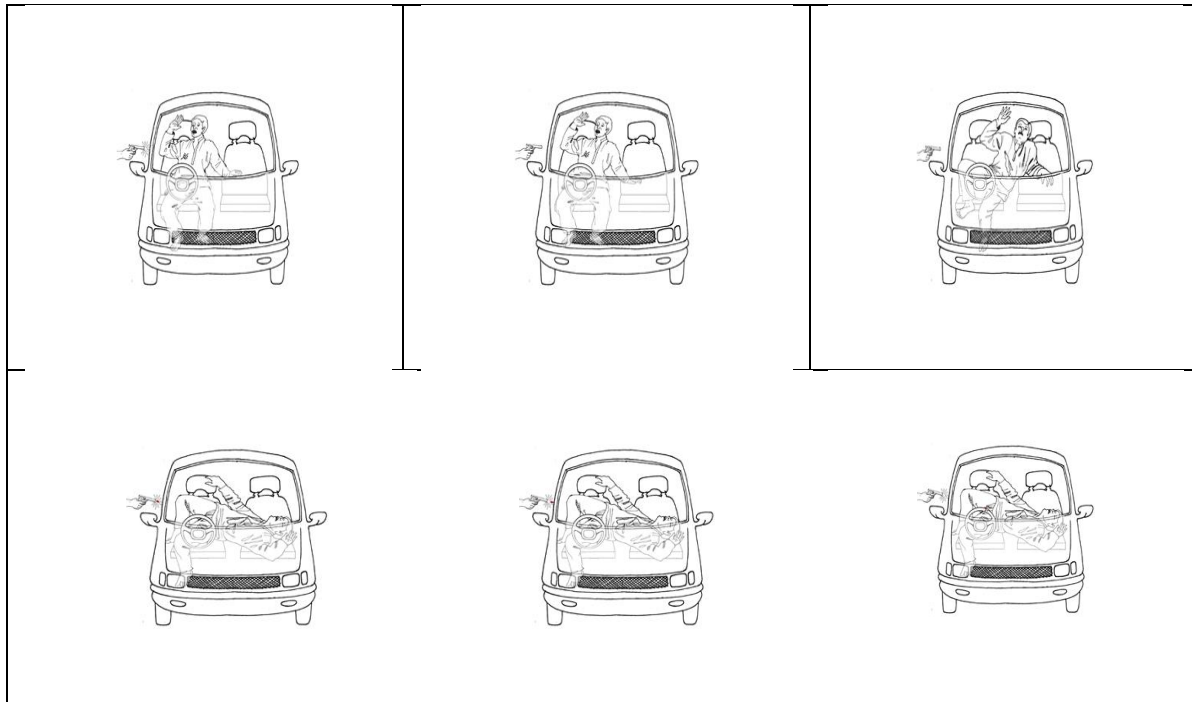


Fig. 2
Case Two

