The Role of "Digital Forensic Photography"- In the Indian Criminal Justice System

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***Abstract** : Photography is one of the most critical factors in any crime scene solving cases. Crime Scene photography or forensic photography is an important role depending on the crime scene as well as its a photo in the criminal justice system as a scene of crime evidence. In the 21st century all over the world, all respective forensic science authorities used high-resolution camera, lens and modern instrumentation technology to capture crime scene occur photos. Evidence collection and preservation using digital forensic photography is a crucial aspect of a future legal proceeding. In this paper, we summarize the modern aspects of digital forensic photography in the Indian criminal justice system.*

Keywords: Digital Photo, forensic photography, Criminal, Justice, system, India.

1. INTRODUCTION

Forensic photography is also known as Crime scene photography or Forensic imaging. The former evidence of photographic documentation dates back to 1843-1844 in Belgium and 1851 in Denmark. Photographing a crime scene imparts a permanent record of the scene of offence or accident, providing the initial appearance of the scene of Crime and relevant evidence (dead-body, weapons, trace evidence, blood spatter, etc.) and mainly reconstructing the scene. Précised photographs of a crime scene play a vital role in court hearings and aid in Investigation. Wounds and injuries photographically recorded are important in forensic medicine cases and especially in forensic odontology teeth restoration and bite marks are photographed.

In spite of videotaping or sketching, photographs provide accurate measurements and distances among them objects which are lacking with sketches. Photographing includes maintaining records from photographing the crime scene to criminal profiling (identity of the criminals are noted down by the law enforcement agencies so that to trace down the offender when released in public) etc. Criminal profiling is done by Photographing the offender/criminal including the identification marks observed. From the emergence of forensic science, photography has abetted in questioning in an investigation. Modern cameras providing high resolution, sharp focus, date and time on the photos, correct exposure has lacked by the traditional cameras. Skills vitally required by the photographer are light adjustment, exposure basics, colour, focus, white balance, filters, colour illustration. Additionally, a Forensic Photographer requires Identification skills relating to Tool marks, Trace evidence, Tire marks, Developing latent fingerprints and Biological stains, vehicle Photography, Post-mortem etc [1-5].

Images clicked digitally are instantly converted into digital files which are stored in computerized files. In the present scenario, Digital Forensic Photography is emerging pillars to solve the crime. The evolution of the digital camera took place in 1975, **Kodak** being the first digital camera invented by Steve Season. The evolution of digital cameras is from **Kodak** to **DSLR's** being the most used camera in the present era. Any digital created image contains 3 primary colours, Red, Green, Blue (pixel colours). These primary colours are referred to as "**colour channel**" and they have an intensity value specified by their bit depth, which can have any range. Images photographed digitally are assigned by a numerical value ranging from 0 to 225 (assigned to RGB pixel). Red, Green, Blue are pixel colours that are combined to create colours that appear in the digital prints. A combination of these three-pixel colours results in 16,777,216 total possible colours i.e., 2^8 or 256 by each of the pixel.

We have three categories of Cameras, they are Camcorders, Pocket cameras (compact cameras), DSLR's (Digital Single Lens Reflex). DSLR is the most used and preferred camera by crime scene investigators or law enforcement agencies, because of its versatility, picture quality and interchangeable lens. A photographer must always check down the ISO number, Shutter speed, date and time, aperture in a camera (the three important pillars of a digital photograph). These three has the maximum effect on the brightness of your images. ISO sensitivity (International Organization for Standardization) is a measure of a camera's potentiality to capture light. ISO value ranges from ISO-100(low ISO) to ISO-6400(high ISO) [6-8].

2. HISTORY OF PHOTOGRAPHY:

Cameras came into existence as Camera Obscura in the 18th Century. The term photography was coined by Johannes in 1604 defining it as drawing with light. The very first photograph was clicked as an experiment in 1827 by Nicephore Niepce, a metal sheet with a film of chemicals spreading on it was used. Around 1839 the word photography began to be used. Entering the year 1841, there was development within the metal plate used for photography, adapting features were lenses made by optical manufacturers [9]. In between 1848-1865 photography branches into photojournalism. The photos of the Crimean War and the US Civil war was in public view. After this, the photographic images were replaced by hand-drawn or painted images by the journalists. During 1835-1887 metal and glass plates got replaced by silver halides & celluloid based emulsion rolls, improvising it. George Eastman invented the camera which was easy to use, by the help of a new film roll. Motion pictures or moving pictures were established in 1878-1900. Finally, in 1957 the first eye-level viewing Single Lens Reflex Camera (abbreviated as SLR's). In the year 1975, the first digital camera came across and with many developments and changes continuing at present.

3. PRINCIPLE OF PHOTOGRAPHY:

Photography contains 7 main principles and they are as follows, balance, pattern, contrast, unity/grouping, rhythm/continuity, texture, and light.
Principles to be followed in Forensic Photography:
There are certain rules which are followed by every forensic photographer to obtain proper photographs at the crime scene, they are:

- Securing the scene of the offence.
- Evaluating the condition at Crime Scene.
- Photographing the crime scene.
- Photographing the victims.
- Photographing the Evidence.
- Avoiding photographing irrelevant objects/items at Crime Scene.
- Developing latent prints if in case present at Crime Scene.

4. CRIME SCENE PHOTOGRAPHY:

Photography is the most important part of Crime scene investigation. Where a crime namely theft, robbery, sexual assault, kidnapping and murder has taken place and from which the majority of the physical evidence associated with the crime is obtained. The photographs documentation of evidence, crime scenes and autopsy photographs for investigation and presents an argument in a criminal justice system from the court. A Crime Scene Photographers or forensic photographers must be able to identify the targeted place or areas where the most probable evidence is located and suitably capture those areas by using various types of Photographic techniques so that they can identify and present in the court of law. Crime scene photography is important to the overall documentation of a Crime Scene. Crime scene photography or forensic photography should be considered a main responsibility and duty of forensic photographers, investigators, as everything that is done later is rarely done without a proper photographic foundation. Crime scene Photographers must ensure their work is both ethical and honestly while capturing as much accurate information and detail as possible photographs of a Crime scene. Documenting all elements of the crime scene is a major step when trying to piece together what happened, how it happened and who did it. There are different protocols specific to each stage of Forensic photography (e.g.: exhumation, crime scene, autopsy, etc.). In all forensic investigations, the crime scene investigation officers have first taken a step is to secure the Crime scene. The forensic photographer should evaluate the all-conditions available Light and weather conditions and adjust camera settings properly. As we know, Crime scenes are three types that are indoor, outdoor and conveyance crime scene [10]. The indoor crime scene indicates the inside of the house, rooms, college, offices etc, outdoor crime scene is outside of the home or any open place and conveyance crime scene are refers to a crime that occurs in vehicles, therefore no single camera Setting will work for all crime scenes. The photographer should take photographs before Anything is disturbed, changes, properly working through the scene from outside. All crime scene photography or forensic photography consists of three basic types of photographs which are used by every forensic photographer in any cases, that is: overall, mid-range, and close-up. To close-up pictures with scale. Many shots should be taken, from the all over scene. Medium shots are intended to show the relationship of evidence to the overall scene for photography. Photograph the evidence then each piece of evidence should be Photographed to illustrate which location where it was found. It establishes the relationship of evidence for the victim, the victim in the room and so on and how to add all the evidence. Digital cameras currently provide an easy and quick method of recording images and a wide variety of cameras are employed to do so. Digital photography, digital Imaging and its management are exploding at an Extraordinary rate. Digital photography is the most important in forensic science in most of the field like forensic medicine, dentist. Most off micro and trace evidence captured by digital photography. And documentation most important of photometry. Most of the techniques used in the forensic field for analysis and identify by photography and photography method. At the Crime scene most of the cameras and equipment of forensic photography used for capturing micro and traces evidence. Most of the equipment present in the market for forensic photography.

5. DIGITAL PHOTOGRAPHY:

Digital SLR cameras are meant best for Forensic Photography. It is a versatile camera with many characteristics. DSLRs provide interchangeable lens feature with mechanically moving mirror system. Focusing can be controlled manually by twisting the focus on the lens or else by the auto-focus system can be activated by pressing the AF button (auto-focus button). Focus plays a major role in the case of close-up imaging (Beneficial for trace evidence photography in forensic science). DSLR basically uses auto focus based on phase detection. DSLR with ISO and image noise range from 200-800 which supports you photographing in dark without a flash (but the image quality may decrease). Aperture (Aperture controls the amount of light entering the camera lens) in DSLR ranges minimum f/16, f/22 or f/32 to maximum f/64. Shutter speed in most DSLR is 1/30 seconds. In modern DSLR cameras shutter speed availability is 1/4000seconds(the fastest). Hence the fastest shutter speed produces clearer photograph. Almost all digital cameras have a mode dial option, which gives you access to standard settings of a camera or automatic scene-mode. Digital sensor is available that caries according to various digital cameras, **CCD** (charged coupled device) and **CMOS** (complementary metal oxide semiconductor) are the most observed sensors. Large image sensors are found in Higher-quality DSLR cameras to produce high quality images [11,12].
The main difference between SLR (Single Lens Reflex Camera) and DSLR is a digital sensor to record images which is present in DSLR's and lack by SLR's having all other features common in both (ISO, focus, aperture, etc). In simple words, all DSLR's are SLR's but all SLR's are not DSLR's.

6. WHY PHOTOGRAPHY IS IMPORTANT IN A CRIMINAL INVESTIGATION?

Photography is enormously important to crime scene or scene of crime investigation because it recognized what the crime scene looked like at the time that investigation officers got there. The main purpose or objective of crime scene photography or forensic photography is to provide an accurate and accurate recording of the crime scene, recording the primary or original visual and related areas of what kind of physical evidence exists. This is extremely important for helping crime scene investigators to truly understand that what the crime scene looked like in its fullness. If any crime has happened, the crime committed person always leave a shred of trace evidence at the crime scene and this trace evidence is caught by the camera, which helps an investigator is to understand exactly what happened at the scene [13]. So, photography helps to make this clear. Better camera photographs help investigators to look at exactly where each object was found and what types of evidence around it. In case, the investigation officers change and new officers can appoint that particular case then he\she will be checking the old photographs and video, which is helpful to understand them, what is occurring that is called reconstruction of the crime. Once the case goes to trial, better photographs can be important as well and a judge can declare the punishment of the guilty person.

7. ROLE OF PHOTOGRAPHER AT THE CRIME SCENE:

In forensic science, every expert can do their work and generate the report based on their personality skills and experience and one of the most important experts is a forensic photographer. A forensic photographer is also known as a crime scene photographer who is skilled in the art of producing the exact and detailed photographs that record at the scene of the crime. The photographer captured the physical evidence which shows an object present at the crime scene[14]. A photographer has used a better camera for recording the whole crime scene and they used proper lighting, lenses and accurate angles to produce professional photographs which are analyzed, enlarged and submitted in the court during trials. After capturing the photos or images, It preserved in a device. During court proceedings, the crime scene capturing photos depends on the main role which helps the court of law [15].

CONCLUSION:

Digital photography offers significant benefits in our community to get justice. Forensic photography or crime scene photography provides unbiased and accurate evidence used to document all reports during a forensic investigation at a crime scene and is an integral part of criminal investigation procedures and an element of legal evidence. The photographer must be able to use the best photographic techniques to obtain the best results and must be well acquainted with police procedure as well as a good understanding of the Legal system. Digital photography plays an important role in providing evidence. The inherent potential of digital photography makes it highly beneficial, however, for computerization, the practitioner requires a basic understanding of computer technology and standard photography. The appropriate selection and implementation of appropriate photography and computer equipment, combined with the necessary training and the right workflow pattern, is an easily attainable goal involving digital photography in the field of forensics. Nowadays better advantages feature in digital photography is the ISO number, Date and timing, focusing power, high-resolution quality etc, present in the images but as compare to old camera photography this type of advanced features are not available. These types of features are too much useful to our Indian criminal justice system.

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