

*Understanding Forensic Digital Imaging is the first book to address both types of knowledge, offering a comprehensive and thorough approach to the subject of digital imaging, providing the reader with necessary information about the techniques and a solid understanding of the technology.*

Taking pictures is such a normal thing to do that we rarely think about why we are doing it. This is especially true today when cameras are so ubiquitous and easy to use that you can take photos with your cell phone. So why do it? Humans are very good at using these visual clues to resurrect the whole set of feelings and understandings that the photo preserved. This means that the photographer does not really have to be particularly skilled to get photos that will serve the purpose. The amateur photography industry is predicated on these simple facts: Prior to that, in the s, pho- tos were being taken, but the complex nature of the technology at that time limited its use to professional photographers. Photos from the civil war in the United States are still compelling to all who see them, but only Matthew Brady and his colleagues could take pictures back then. But what about before that time: What were the precursors to photo- graphy? Drawings and paintings are the obvious responses. These go back to the Stone Age. Unfortunately they require some skill to produce, and if the individual is not so skilled, an artist has to be hired, so the cost is not CHAPTER 1: Introduction to Forensic Use of Digital Imaging 2 right for everyone. Some of these were no doubt quite rough indeed. Another approach to preserving memories was with verbal descrip- tions. Adding melody made it easier to remember the words and captured additional feelings. When writing came into being, the oral history could be rendered as a written history. These were effective, could be extended over long time periods and distances, and although embellishment was possible, it was not quite as easy as with the oral version. Drawings and pictures could be added easily, and decorations could be put on the pages to reinforce the importance of the material. All these memory-jogging techniques continue to this day. One interesting aspect of the memory jogger is that it generally requires that the reader have a memory to jog. That is, he was there at the time of the original event, can envision a reasonable semblance of that situation, or has heard or seen the story so often that he has a mental image of it even though he was never there. In the world of forensics, some of the factors change. First of all, the memory-jogging mission applies only to the people who were there at the time. For all others, the issue is communication. In this situation, the per- son who was there at the crime scene, the accident scene, or the disaster scene is trying to convey to others what the scene was like, what was there at the time, where those things were in relation to each other, and what con- dition the items were in at the time. The simple internal, emotional glow of the memory jogger assuming a happy event gives way to a more matter- of-fact communication. The photo however will contain much more detail. Moreover, it would not convey the ambiance of the situation nearly as well as a photo. Without a photograph, the effect of the lighting will be gone, the comprehension of the level of general orderliness or confusion will be lost, and the character of any decoration will vanish. The photo conveys the gestalt of the setting, not just a few details. A photo can convey a comprehensive impression of an environment, and since much will depend upon doing this fairly and accurately, the photo- grapher and subsequent image preparer must do their work with more skill 3 than the average amateur to avoid the bias of the freelance storyteller. The photos must be exposed properly to give the viewer a clear impression of what the scene was like at the time. They must show both the relationships among objects as well as detail in key areas. This is usually accomplished by taking establishment shots from some distance away, medium shots to juxtapose selected items accurately, and close-ups to show important details. Finally, it is important to avoid bias. Freelance photographers are often out to tell a story as opposed to present- ing a balanced set of facts. As a result they will carefully compose photos to do just that. For example, if the story involves enforced separations, they will look for some fencing and then position a subject in front of that fence to help the storyline even if the fence in the photo has nothing to do with the separa- tions. If they are seeking to express slovenliness, they may take photos in a workshop or laundry room at some inopportune time. In general, they have a preplanned story to tell and are looking for ways to convey that message. In forensic assignments, the story is probably not known at the time the photos

are taken, and in fact, the photos should be able to play an important part in determining what the true story is. But it must be a fair and accurate story. Then, later, they can be used to help tell that story to a jury or judge. In the typical forensic photography assignment, the timeline is an important issue. They ascertain the nature of the situation, care for any injured people, and at the same time, protect the area from contamination and change. The technicians, including the photographers, will be next on the scene. They have limited time to document the setting as it was found, and to collect samples and items that could be useful in understanding what happened. As they do their work, the scene will start to undergo change, and as they complete their assignment, the rate of change will accelerate. There is no going back. While they are working the crime scene, other investigators are starting to question witnesses. The story will begin to unfold. And later, after a lot of detective work, the story of the situation will start to become clear. This means that the photographers had to do their work without knowing the story their work eventually would help to tell. In most jurisdictions, all the photos taken by the police or crime lab may have to be given to the defense team. So any attempts to bias the story using photos taken before the whole story is known could lead to extremely embarrassing outcomes and the release of a potentially dangerous defendant. The most common purpose for photos is to revive memories, the second is to communicate, and the third is to provide a base for measurements. If the purpose for the photos is to recall memories, no special care is required in taking the photos. If the purpose is to tell a story, a sequence of photos will be needed, and it must be possible for viewers of the images to make the connections among the various shots. If the images will be used for making measurements, great care must be taken to ensure that the intended measurements will be valid. The particulars will vary with the anticipated analytical purposes. In many instances, special analytical tools are used to extract information from photographs. Some tools extract dimensions or colors that are attributable to the item that was photographed. More recently, sets of photos have been used to create three-dimensional renditions of objects. In these situations, great care must be taken to ensure that when the photos were taken close attention was paid to the intended measurement process that would follow. This arises when the object is not visible to the human eye, and therefore, no one actually could have seen the result prior to processing. The subsequent chapters of this book explain the basics of the science supporting the most frequently used tools and techniques in forensic photography. The objective is to make the analyst aware of the principles upon which the tools are based, the limitations associated with those tools, and to some degree, why the tools and techniques are designed the way they are. The chapters at the end of the book describe the applicable law and thereby provide guidance to the analyst as needed as he prepares to deliver testimony regarding the work done and the conclusions drawn. This is generally taken for granted, but in fact a lot of careful design work was required to make the equipment and software suitable for the task. The photographic system employed must capture the optical information from a scene; in most cases this is the visual information. This is the information that a person at the scene would be able to glean visually. Extreme examples of images from nonviewable originals include x-rays, sonograms, PET scans, and nuclear autoradiographs. That is, they can look beyond the photograph and form a mental image of what the original setting was like. Humans see color by virtue of sensor organs in their eyes called cones. These are in the retina on the back, internal wall of the eye. There are three kinds of cones. In addition to cones, there are sensors called rods. The rods and cones actually move back and forth depending on the light level. Outdoors at night we use primarily rod vision and during the day, we use primarily cone vision. Since the three types of cones are sensitive to different portions of the visual spectrum, they respond differently to different colors in the original scene and we are able to determine that color by combining those responses. Rods have a broad response, covering the full spectrum, and so respond the same no matter what the color of the object in the scene. We cannot distinguish colors with pure rod vision. It should be noted that color is a mental construct. The light that we see as yellow is not necessarily a light with a particular wavelength. Roughly equal responses by the red and green cones, and none by the blue cones, will evoke the color yellow. That could be done with some red and some green light, or just a single yellow source. The sensitivities of the red, green, and blue sensitive cones in the human eye are shown normalized to the areas under the curves being equal to one. The sensitivity of the rods is shown with its peak sensitivity set to one. Introduction to Forensic

Use of Digital Imaging 6 A photographic system must be able to respond to scene coloration so that it captures information in a way that can be used to construct an image with proper colorization so that a human can recognize the contents. Once the image information is captured, it must be processed so that it can drive a printer or display device to present a human viewable image. It is easiest to understand the process by skipping to the viewing of the image. The eyes capture information and feed it into the optic nerves, which connect into the occipital lobes. The rods and cones in the eye gather the raw data and the visual system starts to process that data in the ganglion cells in the retina. Light levels, primitive shapes, and early blending of color-response start there and move on into the optic nerve. The partially processed information arrives in the central brain 2 meaning and receives detailed analysis. The brain-resident, ephemeral image is held there pending updates from the early parts of the system.

Chapter 2 : Understanding Forensic Digital Imaging (PDF) | UK education collection

*Understanding Forensic Digital Imaging offers the principles of forensic digital imaging and photography in a manner that is straightforward and easy to digest for the professional and student.*

The digital revolution over the past several decades has advanced every facet of evidence detection, photography, optimization, and interpretation. Forensic scientists and practitioners have benefited tremendously from the move from film to digital. With proper procedures in place, digital images and casework capabilities have increased tremendously in both complexity and range due to a vast array of tools to enhance evidence and photography. *Forensic Digital Image Processing: Optimization of Impression Evidence* provides the forensic investigator with the tools and understanding to extract, optimize, and interpret the maximum evidence possible from crime scenes to increase identifications. The book begins by examining the emergence of forensic digital image processing, and the gradual improvement and acceptance of the science over the past four decades. Coverage includes looking at the issues of image integrity and authentication including forensic image optimization and the manipulation of images. Chapters explore techniques exploiting color theory, modes, and channels to optimize signal-to-noise ratio in images. One of the greatest assets of digital image technology is the ability to combine multiple images of the same subject to create a final, blended image: Later chapters demonstrate image subtraction, focus stacking, and high dynamic range, utilizing images in optimum focus and with substrate interference diminished or removed entirely. The authors look at fast Fourier transform as an optimal tool for noise removal, addressing basic theory and diagnosis of the noise signatures. The book discusses the history of digital imaging techniques and their treatment within the court system. *Optimization of Impression Evidence* serves as an invaluable resource and tool for practicing professionals as well as those new to the field to look at best practices, the latest technology, and advances in utilizing the increasing array of tools of the trade. The ability to work with, and retrieve images, is vital to forensic and criminal case work. During a five-decade-long career, author John C. Russ has taught methods for image processing and measurement to thousands of students. *Forensic Uses of Digital Imaging, Second Edition* distills his classroom and workshop material to present the information most relevant to forensic science. Since the publication of the first edition, there have been many significant changes in technology that have revolutionized the ways digital images are used in forensic investigations. Fully updated, the second edition: Covers the widespread advancements of digital imaging photography and processing Discusses the increased power, storage capacity, and use of digital cameras, laptop computers, tablets, and cell phones in forensic science Gives real-world examples to illustrate comparisons between different processing options Includes hundreds of full-color images that demonstrate technologies and techniques Addresses issues of admissibility of forensic investigation results under Frye and Daubert rules Provides guidelines and suggestions for effectively presenting and explaining results *Forensic Uses of Digital Imaging, Second Edition* explains concepts with minimal jargon, and the methods and tools described in this book can be implemented in a broad spectrum of available computer programs. By demonstrating how these methods can be applied to a variety of images, this book helps readers develop the ability to understand when and how specific techniques should be used. It will be of particular use in casework for practicing photography and imaging police and forensic professionals who need to verify and explain both interpretations and processes to legal professionals, judges, and juries. The images and exercises in the CD-ROM provide practical examples of the techniques described in the book. The utilization of footwear impression evidence continues to evolve with new materials, equipment and techniques, providing an increased ability to detect, record, enhance, and examine this form of evidence. Recently developed technology now allows investigators to more efficiently or, in some cases, instantly link multiple crime scenes where impressions have been produced by the same perpetrator. *Forensic Footwear Evidence* covers a wide range of relevant topics, including historical references, general information about the formation and investigative use of footwear impressions, and the best practices and considerations that apply to the recovery, enhancement, and examination of this evidence. Highlighted topics covered within the book include Three chapters covering footwear manufacturing Shoe

grading, sizing, and the forensic application of sizing information Examination and reporting procedures Casting impressions in snow Barefoot evidence Topics of interest for both prosecution and defense attorneys The book includes more than color photographs and illustrations throughout, as well as case examples that apply theoretical concepts to the real world. A single, complete reference on the subject, Forensic Footwear Evidence presents a wide range wealth of information that will serve as an invaluable reference to novice and experienced examiners, crime scene technicians, investigators, and prosecution and defense counselors alike. Forensic imaging with multidetector computed tomography MDCT and other cross-sectional imaging modalities is a rapidly evolving field. Understanding the pathological basis of disease and death is fundamental to the interpretation of radiologic images. Forming a bridge between these distinct disciplines, Essentials of Forensic Imaging: A Text-Atlas brings the long tradition of radiologic pathologic correlation to forensic radiology and autopsy. Providing readers with a technical and interpretive foundation for applying modern cross-sectional imaging to forensic autopsy, the book integrates more than color autopsy photographs with postmortem MDCT and radiography in a topical format. Organized by cause of death, the rich pictorial display of case material that accompanies the text establishes a contextual understanding. Readers can learn the diagnostic value of imaging applied to forensic autopsy by correlating specific causes of death with their respective forensic and radiologic principles. Causes of death covered in this practical volume include: Gunshot wounds Blunt force injury Fire and burn injury Blast injury Drowning and other deaths in water Suicide Natural causes Asphyxia Electrocutation As forensic imaging becomes more advanced, the possibilities for its use in autopsy continue to grow, as do the opportunities for application in related areas. In the final chapter, these expert authors also discuss the use of MDCT in the assessment of medical intervention, exhumation and second autopsy, and anthropology. From the author of Crime Scene Photography, 2nd Edition, this introductory text serves as a detailed nuts-and-bolts version of its big brother, currently required reading for certification by the IAI Crime Scene Certification Board. Written for those just beginning their educations related to crime scene investigations, Introduction to Crime Scene Photography shares many of the features of the advanced text. This text initiates the novice to all the essentials of basic crime scene photography techniques. And, it provides a smooth transition to the more complicated and advanced techniques found in the larger text. The beginning of the book deals with basic theory and science of photography. This acquaints the reader with knowledge required to take superior photographs using composition, lighting and focus. Then follows photographing the crime scene, including specialty types of photography such as ultraviolet, fluorescence and infrared, going digital, using photos specifically to document bodies, wounds, and other related components to the crime scene. Also included are two chapters on the legal aspects of forensic photography and digital image processing.

### Chapter 3 : Download PDF EPUB Understanding Forensic Digital Imaging - PDF and ePub Download Free

*Summary. Understanding Forensic Digital Imaging offers the principles of forensic digital imaging and photography in a manner that is straightforward and easy to digest for the professional and student.*

### Chapter 4 : Forensic Photography

*Understanding Forensic Digital Imaging offers the principles of forensic digital imaging and photography in a manner that is straightforward and easy to digest for the professional and student. It provides information on how to photograph any setting that may have forensic value, details how to.*

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### Chapter 8 : Understanding Forensic Digital Imaging by Herbert L. Blitzer

*Sonia J. Leerkamp, in Understanding Forensic Digital Imaging, The case above is a simple example. But the use of forensic imaging is becoming more and more diverse. The areas in which imaging is being used include fingerprints, footwear and tire impressions, ballistics, tool marks, accident scenes, crime scene reconstruction, documentation of wounds or injuries, surveillance videos, and.*

### Chapter 9 : understanding forensic digital imaging - TÃ i liá»¸u text

*Founded in as Forensic Digital Imaging, FDI's early work was rooted in professional photographer and founder David Knoerlein's extensive experience in precision forensic photography. FDI has since expanded its scope to include a variety of photographic solutions including field and technical photography, aerial photography, image.*