Preface

Digital forensics deals with the acquisition, preservation, analysis and presentation of electronic data. The detailed documentation and analysis of human data with 3D-imaging and processing techniques has led to qualitative improvements in forensic pathologic investigation and documentation.

In the human genome are a considerable number of genetic variations. Modern DNA techniques apply powerful tools that enable the precise identification. Bioinformatics methods are applied to the analysis of large-scale gene expression data from high-throughput technologies like microarrays. These technologies provide information for thousands of genes in parallel and produce huge amount of data. Data-analysis tools are developed for processing and data mining of this data, and provide insights into complex biological and medical forensic questions.

OBJECTIVE OF THE BOOK

This book provides current applications of digital forensics in health sciences as well as the latest research in this area. The book covers basic concepts, best practices, common techniques, investigative challenges in research. Most important, it also examines the major limitations of current tools and discusses approaches that may help investigators to deal with the ever-increasing size and complexity of forensics targets. These approaches cover a wide spectrum, from imaged-based authentication to high-throughput technologies for forensic analysis.

The target audience of this book will be composed of professionals and researchers working in the field of digital forensics as well as in health sciences.

ORGANIZATION OF THE BOOK

The book is divided into 3 sections:

Section 1, Digital Forensics: Best Practices in Medicine introduces the basic concepts in the use of computational tools in medical forensics. Chapter 1 is an introductory chapter presenting the current tools and future concepts in forensic anthropology. Chapter 2 is focused on the application of laser scanning confocal imaging in forensics. The emphasis of Chapter 3 is on strength and limitations of data hiding techniques applied in medical images. Chapter 4 describes the use of the vertebral morphometry approach in Forensics, and Chapter 5 presents a computed-assisted method in facial reconstruction.
Section 2, Basic Research: A Bridge to Digital Forensics serves as a comprehensive introduction to computational methods supporting basic research. Chapter 6 provides a general overview on technologies applied to analyse gene expression data. Chapter 7 describes methods used for discrimination traces of nucleic acids within a complex mixture of samples. Chapter 8 gives an extended analytical consideration of mathematical modelling in complex networks and Chapter 9 introduces the novel machine learning techniques applied in clinical data processing.


The book Digital Forensics for the Health Sciences: Applications in Practice contains text information, but also a glossary of terms and definitions, contributions from international experts, in-depth analysis of issues, concepts, new trends, and advanced technologies in digital forensics. This edition focuses more directly and extensively than ever on applications of digital forensics in medicine. Because of the diverse and comprehensive coverage of multiple disciplines in the field of medical digital forensics in this book, this book will contribute to a better understanding for current applications, research, and discoveries in this evolving, significant field.

In shaping this book, I committed myself to making the textbook as useful as possible to forensics specialists, clinicians, as well as advanced researchers coping with the demands of modern medical research.

I hope this book will be a helpful tool, not only for the medical doctor who needs an expert source of basic knowledge in digital forensics, but also for the computer scientist and biologist who need clear, concise, and balanced information on which to conduct their research.

Thanks to a very hard-working advisory editorial board of scientists, excellent authors who fulfilled our invitations, and a very efficient publisher providing clear procedures and practices for a quality production, readers may now enjoy chapters on some of the major ideas that have concerned digital forensics and its applications in health sciences.

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REFERENCES