

Preface

INTRODUCTION

Intellectual property protection is a hot issue on the globe in the twenty first century, because the recent expansion of network connectivity to the Internet known as ubiquitous allows people to enjoy a number of contents and software stored in the digital forms which are fragile to unauthorized electric duplication or copyright and/or patent infringement. Institutional protection against digital infringement of multimedia intellectual property has been practically supported by technical solutions to digitally maneuver multimedia contents and software in the Internet. The advent of new solutions in the area of information technology is to allow easy access to the tools for protection against multimedia intellectual property infringement that is negative side effect of innovation in the information industry.

Facing the digital infringement of intellectual property of contents and software, those in the fields of multimedia information engineering and its institutional operations have been aware of a need for a complete reference of past, current and future trends of multimedia intellectual property protection from technological fields to institutional aspects. This book, all twenty one chapters of which have been double-blind reviewed by leading scholars, is to offer a first reference on multimedia intellectual property protection with multidisciplinary intellectual property knowledge and analyses which are given by twenty three leading researchers and practitioners with the technical backgrounds in multimedia information engineering and the legal or institutional experiences in intellectual property practice.

PURPOSE

The principal concern of this book is to provide those in the multimedia information technology and its institutional practice including law and policy with a series of concise and thorough references on a variety of issues of multimedia intellectual property protection and its proper solutions from the technical and legal aspects. We discuss both technical and institutional solutions to protect copyrighted material and patentable software for multimedia intellectual property protection.

The first object of our discussion is digital copyright protection. We study its past, current and future technology: digital watermark and its innovative idea like steganography on digital copyright, and infringement or misappropriation of digital contents and their protection by peer-to-peer technology. The second object of our research is the protection of multimedia databases or digital libraries, and their infringement and counteraction from the point of network security. In the advent of multimedia digital libraries, the protection of their rights as intellectual properties is an urgent issue to offer an instrument for recouping investment in their development. A new scheme for the protection of multimedia digital libraries should be studied. The third object of our research is institutional analysis on multimedia intel-

lectual property protection. It includes information management issues on intellectual property protection of multimedia contents, international intellectual property protection and standardization.

We thoroughly discuss those institutional and technical issues, and provide their solutions on multimedia intellectual property protection from legal to technological analyses. The goal of this book is to design a complete reference in the area of multimedia intellectual property protection which is demanded by those in the areas of law and technology. Already published intellectual property law and business books just discuss institutional analyses without interdisciplinary insights by technical experts. Meanwhile, technical references only talk about engineering solutions without the social impact to institutional protection of multimedia digital information. This book should fill in the gap between law and technology, and to fulfill a great mission under which people in the field of multimedia intellectual property protection discuss all the related issues and their solutions from both institutional and technical aspects.

AUDIENCE

This book is a first guidance or introductory reference to graduate students and students in professional schools, researchers and practitioners in the areas of law and policy, engineering and education, and provides them with mandatory knowledge bases on intellectual property protection of multimedia information engineering. This kind of complete reference has not been available in the previous research publication. The readers may enjoy the brand new aspects of legal analyses of engineering solutions for multimedia intellectual property protection.

The content of the book is also useful to the academia in which those concerned about intellectual property management need to acquire sound techniques for intellectual property protection and fundamental knowledge on intellectual property rights in the frontiers of IT outbursts. Meanwhile, this book works as a technical milestone for research trends of multimedia intellectual property protection engineering in the target of the next ten years. Both practitioners with technical agendas and IT engineers of institutional agendas may appreciate the content of this book with a variety of interdisciplinary topics. Multimedia information engineering or technology per se has not been discussed from any legal or technological aspects. In the previous publications, *both legal and technical aspects* on the multimedia intellectual property protection have not been analyzed in any single titles in the world.

ORGANIZATION AND OVERVIEW OF THE CHAPTERS

The book is organized three sections into twenty-one reviewed chapters with the following major themes:

1. Frameworks
2. Solutions
3. Surveys

Section I is concerned with **Frameworks** on the intellectual property protection.

Chapter I, **Digital Library Protection Using Patent of Retrieval Process**, presents a technical formulation for protecting digital library as intellectual property, especially image digital library. The

chapter identifies an innovative approach for protecting digital library associated with content-based retrieval that dynamically generates indexes to its contents.

Chapter II, **Intellectual Property Rights: From Theory to Practical Implementation**, presents foundational concepts and issues in intellectual property, and examines each IP right with a concise review of recent U.S. legislation and court cases, including the Napster case and the Microsoft antitrust suit.

Chapter III, **Multimedia Encryption Technology for Content Protection**, presents an overview of multimedia content encryption technology with the general encryption algorithms, and introduces the special encryption algorithms.

Chapter IV, **Masking Models and Watermarking: A Discussion on Methods and Effectiveness**, describes the relationship between digital right management (DRM) and Intellectual Property on the watermarking techniques and masking models. The chapter also presents two strategies that make use of a masking model, applied to a classic watermarking technique.

Chapter V, **Damageless Watermark Extraction Using Nonlinear Feature Extraction Scheme Trained on Frequency Domain**, presents a new information hiding and extracting method without embedding any information into the target content by using non-linear feature extraction scheme trained on frequency domain.

Chapter VI, **Perceptual Data Hiding in Still Images**, presents steganography that embeds some information within a digital media, in such a way that the inserted data are intrinsically part of the media itself without affecting the visual quality of the host data, using the mechanisms underlying Human Vision.

Section II is concerned with **Solutions** for the intellectual property protection.

Chapter VII, **Online Personal Data Licensing: Regulating Abuse of Personal Data in Cyberspace**, presents a new technical and legal approach, called online personal data licensing (OPDL), for responding to the concerns about the privacy of personal data. The OPDL enables individuals to concretize their consent to allow others to use their personal data as licenses.

Chapter VII, **Property Protection and User Authentication in IP Networks Through Challenge-Response Mechanisms: Present, Past, and Future Trends**, introduces the basic concepts of authentication explaining their relationship with property protection. The basic functionalities of challenge-response frameworks are presented, together with several applications and the future trends.

Chapter IX, **Q-R Code Combined with Designed Mark**, introduces a method to produce the designed Q-R code and its production system, which allows a cellular phone with the Q-R (Quick Response) code reader function (a two dimensional code developed) to be easily accessed to web-sites.

Chapter X, **Visual Environment for DOM-Based Wrapping and Client-Side Linkage of Web Applications**, introduces a new framework where end-users can wrap remote Web applications into visual components called pads, and functionally combine them together through drag and drop-paste operations by using new media architecture, "IntelligentPad"

Chapter XI, **Symbolic Computation for DS-CDMA Code Acquisition Using First Order Logic**, introduces a formulation of state-space problem of which solution is directed by redundant reasoning control method for semi-heuristic and lightweight DS-CDMA code acquisition.

Chapter XII, **Device Driver Based Computer in Broadband Age**, introduces a device-driver-based computer, which realizes the reduction of mode (domain or vertical) switching overheads between user and kernel mode with innovative attributes including shared-keyboards and mice, access controlled files, and timed files.

Section III is concerned with **Surveys** on the intellectual property protection.

Chapter XIII, **Cultivating Communities Through the Knowledge Commons: The Case of Open Content Licenses**, surveys the communities in the context of the knowledge commons about the structure of open content licenses operating within such domains. The chapter explores licenses as a structure from the concept of the knowledge commons.

Chapter XVI, **E-Commerce and Digital Libraries**, surveys the access control model and system on the electronic commerce in digital library service.

Chapter XV, **Intellectual Property Protection and Standardization**, surveys the standardization strategies to protect intellectual property rights based on a small sample of European companies.

Chapter XVI, **The Performance of Standard Setting Organizations: Using Patent Data for Evaluation**, surveys the technological significance of voluntary standard setting organizations (SSOs) using citations to patents disclosed in the standard setting process.

Chapter XVII, **Patents and Standards in the ICT Sector: Are Submarine Patents a Substantive Problem or a Red Herring?**, surveys the cooperation on standard setting in the Information Communication Technology sector.

Chapter XVIII, **Legal Protection of the Web Page as a Database**, surveys legal issues on the institutional protection of intellectual property related to the WebPages from the points of database protection. The chapter identifies each component of database that is found in individual web page, and presents legislative concerns on databases.

Chapter XIX, **Steganography and Steganalysis**, surveys steganography in the context of security threat and discusses steganalysis.

Chapter XX, **Intellectual Property Protection in Multimedia Grids**, surveys the legal issues on the Grid computing environments and multimedia content transactions with immense volume of multimedia content from the point of computing resource.

Chapter XXI, **Secure Image Archiving Using Novel Digital Watermarking Techniques**, surveys and introduces secure image archiving techniques using novel digital watermarking techniques.

USE AS A COURSE TEXT

This book is designed to offer a reference in the communities on multimedia information technology and intellectual property studies. The main target of prospective academic audience is graduate students who study information studies, management of information technology, library science, computer science, information engineering, system engineering. Another target is students who work for professional degrees in business schools, management schools, MOT programs, public policy schools, law schools, or their equivalents. The book has twenty one chapters, which are materials for assignment in class at junior or senior engineering of the undergraduate lectures, and master-level graduate schools of management, or law schools. Lectures may commence with all the chapters in the Section I, and select some chapters from the Section II and/or III to complete one semester.

The other target is not a small number of practitioners including lawyers who counsel to IT companies as in-house counsels or at firms, chief information officers (CIOs), chief technology officers (CTOs) and chief risk management officers (CROs) in enterprises and the consultants in those related fields. Not the last but an important part of prospective audience is found in a large number of intellectual property related staff or administrators in universities and librarians. Instructors of business administration programs and information management curricula may follow the above instructions in their classes.