



# **DATA HIDING FUNDAMENTALS AND APPLICATIONS**

**Content Security in Digital Multimedia**

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**Mahalingam Ramkumar**

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# Data Hiding Fundamentals And Applications

## Data Hiding Fundamentals And Applications

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## **Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications:**

**Data Hiding Fundamentals and Applications** Husrev T. Sencar,Mahalingam Ramkumar,Ali N. Akansu,2004-08-20

Multimedia technologies are becoming more sophisticated enabling the Internet to accommodate a rapidly growing audience with a full range of services and efficient delivery methods Although the Internet now puts communication education commerce and socialization at our finger tips its rapid growth has raised some weighty security concerns with respect to multimedia content The owners of this content face enormous challenges in safeguarding their intellectual property while still exploiting the Internet as an important resource for commerce Data Hiding Fundamentals and Applications focuses on the theory and state of the art applications of content security and data hiding in digital multimedia One of the pillars of content security solutions is the imperceptible insertion of information into multimedia data for security purposes the idea is that this inserted information will allow detection of unauthorized usage Provides a theoretical framework for data hiding in a signal processing context Realistic applications in secure multimedia delivery Compression robust data hiding Data hiding for proof of ownership WATERMARKING Data hiding algorithms for image and video watermarking     *SOME*

**INVESTIGATIONS ON STEGANOGRAPHY TECHNIQUES** Dr. V. Nagaraj,2021-05-20 Steganography is the art of hiding and transmitting data through apparently innocuous carriers in an effort to conceal the existence of the secret data The Least Significant Bit LSB steganography that replaces the least significant bits of the host medium is a widely used technique with low computational complexity and high insertion capacity Although it has good perceptual transparency it is vulnerable to steganalysis which is based on statistical analysis Many other steganography algorithms have been developed such as Discrete Cosine Transform DCT Discrete Wavelet Transform DWT and Spread Spectrum Embedding But the insertion capacities for all the above methods were not satisfied Therefore developing new steganography algorithms against statistical analysis seems to be the prime requirement in steganography The LSB insertion method is the most common and easiest method for embedding messages in an image with high capacity However it is detectable by statistical analysis such as RS and Chisquare analysis Hence researchers are still in look out for steganography techniques with enhanced insertion capacity of secret data along with greater security and which can resist attacks In this work in order to enhance the embedding capacity of secret data four techniques for secret communication have been proposed They are classified into two categories In first category cryptography is used along with steganography to enhance the security while in second category only steganography is used In the first category two improved LSB substitution techniques have been proposed The first technique is known as Zigzag Modulo Substitution Method in which embedding locations are Sequence based The second technique is known as Random Modulo Substitution Method using Random Technique in LSB Steganography and user key based LSB substitution steganography for RGB images where in RSA algorithm is used for encryption The techniques under the first category are exclusively LSB array based The first LSB array based technique embeds message bits into LSB arrays

of cover image by using zigzag scanning On the other hand the Random Modulo Substitution Method embeds secret data into the different locations of cover image by using pseudo random index generator Moreover both these LSB array based techniques use RSA algorithm to enhance security Histogram and Statistical analysis performed on the stego image proved that the proposed techniques can effectively resist steganalysis Comparison of the statistical parameters like Root Mean Square RMS Peak Signal to Noise Ratio PSNR and Structural Similarity Index Matrix SSIM for the proposed techniques with cover image and stego image was carried out and analyzed The Second category includes pixel value modification method and pixel value differencing method in which the embedding decision for a target pixel is taken by random technique Data hiding by using pixel value modification with modulus function in color images guarantees that no pixel value will exceed the range 0 to 255 in stego image In the existing PVD embedding methods only one secret digit was embedded for two consecutive pixels but the proposed method embeds one secret digit in only one pixel Proposed method on color images gives more capacity and security than the PVD methods It also provides better visual quality of stego image Moreover proposed method extracts the hidden secret message efficiently without using the range tables In existing steganography algorithms like Pixel Value Differencing PVD methods the secret data are embedded into the differences of adjacent pixels This pair wise modification mechanism in cover image increases the histogram distortion

### **Aspects of Network and Information**

**Security** E. Kranakis,E. Haroutunian,E. Shahbazian,2008-06-24 Understanding network vulnerabilities in order to protect networks from external and internal threats is vital to the world's economy and should be given the highest priority This volume discusses topics such as network security information security and coding

Multimedia Security Handbook Borko Furht,Darko Kirovski,2004-12-28 Intellectual property owners who exploit new ways of reproducing distributing and marketing their creations digitally must also protect them from piracy Multimedia Security Handbook addresses multiple issues related to the protection of digital media including audio image and video content This volume examines leading edge multimedia security

**Handbook of Communications Security** F. Garzia,2013 Communications represent a strategic sector for privacy protection and for personal company national and international security The interception damage or loss of information during communication can generate material and non material economic damages from both a personal and collective point of view The purpose of this book is to give the reader information relating to all aspects of communications security beginning at the base ideas and building to reach the most advanced and updated concepts The book will be of interest to integrated system designers telecommunication designers system engineers system analysts security managers technicians intelligence personnel security personnel police army private investigators scientists graduate and postgraduate students and anyone that needs to communicate in a secure way

**Leveraging Emerging Technologies and Analytics for Empowering Humanity, Vol. 1** D P Goyal,Suprateek Sarker,Somnath Mukhopadhyay,Basav Roychoudhury,Parijat Upadhyay,Pradeep Kumar Dadabada,2025-05-15 This book provides a platform for interdisciplinary discussions on leveraging

emerging technologies and analytics to empower humanity fostering collaboration between experts in AI and analytics sustainability different areas of management and IT As the world grapples with complex challenges from climate change to economic inequality this first volume of a two volume proceedings series is a crucial resource for fostering collaboration and exploring untapped potential of emerging technologies By harnessing the power of AI blockchain IoT and big data the chapters address critical global challenges towards improving quality of life and promoting inclusive and sustainable development while keeping in mind ethical implications and their impact on social justice The volume will be of use to thought leaders researchers innovators and policymakers from around the globe who are interested in knowing more on how cutting edge technologies can be harnessed for the greater good of society

*Digital Media Steganography* Mahmoud Hassaballah,2020-06-27 The common use of the Internet and cloud services in transmission of large amounts of data over open networks and insecure channels exposes that private and secret data to serious situations Ensuring the information transmission over the Internet is safe and secure has become crucial consequently information security has become one of the most important issues of human communities because of increased data transmission over social networks *Digital Media Steganography Principles Algorithms and Advances* covers fundamental theories and algorithms for practical design while providing a comprehensive overview of the most advanced methodologies and modern techniques in the field of steganography The topics covered present a collection of high quality research works written in a simple manner by world renowned leaders in the field dealing with specific research problems It presents the state of the art as well as the most recent trends in digital media steganography Covers fundamental theories and algorithms for practical design which form the basis of modern digital media steganography Provides new theoretical breakthroughs and a number of modern techniques in steganography Presents the latest advances in digital media steganography such as using deep learning and artificial neural network as well as Quantum Steganography

*Hybrid Intelligent Systems* Ajith Abraham,Shishir K. Shandilya,Laura Garcia-Hernandez,Maria Leonilde Varela,2020-08-12 This book highlights the recent research on hybrid intelligent systems and their various practical applications It presents 34 selected papers from the 18th International Conference on Hybrid Intelligent Systems HIS 2019 and 9 papers from the 15th International Conference on Information Assurance and Security IAS 2019 which was held at VIT Bhopal University India from December 10 to 12 2019 A premier conference in the field of artificial intelligence HIS IAS 2019 brought together researchers engineers and practitioners whose work involves intelligent systems network security and their applications in industry Including contributions by authors from 20 countries the book offers a valuable reference guide for all researchers students and practitioners in the fields of Computer Science and Engineering **Information Hiding in Communication Networks** Wojciech Mazurczyk,Steffen Wendzel,Sebastian Zander,Amir Houmansadr,Krzysztof Szczypiorski,2016-02-09 Describes Information Hiding in communication networks and highlights their important issues challenges trends and applications Highlights development

trends and potential future directions of Information Hiding Introduces a new classification and taxonomy for modern data hiding techniques Presents different types of network steganography mechanisms Introduces several example applications of information hiding in communication networks including some recent covert communication techniques in popular Internet services

**Intelligent Multimedia Data Hiding** Hsiang-Cheh Huang,Wai-Chi Fang,2007-04-25 This book lays out all the latest research in the area of multimedia data hiding The book introduces multimedia signal processing and information hiding techniques It includes multimedia representation digital watermarking fundamentals and requirements of watermarking It moves on to cover the recent advances in multimedia signal processing before presenting information hiding techniques including steganography secret sharing and watermarking The final part of this book includes practical applications of intelligent multimedia signal processing and data hiding systems

**3D Object Processing** Jean-Luc Dugelay,Atilla Baskurt,Mohamed Daoudi,2008-06-03 The arrival and continuing evolution of high quality 3D objects has been made possible by recent progress in 3D scanner acquisition and 3D graphics rendering With this increasing quality comes a corresponding increase in the size and complexity of the data files and the necessity for advances in compression techniques Effective indexing to facilitate the retrieval of the 3D data is then required to efficiently store search and recapture the objects that have been compressed The application of 3D images in fields such as communications medicine and the military also calls for copyright protection or watermarking to secure the data for transmission Written by expert contributors this timely text brings together the three important and complementary topics of compression retrieval and watermarking techniques for 3D objects 3D object processing applications are developing rapidly and this book tackles the challenges and opportunities presented focusing on the secure transmission sharing and searching of 3D objects on networks and includes an introduction to the commonly used 3D representation schemes the characteristics advantages and limitations of polygonal meshes surface based models and volumetric models 3D compression techniques the 3D coding and decoding schemes for reducing the size of 3D data to reduce transmission time and minimize distortion state of the art responses to the intrinsic challenges of building a 3D model search engine considering view based structural and full 3D approaches watermarking techniques for ensuring intellectual property protection and content security without altering the visual quality of the 3D object 3D Object Processing Compression Indexing and Watermarking is an invaluable resource for graduate students and researchers working in signal and image processing computer aided design animation and imaging systems Practising engineers who want to expand their knowledge of 3D video objects including data compression indexing security and copyrighting of information will also find this book of great use

**Coding and Data Hiding for Multimedia** Bin Zhu,1999

**Proceedings** ,2005 *Digital Watermarking and Steganography* Frank Y. Shih,2008 In addition to providing students researchers and other professionals with mechanical information regarding digital watermarking and steganography this work also provides them with the framework needed to develop extensive advanced algorithms It shows how robust high

capacity watermarking techniques can be successfully used to enlarge the hiding capacity while maintaining the robustness of the watermark. Several robust algorithms are presented to illustrate the framework and provide assistance in understanding and implementing fundamental principles. Alternatives to traditional strategies are presented. The principles taught are illustrated with plentiful graphs and examples in order to simplify the problems and make highly complicated theories readily understandable.

Information Hiding, Proceedings, 2005      **Fundamentals of Information Studies**

June Lester, Wallace C. Koehler, 2007. Lester and Koehler have vastly revised and expanded this brand new edition of the first textbook geared towards undergraduate information studies to approach the field from a multidisciplinary perspective. The book's fourteen chapters begin with The Impact of Information in Society and Fundamental Concepts of Information look at The Information Professions and The Impact of Information Cultures and Societies and conclude with Information Ethics and Information Futures information technology. Every chapter has been thoroughly updated and revised. Expansions include two whole new chapters one on user behavior and the second on information power and society. Five other chapters have been substantially expanded. In addition the authors have added two new features. A Learning Guide precedes each chapter and an Information Idea draws attention to the application of the

Library Journal, 2005      Transactions on Data Hiding and Multimedia Security, 2006      Library Journal Melvil Dewey, Richard Rogers Bowker, L. Pylodet, Charles Ammi Cutter, Bertine Emma Weston, Karl Brown, Helen E. Wessells, 2005. Includes beginning Sept 15 1954 and on the 15th of each month Sept May a special section School library journal ISSN 0000 0035 called Junior libraries 1954 May 1961. Also issued separately

Software Engineering Fundamentals Ali Behforooz, Frederick J. Hudson, 1996. Software Engineering Fundamentals provides a comprehensive overview of software engineering and its process builds on experience drawn from actual practice and guides engineering students towards a better understanding of various disciplines tasks and specialities that contribute to the development of a software product. Intended for both students and professionals the text follows the full software development life cycle including a thorough coverage of methods tools principles and guidelines. Software Engineering Fundamentals is unique in its coverage of such topics as software metrics real time software design quality assurance reliability risk management cost and schedule estimation sizing planning test and integration process technical management and human factors. It establishes the concept of software development as an engineering process and software as an engineered product and describes software development as a team oriented activity usually conducted in a system development setting. The notion of using software metrics attributes to measure properties of the software product as a means to evaluate and control the development process is introduced. Software metrics are presented as a management tool and the software development process is described using an accepted review and documentation structure as an outline. Many interim products of the software engineering process are described in enough detail to permit the reader to produce a credible draft of these products. While encouraging the use of modeling techniques for sizing cost and schedule estimation

reliability risk assessment and real time design the authors emphasize the need to calibrate models with actual data. Explicit guidance is provided for virtually every task that a software engineer may be assigned and realistic case studies and examples are used extensively to reinforce the topics presented. Software Engineering Fundamentals presents a unique blend of practical and theoretical treatment of software engineering topics for students and professional use.

The book delves into Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications. Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications is an essential topic that must be grasped by everyone, from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications, encompassing both the fundamentals and more intricate discussions.

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6. In chapter 5, this book will draw a conclusion about Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications. The final chapter will summarize the key points that have been discussed throughout the book.

The book is crafted in an easy-to-understand language and is complemented by engaging illustrations. This book is highly recommended for anyone seeking to gain a comprehensive understanding of Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications.

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## **Table of Contents Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications**

1. Understanding the eBook Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications
  - The Rise of Digital Reading Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications
  - Advantages of eBooks Over Traditional Books
2. Identifying Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications
  - User-Friendly Interface
4. Exploring eBook Recommendations from Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications
  - Personalized Recommendations
  - Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications User Reviews and Ratings
  - Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications and Bestseller Lists
5. Accessing Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications Free and Paid

### eBooks

- Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications Public Domain eBooks
- Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications eBook Subscription Services
- Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications Budget-Friendly Options

### 6. Navigating Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications eBook Formats

- ePUB, PDF, MOBI, and More
- Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications Compatibility with Devices
- Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications Enhanced eBook Features

### 7. Enhancing Your Reading Experience

- Adjustable Fonts and Text Sizes of Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications
- Highlighting and Note-Taking Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications
- Interactive Elements Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications

### 8. Staying Engaged with Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications

- Joining Online Reading Communities
- Participating in Virtual Book Clubs
- Following Authors and Publishers Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications

### 9. Balancing eBooks and Physical Books Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications

- Benefits of a Digital Library
- Creating a Diverse Reading Collection Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications

### 10. Overcoming Reading Challenges

- Dealing with Digital Eye Strain

## **Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications**

---

- Minimizing Distractions
- Managing Screen Time

11. Cultivating a Reading Routine Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications

- Setting Reading Goals Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications
- Carving Out Dedicated Reading Time

12. Sourcing Reliable Information of Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications

- Fact-Checking eBook Content of Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications
- Distinguishing Credible Sources

13. Promoting Lifelong Learning

- Utilizing eBooks for Skill Development
- Exploring Educational eBooks

14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

## **Data Hiding Fundamentals And Applications Data Hiding Fundamentals And Applications Introduction**

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