

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Alfred Kobsa

University of California, Irvine, CA, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

University of Dortmund, Germany

Madhu Sudan

Massachusetts Institute of Technology, MA, USA

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Kaushal Solanki Kenneth Sullivan
Upamanyu Madhow (Eds.)

Information Hiding

10th International Workshop, IH 2008
Santa Barbara, CA, USA, May 19-21, 2008
Revised Selected Papers

Volume Editors

Kaushal Solanki
Kenneth Sullivan
Mayachitra Inc.
5266 Hollister Avenue, Suite 229
Santa Barbara, CA 93111, USA
E-mail: {solanki, sullivan}@mayachitra.com

Upamanyu Madhow
University of California
Department of Electrical and Computer Engineering
Santa Barbara 93106, USA
E-mail: madhow@ece.ucsb.edu

Library of Congress Control Number: 2008938111

CR Subject Classification (1998): E.3, K.6.5, K.4.1, K.5.1, D.4.6, E.4, C.2, H.4.3, H.3

LNCS Sublibrary: SL 4 – Security and Cryptology

ISSN 0302-9743
ISBN-10 3-540-88960-4 Springer Berlin Heidelberg New York
ISBN-13 978-3-540-88960-1 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media

springer.com

© Springer-Verlag Berlin Heidelberg 2008
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 12550937 06/3180 5 4 3 2 1 0

Preface

It is our great pleasure to present this volume of the proceedings of the 10th edition of Information Hiding (IH 2008). The conference was held in Santa Barbara - the American Riviera, California, USA, during May 19–21, 2008. It was organized by three Santa Barbarans on fire, from both industry (Mayachitra) and academia (UCSB).

Over the years, Information Hiding (IH) has established itself as a premier forum for presenting research covering various aspects of information hiding. Continuing the tradition, this year, we provide a balanced program including topics such as anonymity and privacy, forensics, steganography, watermarking, fingerprinting, other hiding domains, and novel applications. We received a total of 64 papers from all over the globe, and would like to take this opportunity to thank all the authors who submitted their paper to IH 2008 and thus contributed to the consolidation of the reputation of the conference. The papers were refereed by at least three reviewers who provided detailed comments, which was followed by discussion amongst the Program Committee members. Only 25 papers were selected for presentation. This rigorous review process will certainly strengthen Information Hiding's position as the top forum of our community.

We would like to thank all the members of the Program Committee and all the external reviewers for the enormous amount of effort that they put into the review process. We thank Mary Jo Comer from Santa Barbara Travel for her help in all the arrangements throughout the process. We are thankful to the volunteers from UCSB whose tireless efforts were crucial in making this event successful. Finally, we are extremely grateful to our sponsors, MovieLabs, Thomson, and VRL-UCSB, for their valuable support to the conference, and to INRIA for passing on the leftover funds from IH 2007.

We hope that you will enjoy reading these proceedings and find inspiration for your future research.

May 2008

Kaushal Solanki
Kenneth Sullivan
Upamanyu Madhow

Volunteers

Lakshmanan Nataraj
Sandeep Bhat

Malavika Bhaskaranand
Vivekanandan N.

R. Pravin Kumar
Vivek Kankanhalli

External Reviewers

Giacomo Cancelli
Alessandro Piva
Wei-Jen Li

Qiming Li
Ben Zhao
Andrew Ker

Ryutarou Ohbuchi
Victor Raskin
Roberto Caldelli

Sponsoring Institutions

Motion Pictures Laboratories, Inc., USA
Thomson, USA
Lecture Notes in Computer Science (LNCS)
Vision Research Lab, UCSB, USA
INRIA , France

Table of Contents

Anonymity and Privacy

A Display Technique for Preventing Electromagnetic Eavesdropping Using Color Mixture Characteristic of Human Eyes	1
<i>Takashi Watanabe, Hiroto Nagayoshi, and Hiroshi Sako</i>	
Hiding a Needle in a Haystack Using Negative Databases	15
<i>Fernando Esponda</i>	
Information Leakage in Optimal Anonymized and Diversified Data	30
<i>Chengfang Fang and Ee-Chien Chang</i>	

Steganography I

Perturbation Hiding and the Batch Steganography Problem	45
<i>Andrew D. Ker</i>	
Maximizing Steganographic Embedding Efficiency by Combining Hamming Codes and Wet Paper Codes	60
<i>Weiming Zhang, Xinpeng Zhang, and Shuozhong Wang</i>	

Forensics

Detecting Re-projected Video	72
<i>Weihong Wang and Hanj Farid</i>	
Residual Information of Redacted Images Hidden in the Compression Artifacts	87
<i>Nicholas Zhong-Yang Ho and Ee-Chien Chang</i>	

Novel Technologies/Applications

Trusted Integrated Circuits: A Nondestructive Hidden Characteristics Extraction Approach	102
<i>Yousra Alkabani, Farinaz Koushanfar, Negar Kiyavash, and Miodrag Potkonjak</i>	
Reversible Watermarking with Subliminal Channel	118
<i>Xianfeng Zhao and Ning Li</i>	

Watermarking I

Watermarking Security Incorporating Natural Scene Statistics	132
<i>Jiangqun Ni, Rongyue Zhang, Chen Fang, Jiwu Huang, Chuntao Wang, and Hyoung-Joong Kim</i>	

Block-Chain Based Fragile Watermarking Scheme with Superior Localization 147
Hong-Jie He, Jia-Shu Zhang, and Heng-Ming Tai

Steganalysis

Generic Adoption of Spatial Steganalysis to Transformed Domain 161
Andreas Westfeld

Weighted Stego-Image Steganalysis for JPEG Covers 178
Rainer Böhme

Practical Insecurity for Effective Steganalysis 195
Johann Barbier and Stéphanie Alt

Other hiding Domains I

Authorship Proof for Textual Document 209
J. Wu and D.R. Stinson

Linguistic Steganography Detection Using Statistical Characteristics of Correlations between Words 224
Zhili Chen, Liusheng Huang, Zhenshan Yu, Wei Yang, Lingjun Li, Xueling Zheng, and Xinxin Zhao

Steganography II

A Data Mapping Method for Steganography and Its Application to Images 236
Hao-tian Wu, Jean-Luc Dugelay, and Yiu-ming Cheung

Benchmarking for Steganography 251
Tomáš Pevný and Jessica Fridrich

Other Hiding Domains II and Network Security

Other Hiding Domains

Information Hiding through Variance of the Parametric Orientation Underlying a B-rep Face 268
Csaba Salamon, Jonathan Corney, and James Ritchie

A Supraliminal Channel in a Videoconferencing Application 283
Scott Craver, Enping Li, Jun Yu, and Idris Atakli

Network Security

C-Mix: A Lightweight Anonymous Routing Approach 294
Vinayak Kandiah, Dijiang Huang, and Harsh Kapoor

Watermarking II

Strengthening QIM-Based Watermarking by Non-uniform Discrete Cosine Transform	309
<i>Xianfeng Zhao, Bingbing Xia, and Yi Deng</i>	

Distortion Optimization of Model-Based Secure Embedding Schemes for Data-Hiding	325
<i>Benjamin Mathon, Patrick Bas, François Cayre, and Fernando Pérez-González</i>	

Fingerprinting

On the Design and Optimization of Tardos Probabilistic Fingerprinting Codes	341
<i>Teddy Furon, Arnaud Guyader, and Frédéric Cérrou</i>	

Iterative Detection Method for CDMA-Based Fingerprinting Scheme ...	357
<i>Minoru Kuribayashi and Masakatu Morii</i>	

Author Index	373
---------------------------	-----