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# Digital Watermarking

Third International Workshop, IWDW 2004  
Seoul, South Korea, October 30 - November 1, 2004  
Revised Selected Papers

## Volume Editors

Ingemar J. Cox  
University College London  
Department of Computer Science &  
Department of Electronic and Electrical Engineering, UK  
E-mail: ingemar@ieee.org

Ton Kalker  
Hewlett-Packard Lab.  
Multimedia Communications & Networking Department  
1501 Page Mill Road, Palo Alto, CA 94305, USA  
E-mail: Ton.Kalker@hp.com

Heung-Kyu Lee  
KAIST, Department of EECS  
373-1 Gusong-Dong, Yusong-Gu, Daejeon, South Korea, 305-701  
E-mail: hklee@mmc.kaist.ac.kr

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# Preface

We are happy to present to you the proceedings of the 3rd International Workshop on Digital Watermarking, IWDW 2004. Since its modern reappearance in the academic community in the early 1990s, great progress has been made in understanding both the capabilities and the weaknesses of digital watermarking.

On the theoretical side, we all are now well aware of the fact that digital watermarking is best viewed as a form of communication using side information. In the case of digital watermarking the side information in question is the document to be watermarked. This insight has led to a better understanding of the limits of the capacity and robustness of digital watermarking algorithms. It has also led to new and improved watermarking algorithms, both in terms of capacity and imperceptibility. Similarly, the role of human perception, and models thereof, has been greatly enhanced in the study and design of digital watermarking algorithms and systems.

On the practical side, applications of watermarking are not yet abundant. The original euphoria on the role of digital watermarking in copy protection and copyright protection has not resulted in widespread use in practical systems. With hindsight, a number of reasons can be given for this lack of practical applications.

We now know that watermark imperceptibility cannot be equated to watermark security. An information signal that cannot be perceived by the human sensory system is not necessarily undetectable to well-designed software and hardware systems. The existence of watermark readers bears proof of this observation. Designing watermarking methods that are robust to intentional and targeted attacks has turned out to be an extremely difficult task. Improved watermarking methods face more intelligent attacks. More intelligent attacks face improved watermarking methods. This cycle of improved attacks and counterattacks is still ongoing, and we do not foresee it ending soon.

It was the goal of IWDW 2004 to update the scientific and content-owner communities on the state of the art in digital watermarking. To that end, more than 60 submissions to IWDW 2004 were carefully reviewed, with at least three reviewers each. Emphasizing high quality and the state of the art, fewer than 50% of the submitted papers were selected for oral presentation. The topics that were addressed in the accepted papers cover all the relevant aspects of digital watermarking: theoreticals modeling, robustness, capacity, imperceptibility and the human perceptual system, security and attacks, steganography, methods, and watermarking systems. Every effort was made to give the authors the best possible podium to present their findings.

We hope that you enjoy the workshop proceedings and find it an inspiration for your future research.

October 2004

Ingemar J. Cox  
Ton Kalker  
Heung Kyu Lee

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