

Preface

Welcome to the first edition of the book “Embedded Multimedia Security Systems: Algorithms and Architectures”. The main objective behind this book is NOT to serve as a textbook or a book which gives readers a thorough understanding of security approaches in embedded multimedia systems. Rather, our goal is to stimulate creative thinking in the readers to come up with newer schemes for video encryption problems.

This book gives the perspective that architecture, coding (compression) and encryption can be viewed together. Instead of designing a compression and an encryption algorithm separately and then fitting it into a target architecture, we can make a complete design altogether. Some food for thought is given to the readers in the form of research articles in this book, but we hope that the readers will take the frontiers beyond what has been presented here.

Part one of this book gives a brief introduction to the security and encryption approaches in existing literature, as well as motivation of the joint approach for compression and encryption. The second example gives more concrete examples of how to do this, in a modular way, by augmenting encryption to video compression blocks. Polymorphic Wavelet Transform discusses a hardware architecture which can be modified at run-time to suit the needs of application and requires much less computing resources, all with the help of novel signal processing approach designed to suit the hardware requirements. Secure Wavelet Transform is an architecture that uses wavelet transform stage for encryption, and then optimizes the implementation for hardware. Chaotic Filter Banks introduce the idea of chaotic maps to wavelet filter banks for encryption. Chaotic Arithmetic Coding is presented as an interpretation of chaotic maps to replace the existing arithmetic coding scheme.

Intended Audience

This book is suitable for advanced undergraduates and first-year graduate students in computer science, computer engineering and electrical engineering majors, and

for students in other disciplines who are interested to study the marriage of multimedia (video) coding, encryption and hardware implementation. The book will also be useful for many professionals, like software firmware/algorithm engineers, hardware engineers, chip and system architects, technical marketing professionals and researchers in multimedia, communication, security, semiconductor, and computer industries.

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<http://www.springer.com/978-1-4471-4458-8>

Embedded Multimedia Security Systems
Algorithms and Architectures

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2013, XVIII, 146 p., Hardcover

ISBN: 978-1-4471-4458-8