

Full Module Description, 2006/07

Module Title

Introduction to Multimedia Security

Module Provider (AoU):	Computing	Subject (3 letters):	CSM24
Level:	M	Number of Credits:	15
Module Co-ordinator:	Prof Anthony TS Ho		

Module Availability

Assessment Pattern

Unit(s) of Assessment	Weighting Towards Module Mark(%)
2 hour unseen examination	60%
Coursework	40%
Project/Exercise A – 20%	
Project/Exercise B – 20%	
Qualifying Condition(s) A weighted aggregate mark of 50% is required to pass the module	

Pre-requisite/Co-requisites

None

Module Overview

With the tremendous growth of the Internet and computer technologies, and the wide usage of multimedia content such as audio, image and video data, the protection and authentication of multimedia content is becoming increasingly important to industry and government sectors, as well as for individual personal usage. Moreover, recent terrorist events such as 9/11 and London bombings further highlight the necessity of information security technologies that can be applied to detect covert communication, such as steganography (data hiding) and cryptography, as well as deploying multimodal biometric techniques that can be used to accurately identify faked passports at airports and border checkpoints. Protection of ownership and authentication of multimedia contents and documents are also attracted significant attention in the digital arena through the application of digital watermarking and digital rights management technologies.

This module will provide an introductory background to various digital security technologies currently used in different applications for multimedia content and documents. The knowledge gained in this module will also serve as a pre-requisite for students to attend the more advanced modules in Security Technologies and Applications.

Module Aims

The main aim of this module is to provide students with a good working knowledge on the basic background relating to multimedia security technologies for multimedia content currently available in the digital arena. These technologies include digital steganography and its counter-measure, steganalysis, watermarking and authentication, data encryption, network security and biometric identification. Many of these technologies are now being combined to form complementary technologies to enhance their performance in terms of detection/identification accuracy such as multimodal biometrics with face, fingerprint and iris pattern recognition. There will be coursework/exercises involved to provide the students some practical hands-on programming experience on the implementation of a simple digital watermarking system.

Learning Outcomes

By the end of the module, students should be able to:

- Describe in detail the basic concept of digital steganography and steganalysis
- Evaluate different digital watermarking systems for copyright protection and authentication applications
- Describe in detail the methods for multimodal biometric identification using face photographs, fingerprints and iris patterns
- Describe the fundamental concept of data encryption algorithms
- Describe the concept of network/communication security

Module Content

The module is divided into the following areas:

- Digital steganography, steganalysis and detection techniques for images
- Digital watermarking, authentication and recovery techniques:
 - Robust watermark
 - Fragile watermark
 - Semi-fragile watermark
- Multimodal biometric identification systems
 - Facial recognition
 - Iris pattern
 - Fingerprint
- Data encryption
- Communication/network security

Methods of Teaching/Learning

30 contact hours in weeks 1-10, consisting of:

- 24 hours of lecture and example classes
- 6 hours of lab sessions

Selected Texts/Journals

Cox, I.J., Miller, M.L., Bloom, J.A. (2002), **Digital Watermarking**, Morgan Kaufmann Series in Multimedia Information and Systems

Pfleeger, C. & Pfleeger, S. (2003), **Security in Computing**, Prentice Hall

Bishop, M. (2004), **Introduction to computer Security**, Addison-Wesley

Bolle, R.M., Connell, J.H., Pankanti, S., Ratha, N.K., Senior, A.W. (2004), **Guide to Biometrics**, Springer Professional Computing

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