

ECE 1518 Seminar in Identity, Privacy and Security

Fall 2010

Course outline

Instructor

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Overview

This interdisciplinary course examines issues of identity, privacy and security from a range of technological, policy and scientific perspectives, highlighting the relationships, overlaps, tensions, tradeoffs and synergies between them. Topics include: Introduction to important biometric security technologies and policies, biometric modalities and applications, biometrics identity analysis and privacy considerations.

Textbook No specific text will be assigned. Class Notes will be posted online.

Recommended references

- ◆ N. V. Boulgouris, K.N. Plataniotis, E. Micheli-Tzanakou, **Biometrics: Theory, Methods & Applications**, IEEE Press, 2009.
- ◆ D. Petrovska - Delacretaz, G. Chollet, B. Dorizzi, **Guide to Biometric Reference Systems and Performance Evaluation**, Springer,Verlag, 2009.
- ◆ A.K. Jain, P. Flynn, A.A. Ross, **Handbook of Biometrics**, Springer Verlag, 2008.
- ◆ J. Wayman, A.K. Jain, D. Maltoni, D. Maio, **Biometric Systems: Technology, Design & Performance Evaluation**, Springer Verlag, 2004.

Place & Time Monday 4.00 pm - 7.00 pm (starting Monday, September 13th, 2010)

Office hours By appointment

Composition of Final Mark

Common Projects: 30%

Four common projects will be assigned and are to be completed until October 25th 2010. The common projects will have the form of a laboratory experiment, and a report is required.

Mark breakdown:

2.5% Procedure

5% Report

Total : 7.5% x 4 = 30%

Individual Projects: 70%

A project will be assigned or chosen by November 8th 2010. Students are expected to make a presentation on their approach and methodology in addressing the project tasks, during the last two lectures. Interactive discussion and feedback from the class is expected. Interim project reports are due November 22nd 2010. Final project reports are due December 15th 2010.

Mark breakdown:

10% Project proposal

10% Interim Report

20% Final Report

30% Project Presentation

Total: 70%

Tentative Course schedule

September	13 th	Introduction to Biometric Systems	Applications, Common modalities, System modeling, Modes of operation, Accuracy and error measures, Operational evaluation
	20 th	Iris recognition	Iris structure and properties, Advantages and challenges, Image acquisition, Iris localization/ segmentation, Iris unwrapping, Iris code
	27 th	Gait Recognition	Applications, Databases and recognition challenges, Appearance based methods, Model based methods, Anthropometric signatures <i>Deadline for common project report.</i>
October	4 th	Face Recognition	FR challenges, Face detection, Feature based methods, Appearance based methods, State of the art performance, Biometric Encryption <i>Deadline for common project report.</i>
	11 th	Thanksgiving	No class
	18 th	Fingerprint Recognition	Fingerprint structure, Minutiae points, Orientation map, Binarization, Matching, Fingerprint Databases <i>Deadline for common project report.</i>
	25 th	Electrocardiogram Recognition	Heart anatomy, ECG structure and signal acquisition, Fiducial detectors, Analytic vs Appearance features, Arrhythmia <i>Deadline for common project report.</i>
November	1 st	Common Project Discussion	-
	8 th	<i>Invited Talk</i>	TBA <i>Deadline for individual project proposal.</i>
	15 th	<i>Invited Talk</i>	TBA
	22 nd	Individual Project Discussion	<i>Deadline for interim report.</i>
	29 th	<i>Invited Talk</i>	TBA
Dec.	6 th	Project Presentation	-
	13 th	Project Presentation	<i>Final Report Due Dec. 15th</i>

Common Projects

The purpose of the common projects is to familiarize yourselves with biometric devices. Four small experiments need to be completed, on the following biometric modalities: 2D face, 3D face, fingerprint and electrocardiogram (ECG). These experiments are specially designed to deepen your understanding in the practical aspects of biometric systems such as security level selection criteria, control of false acceptance/ rejection, device spoofing and accuracy in controlled vs uncontrolled environments.

Common projects can be completed in an order of your choice. You are required to submit in class one written report at each of the following deadlines:

- ◆ September 27th 2010
- ◆ October 4th 2010
- ◆ October 18th 2010
- ◆ October 25th 2010

By October 25th, all common projects must have been completed.

Common project	Place	Groups	Notes
3D Face	In Lab	Team of 2	One student will be the operator and one will be tested.
Fingerprint	In Lab	Individual	One individual is needed.
Electrocardiogram (ECG)	In Lab	Team of 2	1. One student will be the operator and one will be tested. 2. ECG database is required. Student volunteers will be recorded during the first week of the course. Consent forms for the release of their data will be signed.
2D Face	Take home	Individual	You will need MATLAB and any commercial web camera. The biometric software will be provided.

The common projects will be hosted at the Biometrics Security Laboratory (BA7129). Due to limited availability of the devices, only one team can work on a device per time. An online tool will be available on the course website for you to book the respective station in the lab.