MET CS 599 BIOMETRICS (Special Topics)
Spring 2010
Most lectures at: PSY Building, 64-86 Cummington St, Room B14
Some lab sessions at: 808 Comm. Ave, Room 267, PC Lab
Class meets every Wednesday from 6-9PM starting January 13, 2010

Course Introduction

Automatic and reliable identification of individuals for issuing official documents (e.g., passport and visa) and providing access to secure facilities (e.g., military base) and proprietary information (e.g., corporate websites) has become an essential part of our modern networked society. Biometric recognition systems utilize the physiological or behavioral characteristics of an individual for identification. By using biometrics, it is possible to establish an identity based on "who you are", rather than by "what you possess" (e.g., an ID card) or "what you remember" (e.g., a password). The events of 9/11 have generated huge interest in the design, deployment and evaluation of biometric systems.

Learning Objective:

In this course we will study the fundamental and design applications of various biometric systems based on fingerprints, voice, face, hand geometry, palm print, iris, retina, and other modalities. Multimodal biometric systems that use two or more of the above characteristics will be discussed. Biometric system performance and issues related to the security and privacy aspects of these systems will also be addressed.
http://courseinfo.bu.edu/courses/******/

Prerequisites

Undergraduate courses or equivalent levels in Probability and Statistics.

Textbook

Selected Papers. [Will distribute before every class]

Evaluation and Grading

Lecture material (papers) should be reviewed before the next class. The reading assignments should be done before the material is covered in lecture, and then reviewed afterwards. All assignments must be legible, well formatted, on time and complete.

Homework assignments will be made in class and will be due the following class.
There will be a midterm and final projects. If any grading criteria event will be missed it will be the responsibility of the student to arrange with the professor a mutually agreeable schedule for completion of work.

Grades will be based on:
    Class Participation & Quiz: 20%
    Homework & Labs 50%
    Final Project: 30%

Academic Honesty

The course is governed by the Academic Conduct Committee policies regarding plagiarism (any attempt to represent the work of another person as one's own). This includes copying (even with modifications) of a program or segment of code. You can discuss general ideas with other people, but the work you submit must be your own. Collaboration is not permitted.

Instructor Information

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Schedule of Classes

Class	Date	Lectures	Quiz and Labs
1	Jan 13	Overview of Biometrics: Definitions, biometric modalities, course outline, Basic applications: access control, e-commerce, forensics.	
2	Jan 20	Biometric System Architecture: Building blocks, Modes of Operations. The technology including Scanning/Digitizing, Enhancement, Feature Extraction, Classification, Matching, Searching and Verification	
3	Jan 29	Introduction to probability and statistics, random variables, discrete and continuous distribution. Pattern Classification	Quiz (Biometric Fundament

		and Recognitions.	
4	Feb 03	Voice Recognition fundamentals. Introduction to speech signal processing and pattern recognition. Using Matlab to represent signals in Time and Frequency domain.	

5	Feb 10	Voice Recognition. Vector classification. Hidden Markov Process (Mathematic foundations) . Other statistics methods on voice recognition. Performance evaluation in Biometrics: Basic System Errors. Java Speech API.	Matlab
			  Speaker Identification Lab
			  Speech Recognition Lab

6	Feb 17	Fingerprint recognition.	Quiz (Voice Recognition) Fingerprint Recognition Lab Fingerprint Recognition Mat
7	Feb 24	Iris Recognition.	Iris Lab
8	Mar 03	Face recognition.	Quiz (Fingerprint and Iris Recognition)
	Mar 10	Spring Recess, no class	
9	Mar 17	Face Recognition 2.	
10	Mar 24	Other biometric modalities: retina, signature, Hand geometry, gait, keystroke, teeth.	Quiz (Face Recognition)
11	Apr 07	Quantitative analysis on the biometrics. Performance evaluation in Biometrics	Quiz (Other modalities)
12	Apr 14	Advanced Biometric Topis: Biometric system integration, Multimodal biometric systems: theory and applications, The performance evaluation of multimodal biometric systems.	Hand Geometry Labs Signature Labs
13	Apr 21	Wavelets Transforms and Pattern Recognition. Use of wavelets in fingerprint and speech recognition.	Java Wavelet Programming exercise.
14	Apr 28	Biometric System Security: Attack points, solutions, watermarking, encryption and cancellable biometrics. Review for final exam.	
15	May 05	Final Project Presentation	

Important date you should keep in mind:

March 10th: No Class..