BOSTON UNIVERSITY
METROPOLITAN COLLEGE
COMPUTER SCIENCE DEPARTMENT

MET CS 599 BIOMETRICS (Special Topics)
Spring 2016
Lectures and labs at: Meets in FLR PC LAB 5, RM 247
Class meets on Mondays (alternate Tuesdays), 6-9PM, starting January 25, 2016

Course Introduction

Automatic and reliable identification and verification of individuals using official documents (e.g., passport and visa) or 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 his or her identification. Biometrics allows us to establish person's identity based on "who the person is", rather than by "what the person possess" (e.g., an ID card) or "what the person remembers" (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 scientific basis of biometric systems and their design principles. We will analyze biometric systems based on fingerprints, voice, face, hand geometry, iris, retina, and other modalities. Multimodal biometric systems that use two or more of the above characteristics will be discussed as well. Performance of those systems and issues related to their security and privacy will also be addressed.

Prerequisites

- Undergraduate courses or equivalent levels in Probability and Statistics.
- Knowledge of one programming language.
- General aptitude for mathematical reasoning.

Textbook

Selected scientific papers in the field will be distributed before every class.

Evaluation and Grading

Lecture material (papers) should be reviewed before the next class. The reading assignments should be done before the lecture, and then carefully studied afterwards. All

assignments must be legible, well formatted, on time and complete. 10% penalty per day will be applied for every late assignment, without any exceptions.

Homework assignments will be issued on the day of the class and will be due on the day of the following class.
There will be final projects. Every student will present his/her final project to the entire class and will share all of project's materials with the class.

Grades will be based on:

- Class Participation 10%
- Homework & Labs 70%
- Final Project: 20%

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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Tentative Schedule of Lecture Topics

Class	Date	Lectures	Labs
1	Jan 25	Overview of Biometrics: definitions, biometric modalities, access control, e-commerce, forensics. Biometric Systems Architecture. Brief introduction to Matlab	Matlab Basic Lab
2	Feb 01	Review of Complex Algebra, Linear Algebra and Fourier Transform	Matlab FFT lab
3	Feb 08	Introduction to probability and statistics, random variables, discrete and continuous distributions.	Matlab Probability Lab
	Feb 15	President's day. No class	Class moved to Tuesday
4	Feb 16	Speech Recognition fundamentals. Introduction to speech signal processing and pattern recognition. Using Matlab to capture and represent signals in time and frequency domain.	Speech Identification Lab
5	Feb 22	Introduction to Pattern Recognition and Machine Learning.	Matlab Pattern Recognition Lab
6	Feb 29	Speaker Recognition	Speaker Recognition Lab
	Mar 07	Spring Recess. No class.	
7	Mar 14	Wavelets Transforms and Pattern Recognition. Use of wavelets in fingerprint and speech recognition	Matlab wavelet lab.
8	Mar 21	Face Recognition with eigenfaces approach	Face Recognition Lab
9	Mar 28	Face Recognition with wavelets	
10	Apr 04	Fingerprint Recognition	Fingerprint Recognition Lab
11	Apr 11	Iris Recognition	Iris Recognition Lab
	Apr 18	Patriots' Day Holiday	Class moved to Wednesday
12	Apr 20	Multimodal Biometrics,.	Wavelet Pattern Recognition Lab
13	Apr 26	Presentation of Student Projects	