BOSTON UNIVERSITY
METROPOLITAN COLLEGE
COMPUTER SCIENCE DEPARTMENT

MET CS 599 BIOMETRICS (Special Topics)
Spring 2019

Lectures and labs in Kenmore Classroom Building (KCB)
565 Commonwealth Ave
Boston, MA, Room 103
Class meets on Mondays (alternate Tuesdays or Wednesdays), 6-8:45PM,
starting January 28, 2019

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. This year we will put an extra emphasis on use of Neural networks for various Biometric tasks.

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 28	Overview of Biometrics: definitions, biometric modalities, access control, e-commerce, forensics. Biometric Systems Architecture. Brief introduction to Matlab	
2	Feb 04	Overview of Matlab	Matlab General Lab
3	Feb 11	Review of Complex Algebra, Linear Algebra and Matlab Graphics	Matlab Graphics Lab
	Feb 18	Presidents' Day, No class	Class moved to Tuesday
4	Feb 19 Tuesday	Fourier Series and Transform, Fast Fourier Transform (FFT)	Matlab FFT and Signal Processing Lab
5	Feb 25	Speech Recognition fundamentals. Introduction to speech signal processing and pattern recognition.	Speech Recognition Lab
6	March 04	Pattern Recognition	Speaker Recognition Lab
	March 11	Spring Recess	No class
7	March 18	Review of Probability, Errors	Matlab Probability Lab.
8	March 25	Face Recognition with eigenfaces approach	Face Recognition Lab
9	April 01	Neural networks	Lab on Neural Networks with Matlab
10	April 08	Iris Recognition	Iris Recognition Lab
	April 15	Patriots' Day Holiday	Class moved to Wednesday
11	April 17 Wednesday	Fingerprint Recognition	Fingerprint Recognition Lab
12	Apr 22 Wednesday	Wavelets	Wavelet Pattern Recognition Lab
13	Apr 29	Speaker Recognition, Hidden Markov Models, Cloud APIs for Recognition	Speaker Recognition Lab
14	May 06	Presentation of Student Projects	