

EEL 6935/COT 6930 Automatic Biometric Systems

Credits: 3 credits

Text book, title, author, and year: Introduction to Biometrics, Anil K. Jain, Arun A., Ross and Karthik Nandakumar

Reference materials: Handouts, including journal articles

Specific course information:

Catalog description: Students will learn concepts and methods of person identification and verification in a networked world using automatic biometric means.

Prerequisites: Linear Algebra, Engineering Graduate Standing

Specific goals for the course:

1. Understand the principles and concepts of biometric systems
 2. Understand and the mathematical and analytical tools of automatic biometrics.
 3. Understand and apply simulation techniques for biometric systems
- Experience with in projects to deal with real world

Brief list of topics to be covered:

Part I: Biometrics Fundamentals

- Why Biometric Signal Processing
- Key Terms and Processes
- Accuracy in Biometric Systems

Part II: Image Processing and Computer Vision

- Illumination and Sensors*
- Image Acquisition and Representation
- Fundamentals of Digital Image Processing
- Segmentation

Part III: Pattern Recognition and Machine Learning

- Concepts*
- Statistic Based Methods*
- Sparse Presentation, Support Vector Machine, etc.
- Artificial Neural Network Based Methods

Part V: Face Recognition

- Face Recognition Overview
- Principal Component Method
- Elastic Bunch Graph Method
- Sparse Representation Classifier Method
- Three-Dimensional Face Recognition

Part IV: Fingerprint

- Fingerprint Classification
- Automatic Fingerprint Identification and Verification
- Level 1: Core and Delta
- Level 2: Minutiae
- Level 3: Pores

Part VI: Iris Recognition

Iris Recognition Overview

Detailed discussion

Test Result

Part VII: Other Biometric Methods

Voice Scanning

Retina Scanning

DNA Scanning