EE 5357 Statistical Pattern Recognition

(sections: 001 and 002)

Summer 2020,   Time: 10:30 - 12:20 PM   M,W

Suggested (Not Required) Reference Texts:
Statistical Pattern Recognition by K. Fukunaga and
Pattern Classification by Duda, Hart, and Stork

Professor: M.T. MANRY

Currently, there is explosive growth in the number of machine learning applications, including **data mining**, **face recognition**, **license plate recognition (LPR)**, automatic document reading (as in zip code recognition), fingerprint recognition, prognostics, automatic target recognition, and robotic vision. As a result, there is an increasing demand for students who understand both statistical pattern recognition (SPR) and **Deep Learning** in convolutional neural nets **(CNNs)**. Therefore, in this course, students will (1) learn and contrast the theories of both SPR and CNNs and (2) learn how to design both types of systems.

In the first part of the course we will investigate deformation-invariant and deformation-variant feature vectors for images. Classical feature sets such as moments, Fourier descriptors and Laws features will be covered as well as **H.O.G**. Feature extraction in **CNNs** will be covered, along with explanations of CNN deformation invariance.

Next, we will cover approximate Bayes discriminants nearest neighbor classifiers. Classifiers designed through regression such as **neural networks** and the generalized linear classifiers used in CNNs will be investigated, along with **support vector machines**.

In the last part of the course we will study image and decision fusion approaches used in conventional SPR and in CNNs. In **Program assignments**, students will develop pattern recognition systems of both types.

Prerequisite: Knowledge of Matlab and Digital Signal Processing. **Contact Prof. Manry if the online registration doesn't work.**