**Applied Neural Networks**

IEEE, CSU Fullerton Sponsored Workshop

**Workshop Hours:** Fri. 3-5 PM

**Workshop Description:** The objective is to teach students how to implement and apply Neural Networks to solve problems using the Keras Library. The basics of Machine Learning, Feed Forward Neural Networks, Weight Regularization, Parameter tuning, correcting for overfitting and underfitting, Convolutional Neural Networks, Recurrent Neural Networks, and Long Short Term Memory models will be taught.

**Text:** Chollet, F. (2018). *Deep learning with Python.* Shelter Island, NY: Manning Publications.

**Prerequisites:** A Basic Knowledge of programming (CPSC 120) will help significantly. A basic knowledge of Calculus (derivatives) and Python is recommended.

**Tentative Outline:**

**Week 1:** Introduction to Machine Learning and Neural Networks, Linear Regression. Implement Linear Regression in Python.

**Week 2:** Logistic Regression and Basic Feed Forward Neural Networks, Implement Logistic Regression and a Feed Forward Neural Network to solve MNIST.

**Week 3:** Hyperparameter Tuning, Overfitting and Underfitting, continue MNIST.

**Week 4:** Introduction to project. Data cleaning Project.

**Week 5:** Intro to CNN’s, MNIST with CNN’s.

**Week 6:** CNN’s continued, work on project

**Week 7:** CNN’s, work on project

**Week 8:** Intro to RNN’s, work on project

**Week 9:** Intro to LSTM’s, lab TBD

**Week 10:** LSTM’s, work on projects.

**Weeks 11-14:** Advanced Theoretical Topics, Crick-Mitchison Hypothesis, RBM Autoencoders, Project Presentations and more!