

FRE 7773
Machine Learning for Finance
Fall 2020
Fridays 6-8:30p

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Office Location/Hours: By appointment

Section Leader:
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Course Description:

This course is an introduction to Machine Learning concepts and its application to the financial industry. The purpose is to become knowledgeable enough about the field to pursue individual topics further. In addition, the topics will include practical implementation of the techniques in Python on financial data or other sample data when financial data not available.

Texts (not required for purchase):

- Pattern Recognition and Machine Learning, Bishop
- The Elements of Statistical Learning by Hastie et al.
- Deep Learning by Goodfellow et al.
- Neural Networks and Deep Learning, Michael Nielsen
- [JVP] Python Data Science Handbook by VanderPlas
- [WM] Python for Data Analysis by Wes McKinney

Grading: 4 longer form HWs (30%), midterm (30%), final project (40%).

Course Outline: Material will not necessarily be taught in this order and some topics are subject to be added/removed.

Part I: *Machine Learning in Finance*

- Introduction to machine learning in finance and Python
- Linear regression and classification with Natural Language Processing
- Ensembles with Decision Trees: Random Forests and XGBoost
- Unsupervised Learning: K-means, PCA, Agglomerative clustering

Part II: *Neural Networks and Deep Learning*

- Feed Forward Networks
- Regularization Techniques
- Recurrent Networks, LSTM
- Introduction to tensor flow, keras,....
- Possible other interesting topics, GAN, AutoEncoders, Convolutional Neural networks, Natural Language Processing