**Immersion Training 5 – December 13-14, 2018**

**Advanced Machine Learning and Deep Learning**

**Taught by:** Dennis J. Zhang, Assistant Professor of Operations, Olin Business School, Washington University in St. Louis. Former Machine Learning Scientist at Google.

**Benefits:** When you have completed this seminar, you will learn the basic python and pandas skills to manipulate data and build recommender systems. Then you will understand the basic concepts of machine learnings and be familiar with different types of traditional machine learning models. You will also use the knowledge to solve real machine learning problems on Kaggle. Moreover, you will know the use of deep learning techniques for prediction and the nuances in tuning a deep learning and be able to use Python and standard deep learning libraries to implement deep learning models. Last, you will understand how to decompose a business problem into a machine learning problem and an optimization problem, and you will know the trade-offs between these two problems.

**Who Should Attend:** CMOs, CIOs, CTOs, Directors of Analytics, BI Professionals, Data Analysts, Marketing Researchers, etc., who specialize in analytics-driven strategic decision-making.

**Level of Prior Knowledge:** Basic statistics and linear algebra, working knowledge of Python.

**Topics and Schedule:**

**Day One: Thursday, December 13, 2018**

**Session One: 8 a.m. – 12 p.m (Data Science with Python and Recommender Systems)**

* Quick tour of Python and Jupyter Notebook
  + Python Basics
  + Jupyter Notebook, Numpy and Time Complexity
* Python with Data Science:
  + Pandas Data Wrangling
  + Pandas Visualization
* **Project**: Movie Recommender Systems

**Session Two: 1 p.m. – 5 p.m (Machine Learning with Python)**

* Basic Machine Learning Concepts:
  + Machine Learning Definition
  + Model Evaluation and Cross Validation in Python
* Machine Learning Models and Model Ensemble:
  + Regressions, Nearest Neighbors and Trees
  + Boosting and Bagging with Trees and Random Forest
* Street-fighting Machine Learning
  + XGBOOST
  + Feature Engineering
* **Project**: Kaggle Competition

**Day Two: Friday, December 14, 2018**

**Session One: 8 a.m. – 12 p.m (Deep Learning I)**

* Logistic Regression as Neural Networks
  + Logistic Regression, Cost Function and Gradient Descent
  + Vectorization
  + Logistic Regression with Neural Network Representation
* Neural Networks:
  + Overview and Representation
  + Activation functions, Gradient Descent and Backpropagation
  + Implementing a Neural Network

**Session Two: 1 p.m. – 5 p.m (Deep Learning II and Optimization)**

* Deep Neural Networks with Keras
  + Deep Representation and Parameter Tuning
  + Building a Deep Neural Network with Tensorflow
  + Building a Deep Neural Network with Keras
* Machine Learning and Optimization
  + An Example: Recommender Systems on Alibaba or Amazon
  + Dynamic Programming
* **Project**: Stochastic Knapsack Problems with Prediction

**Costs:**

**Individual Registrations:**

Non-Advisory Board Member Companies/Individuals may attend this two-day intensive training at a cost of $3,000 per person.

An Advisory Board Member Company may send someone at the cost of $2,500 per person

**Group Registrations:**

Non-Advisory Board Companies sending 4 or more learners receives a cost break of $2,500 (4 attendees = $10,000)

An Advisory Board Company sending 4 or more learners receives a cost break of $2,000 (4 attendees = $8,000)