STUDY SESSION

2

Quantitative Methods (2)

This study session provides coverage on techniques that underlie how financial technology (fintech) is affecting areas within the investment industry, such as investment analysis, automated advice, and risk management. The first reading introduces techniques in machine learning (ML) that involve clustering, simplifying, classifying, and predicting relationships in the large datasets that are often found in finance. The session concludes with a reading that examines how data projects involving large datasets are structured with an application to sentiment analysis in investment analysis using machine learning techniques for natural language processing (NLP).

READING ASSIGNMENTS

Reading 4	Machine Learning by Kathleen DeRose, CFA, Matthew Dixon, PhD, FRM, and Christophe Le Lannou
Reading 5	Big Data Projects by Sreekanth Mallikarjun, PhD, and Ahmed Abbasi, PhD

LEARNING OUTCOMES

READING 4. MACHINE LEARNING

The candidate should be able to:

a describe supervised machine learning, unsupervised machine learning, and deep learning;

b describe overfitting and identify methods of addressing it;

c describe supervised machine learning algorithms—including penalized regression, support vector machine, k-nearest neighbor, classification and regression tree, ensemble learning, and random forest—and determine the problems for which they are best suited;

d describe unsupervised machine learning algorithms—including principal components analysis, k-means clustering, and hierarchical clustering—and determine the problems for which they are best suited;

e describe neural networks, deep learning nets, and reinforcement learning.

READING 5. BIG DATA PROJECTS

The candidate should be able to:

a identify and explain steps in a data analysis project;

b describe objectives, steps, and examples of preparing and wrangling data;

c describe objectives, methods, and examples of data exploration;

d describe objectives, steps, and techniques in model training;

e describe preparing, wrangling, and exploring text-based data for financial forecasting;

f describe methods for extracting, selecting and engineering features from textual data;

g evaluate the fit of a machine learning algorithm.