AI for Finance

IT & IT Engineering
Lisbon (Portugal)
27 - 31 Jan 2025

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AI for Finance

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Introduction

A lot of solutions to key problems in the financial world require predicting the future patterns in data from the past to make better financial decisions right now. The evolution of modern machine learning methods and tools in recent years in the field of computer vision bring promise of the same progress in other important fields such as financial forecasting.

In this course, you'll first learn how to quickly get started with ML in finances by predicting the future currency exchange rates using a simple modern machine learning method. In this example, you'll learn how to choose the basic data preparation method and model and then how to improve them. In the next module, you'll discover a variety of ways to prepare data and then see how they influence models training accuracy. In the last module, you'll learn how to find and test a few key modern machine learning models to pick up the best performing one.

Course Objectives of AI for Finance

- Get hands-on financial forecasting experience using machine learning with Python, Keras, Scikit-Learn and pandas
- Use a variety of data preparation methods with financial data
- Predict future values based on single and multiple values
- Apply key modern Machine Learning methods for forecasting
- Understand the process behind choosing the best performing data preparation method and model
- Grasp Machine Learning forecasting on a specific real-world financial data

AI for Finance Course Outlines

Day 1
Introduction to Financial Forecasting

- What's Financial Forecasting and Why It's Important?
  - Define what we mean by financial forecasting, what AI methods we will be using in this course and how they solve common problems in Finance.
  - Learn the basic definition of financial forecasting
  - Learn which AI methods we will be focusing on in this course
  - Learn how those methods help solving one of the most challenging problems in

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- Installing Pandas, Scikit-Learn, Keras, and TensorFlow
  - Learn how to quickly install and verify all the necessary tools to work with financial data and AI methods.
  - Download, install, and verify Miniconda package manager and Python 3.7 distribution

Day 2
Predicting Currency Exchange Rates with Multi-Layer Perceptron

- Getting and Preparing the Currency Data
  - Learn where you can download the free stock prices data and how to convert for forecasting with a MLP Model.
  - Locate and download the free stock prices data
  - Explore the dataset
  - Shape dataset into a supervised learning problem
- Building the MLP Model with Keras
  - Understand how to build a MLP Model for forecasting step by step.
  - Learn the main container, input, and output of each MLP Model
  - Learn how to add a hidden layer into an MLP Model
  - Explore how to pick up the right loss function and optimizer and how to compile the model
- Training and Testing the Model
  - Learn the steps behind training and testing the MLP Model.
  - Understand the key metrics in training and testing the model
  - Learn when it's a good time to stop training the model for optimal results
  - Learn how use the training script and interpret the training results

Day 3
Loan Approval Prediction with Gradient Boosting Classifier

- Getting and Preparing the Loan Approval Data
  - Learn where to get the rare loan financial dataset for free and how to shape it for our model.
  - Locate and download the dataset
  - Explore the dataset
  - Encode the dataset for our classifier
- Creating, Training, Testing, and Using a GradientBoostingClassfier Model
  - Understand how to create a gradient boosted classifier in Scikit-Learn, train and evaluate the model.
  - Create a new classifier
  - Evaluate the classifier using our dataset and cross validation method
  - Use our model on a new dataset

Day 4
Detecting Fraud in Financial Services Using Extreme Gradient Boosting Classfier

- Getting and Preparing Financial Fraud Data
  - Find the rare financial data and learn how to use with detecting frauds.

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- Locate and download the data
- Explore the dataset
- Clean up and encode dataset for optimal results
- Creating, Training, and Testing XGBoost Model
  - Learn how to create, train and test a new model that is able to deal with an imbalanced dataset.
  - Create and configure a new classifier in Scikit-Learn for an imbalanced dataset
  - Train the new model
  - Evaluate the model using a test set

Day 5
Forecasting Stock Prices Using Long-Short Term Memory Network

- Getting and Preparing the Stock Prices Data
  - Find out where you can get the free sock prices data and how to format it for LSTM.
  - Locate and download the free stock prices data, put it in the right place
  - Explore the dataset
  - Create a supervised learning problem dataset
- Building the LSTM Model with Keras
  - Understand the main steps to create a LSTM model in Keras.
  - Understand the main model container and it's input and output
  - Learn how to configure a LSTM hidden layer
  - Pick up the right parameters to compile the model
- Training and Testing the Model
  - Learn the basics of training and testing the LSTM Model.
  - Understand the main training parameters like batch-size and epoch, pick up the right values
  - Understand the training and testing metrics and how to use them to find out when to stop training
  - Learn how to run the training script and interpret results

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