Cognixia

A Collabera LEARNING SOLUTIONS COMPANY

Machine Learning & Artificial Intelligence with Deep Learning Course Outline

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COURSE NAME

Machine Learning / Deep Learning / Artificial Intelligence

DURATION

60 Hours

COURSE CONTENT

Day/Session	Content	Hours
Day 1	▪ Introduction to Artifical Intelligence & Machine Learning ▪ Overview- AI Vs ML Vs Deep Learning ▪ Overview- Subfields of Artificial Intelligence- Robotics, ML, NLP, Computer Vision ▪ Applications of Machine Learning/AI ▪ Difference b/w AI & Programmed Machine ▪ R & R Studio Setup & Installation ▪ Quick tour of R-Studio – Variables, Install, Plot, help, console, repository ▪ Important Links to get datasets – Kaggle, data.gov etc	3 hrs
Day 2	▪ Classes & Objects ▪ Vector and List in R ▪ Hands-on	3 hrs
Day 3	▪ Matrix & Factor in R ▪ Hands-on	3 hrs
Day 4	▪ Dataframe in R ▪ Plotting using gggplot2 in R – Scatter plot, Box plot, Hist, Bar chart etc ▪ N-Dimensional Array in R ▪ Table function in R ▪ Hands-on	3 hrs
Day 5	▪ Statistics in R – Mean, Median, Mode, Range, Variance, SD, Inter Quartile ▪ Twitter- R Integration ▪ Get data from MYSql using R ▪ Get data from website using R ▪ Hands-on	3 hrs
Day 6	▪ Steps involved in solving a Machine Learning Usecase ▪ Data preprocessing/preparation in R ▪ Missing data, Categorical data, Feature Scaling, Spliting data to test & train sets ▪ Hands-on with sample data	3 hrs

Day 7	▪ Types of Machine Learning- Supervised & UnSupervised Machine Learning ▪ Supervised Learning – Regression & Classification ▪ UnSupervised Learning- Clustering ▪ Regression Algorithm- Simple Linear Regression UseCase: Create a Model to predict Salary from years of exp ▪ Classification Algorithm- K Nearest Neighbour UseCase: Create a Model to predict if a particular customer will purchase a product or not ▪ Hands-on with Sample data	3 hrs
Day 8	▪ Clustering Algorithm- Kmeans ▪ Elbow Method in Kmeans to predict optimal no. of Clusters ▪ Clustering Algorithm- Hierarchical Clustering ▪ Dendograms in Hierarchical Clustering to predict optimal no. of Clusters UseCase: Using Kmeans & HC to extract patterns to analyse customer data based on spending score and income ▪ Hands-on with Sample data	3 hrs
Day 9	▪ Logistics Regression UseCase: Create a Model to predict if a particular customer will purchase a product or not ▪ How to create and read ROC curve ▪ How to check the accuracy of the Model using Confusion Matrix ▪ Hands-on with Sample data	3 hrs
Day 10	▪ Random Forest using Decision Trees ▪ Support Vector Machien for Classification UseCase: Create a Model using Random Forest & SVM to predict if a particular customer will purchase a product or not ▪ How to create and read ROC curve ▪ How to check the accuracy of the Model using Confusion Matrix ▪ Hands-on with Sample data	3 hrs
Day 11	▪ Polynomial Regression UseCase: Create a Model to predict Salary from years of exp ▪ UseCase: Satellite Image Classification using Random Forest. Create a Model to indetify/classify different types of land re.g barren, forest, urban, river etc from a Satellite image ▪ Hands-on with Sample data	3 hrs
Day 12	▪ Dimensionality Reduction ▪ Feature Selection Vs Feature Extraction ▪ Feature Selection using Backward Elimination technique ▪ Feature Extraction using PCA ▪ Hands-on with Sample data ▪ How to tune/check accuracy of Model using P- Value, R Square, Adjusted R Square, CAP	3 hrs

Day 13	▪ Overview of NLP/Text Mining ▪ Libraries in R for NLP/text mining – tm, Snowball, dplyr ▪ Bag of words using R Use Case: Restaurents Review System ▪ Sentiment Analaysis using R Usecase: Analyse twitter data for two teams to predict sentiments ▪ Hands-on with Sample data	3 hrs
Day 14	▪ Overview of types of recommendation engines – Example Ecommerce, Netflix etc ▪ Frequently bought items , User Based Collaberative Filtering ▪ Libraries in R for recommendation – recommenderlab ▪ Use Case: Analyse grocery store data to find out frequently bought together item ▪ Use Case: Analyse jokes data to recommend best jokes to users ▪ Hands-on with Sample data	3 hrs
Day 15	▪ Time Series data analysis in R ▪ Components in time series - Trend, Seasonality ▪ Arima Model Vs ETS Model Use Case: Forecast Fight booking from Airline data ▪ Sentiment Analaysis using R ▪ Hands-on with Sample data ▪ Deep Learning Introduction ▪ Limitations of ML and how Deep Learning comes to rescue ▪ Biological Neural Network Vs Artificial Neural Network ▪ Popular Framworks of DeepLearning – Tensorflow, Keras	3 hrs
Day 16	▪ Understanding Deep Learning Terminologies – Input Layer, Hidden Layer, Output Layer, Activation Function, Cost Function, BackPropogation, Gradient Descent, Epoch, Learning Rate ▪ Install Keras (uses tensorflow) ▪ Use Case: Create a model using ANN for boston housing data	3 hrs
Day 17	▪ Convolutional Neural Network ▪ Convolution, Polling, Flattening ▪ Use Case: Image classfication using CNN ▪ Hands-on with Sample data	3 hrs
Day 18	▪ Case Study – Predict Customer Churn	3 hrs
Day 19	▪ Case Study – Canada Crime Analysis	3 hrs
Day 20	▪ Summary & QA	3 hrs