Course : Road to AI via Data science & ML (using Python)
Duration : 50 Hours
Level : Advanced

Overview of Data Science:

- Introducing the world of Data Science, examples of Data science helping up the business.
- Future of Data-driven decisions, Analytical Tools, Pillars of Data science
- Understanding Analytics - Types of Business Analytics - Descriptive Analytics - Diagnostic Analytics - Predictive Analytics - Prescriptive Analytics
- Real life uses case of Machine Learning, Building own use cases of ML (domain specific)
- Supervised ML, Unsupervised ML & Reinforced ML

Python the saviour for ML:

- Basics of Python, Installation and setup
- Python syntax, Variable, datatypes, Keywords, Operators, Conditional statements, loops, control statements
- Functions, LAMBDA & Modules
- Exception Handling, File handling
- Data structures (List, Set, Tuples, Dictionary),
- Advanced Libraries of Python (Numpy, Pandas, Scikit-learn etc)
- Data preparation and munging using Python libraries

Basic of Statistics & Probabilities for ML:

- Statistical Jargons, Central tendencies,
- Sample vs Population
- Exclusive Event, Independent Event, Introduction to random variables, the Joint probability
- Metric, Probability tree, Confusion Matrix
- Discrete probability distributions, Continuous probability distributions

Deep dive on Linear Regression:

- Understanding Linear Regression with an example
- Gradient descent and its parameters
- Formulae and maths behind this model
- Multiple Linear Regression, Polynomial Regression, Categorical Variables in Regression
- Error metrics to calibrate performance the model
- Hands-on modelling of 3 real-time problems (using Python and scikit-learn)
- Pros and cons

Developing and Deploying ML models (AWS CLOUD):

- Building a simple REST application using FLASK
- Exposing the Linear Regression ML model as REST API using FLASK
- Deploying the ML model in AWS and consuming it using a sample application

Deep dive on Logistic Regression:

- Understanding Logistic Regression with an example
- Sigmoid function
- Formulae and maths behind this model
- Error metrics to calibrate the performance of the model
- Hands-on modelling of 3 real-time problems (using Python and scikit-learn)
- Pros and cons

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Deep dive on SVM:

- Understanding SVM with an example
- Learning about Kernel and support vector machines
- Formulae and maths behind this model
- Error metrics to calibrate the performance of the model
- Hands-on modelling of one real-time problem (using Python and sci-kit-learn)
- Pros and cons

Time Series Forecasting:

- Understanding Trend analysis, Cyclical and Seasonal analysis, Smoothing
- Moving averages, Auto-correlation
- ARIMA Applications of Time Series
- Hands-on modelling using FB Prophet for Time series forecasting (Python)

Other Algorithms in Machine Learning:

- Unsupervised Learning: Clustering techniques – K means – K means++
- Decision Tree: Real-time use case, examples, the theory of entropy. Information gain and Gini index, Hands-on

Ensemble Technique:

- Bagging & boosting and its impact
- Random forest, Adaboost - Gradient boosting machines

Text Mining:

- Understanding information retrieval, Crawling and Language modelling
- Text Indexing, Inverted Indexes
- Relevance Ranking TF and IDF
- Evaluation Metrics for Ranking

Natural Language Processing:

- Understanding NLP, real-life systems using NLP
- Parsing and semantic structures, Stemming, POS tagging
- Named Entity Recognition and applications of NER
- Sentiment Analysis

Course completion Project:

- Dataset will be provided
- Expected to prepare and transforms the data to be applicable for modelling
- Model using various algorithms and provide the best prediction results
- Apply Ensemble techniques to improve the prediction accuracy

Key points:

- Hands-on from day one
- Exclusive Python coverage
- Insights on business use cases
- Handsome of data sets will be provided for practice
- All the PPTs, PDF and code will be shared
- Post-session support and assistance
- Specific business/domain use cases will be dealt with (based on the availability of the experts)
- Hackathon/contest will be conducted