APPLIED AI/ML PROGRAM

A comprehensive certified program that combines the power of Data Science, Machine Learning, Data Engineering & Deep Learning

PROGRAM HIGHLIGHTS

- COMPREHENSIVE CURRICULUM
- PERSONALIZED LEARNING PATH
- 100% PLACEMENT ASSISTANCE
- 50+ REAL-WORLD PROJECTS

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COURSE OVERVIEW

This certification program in data science firmly reinforces concepts in mathematics, statistics, calculus, linear algebra, and probability. A primer on data mining and the use of Regression Analysis methods in Data Mining ensues. The concepts and deployment of python programming to enable data mining, Machine Learning are also dealt with in detail. The use of NLP libraries and OPENCV to code Machine Learning Algorithms are detailed. The main highlight of this course is the focus on Machine Learning, Deep Learning, and Neural Networks. Feedforward and Backward Propagation in Neural Networks are described at length. The deployment of activation function, loss function, non-linear activation function is elaborated. A thorough analysis of Convolution Neural Networks (CNN's), Recurrent Neural Networks (RNN's), GANS, Reinforcement Learning, and Q learning is also facilitated in this course. This course is a comprehensive package for all IT enthusiasts who wish to design and develop AI applications in their field of study.

TOOLS COVERED

Flask
scikit learn
pandas
tableau
MLBox, Machine Learning Box
TensorFlow
python
SQL
APACHE Spark
matplotlib
Keras
NumPy
PyTorch
aws

And many more....

MODULE 1

FUNDAMENTALS OF PROGRAMMING

- Python for Data Science Introduction
- Python for Data Science: Data Structures
- Python for Data Science: Functions
- Python for Data Science: NumPy
- Python for Data Science: Matplotlib
- Python for Data Science: Pandas
- Python for Data Science: Computational Complexity
- SQL

This module will help you familiarize with the basic and the advanced tools that are generally used by data scientists in the industry. These include MS Excel, SQL and Python. We will explore each of these tools and explore how to use them to deal with real world datasets.

Case Study:

- Building Excel Simulation to forecast the business for an insurance company
- Descriptive Analytics of FIFA 19 Players

MODULE 2

EXPLORATORY DATA ANALYSIS AND DATA VISUALIZATION

- Plotting for exploratory data analysis (EDA)
- Linear Algebra
- Probability and Statistics
- Interview Questions on Probability and statistics
- Dimensionality reduction and Visualization
- PCA(principal component analysis)
- (t-SNE)T-distributed Stochastic Neighborhood Embedding
- Interview Questions on Dimensionality Reduction
- Statistical Testing

Data exploration and Statistical Inference are one of the initial and important steps in the analysis process. This module will take you through the pro cess of exploring your data with the help of interactive visualizations and insight generation so that you can get the bigger picture of your data. Learn to draw statistical conclusions to discover the unknown aspects of data with the help of various statistical test

MODULE 3

MACHINE LEARNING

- Classification And Regression Models: K-Nearest Neighbors
- Interview Questions on K-NN(K Nearest Neighbour)
- Classification algorithms in various situations
- Performance measurement of models
- Interview Questions on Performance Measurement Models
- Naive Bayes
- Logistic Regression
- Linear Regression
- Solving Optimization Problems
- Interview Questions on Logistic Regression and Linear Regression

In this age of machine learning, every aspiring data scientist is expected to upskill themselves in machine learning techniques & tools and apply these skills in real-world business problems. This module majorly focuses on the most common and must-know machine learning algo rithms such as KNN, Linear regression, decision tree, etc. It also covers hyperparameter tuning to improve models and solving hands-on real-world ML problems.

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MODULE 4

FEATURE SELECTION AND ENGINEERING

- Featurization and Feature engineering.
- Miscellaneous Topics
- Feature Generation from time-series data
- Automated Feature Engineering Tool
- Concept of dimensionality reduction
- Feature Selection and Elimination Techniques
- Detailed Understanding of Principal Component Analysis (PCA)
- Concept of Factor Analysis

Feature Engineering plays a crucial role in improving the quality of your ML model. In this module, you'll go through various feature selection and engineer ing techniques that can help you cre ate/extract new features from a given dataset and select a subset of relevant features for your model that can yield better results

MODULE 5

ADVANCED MACHINE LEARNING

- Explore the Advanced ML concepts and Algorithms
- Use Ensemble Learning Techniques (Stacking and Blending)
- Understand and Implement Bagging and Boosting Algorithms
- Learn to handle Text data and Image Data Work with structured and unstructured data
- Learn to deal with unsupervised learning problems
- Clustering Algorithms including k-means and Hierarchical clustering
- Support Vector Machines (SVM)
- Interview Questions on Support
- Vector Machine
- Decision Trees
- Interview Questions on decision Trees

Till now, you would have developed a good understanding of Basics of Ma chine Learning and Feature Selection techniques. Now, it's time to dive deeper into the advanced ML concepts and algorithms. This module focuses on how you can further improve your model by using ensemble learning, how to handle text and image data and then finally an introduction to unsupervised learning problems.

MODULE 6

MACHINE LEARNING - REAL WORLD CASE STUDIES

- Case Study 1: Quora question Pair Similarity Problem
- Case Study 2: Personalized Cancer Diagnosis
- Case Study 3: Facebook Friend Recommendation using Graph Mining
- Case study 4: Taxi demand prediction in New York City
- Case study 5: Stack overflow tag predictor
- Case Study 6: Microsoft Malware Detection

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MODULE 7

DEEP LEARNING

- Important concepts of Deep learning
- Working of Neural Network from Scratch
- Activation Functions and Optimizers for Deep Learning
- Understand Deep Learning architectures (MLP, CNN, RNN and more)
- Explore Deep Learning Frameworks like Keras and PyTorch
- Learn to tune the hyperparameters of Neural Networks
- Build Deep Learning models to tackle real-life problems

What is deep learning? How can you get started with deep learning? This com prehensive module will provide you with everything you need to know about deep learning with Python, including a deep dive into neural networks! Deep learning algorithms are powered by techniques like Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), Long Short Term Memory (LSTM), etc. and we will cover each one of them and see how they can solve real life problems

MODULE 8

COMPUTER VISION USING PYTORCH

- Get familiar with the world of Computer Vision
- Transfer Learning for Computer Vision
- Work with popular Deep Learning Framework – Pytorch
- Learn State-of-the-art Algorithms like YOLO, SSD, RCNN and more
- Work on different types of problems
- Build Face Detection and Pose Detection Models
- Advanced CV Problems like Image Segmentation and Image Generation
- Understand how GANs work

This module is designed to give you a taste of how the underlying techniques work in current State - of - the - Art Computer Vision systems and walks you through a few of the remarkable Computer Vision applications in a hands-on manner so that you can create such solutions on your own. You will work with PyTorch for computer vision's tasks like image classification, object detection, pose detection and much more. You will quickly find yourself leaning on PyTorch's flexibility and efficiency for computer vision

MODULE 9

GETTING STARTED WITH NLP

- Handling Text Data (Cleaning and Pre-processing)
- Use Spacy, Rasa and Regex for exploring and processing text data Information
- Extraction and Retrieval from text-based data
- Understand Language Modelling
- Learn Advanced Feature Engineering techniques
- Build NLP models for Text Classification
- Understand Topic modelling
- Work on Industry Relevant Project

You need text mining and Natural Language processing (NLP) to make sense out of this data. NLP helps you extract insights from emails of custom ers, their tweets, text messages. This course makes you industry ready for all the applications of NLP.

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MODULE 10

NLP USING DEEP LEARNING

- Understand the concept of Sequence to-Sequence Modeling
- Build a Deep Learning Model for Language translation in PyTorch
- Learn to use Transformers library by Huggingface
- Use Transformers to perform transfer learning in NLP
- Build and deploy your own chatbot
- Learn to work with audio-based data
- Build a voice assistant system using Deep Learning

This module covers advanced Natural Language Processing, including learning about how to use Transformers library by Huggingface and the concept of Sequence-to Sequence modeling. Also, you will learn using deep learning for NLP tasks like language models, Voice assistant systems and creating deep learning powered chatbots

MODULE 11

RECOMMENDER SYSTEMS + REAL WORD CASE STUDIES

- DBSCAN (Density based clustering) Technique
- Recommender Systems and Matrix Factorization
- Interview Questions on Recommender Systems and Matrix Factorization.
- Case Study 8: Amazon fashion discovery engine (Content Based recommendation)
- Case Study 9: Netflix Movie Recommendation System (Collaborative based recommendation)
- High Level + End-End Design of a Music Recommendation system

From Amazon to Netflix, Google to Goodreads, recommendation engines are everywhere and one of the most widely used applications of machine learning techniques. This module covers everything you need to know about rec ommendation systems including their use cases in the industry, their types, algorithms used to build them and then finally actually building a recommender system for a real-life problem.

MODULE 12

TIME SERIES USING PYTHON

- Important concepts of Time Series Forecasting
- Machine Learning techniques for Time Series forecasting
- Validation techniques for Time series data
- Framework to evaluate Time Series Models
- Exponential Smoothing Methods for forecasting
- Reading ACF and PACF plots Tuning Parameters for ARIMA ARIMA and SARIMA
- Model Deep Learning for time series Solve Real-world business problems

Time Series is considered to be one of the less known skills in the data science space because it has this time compo nent that makes time series problems more difficult to handle. This module is entirely dedicated to make Time series forecasting easier to understand. Here you'll learn the concepts related to time series including frameworks to evaluate time series models, exponentials smoothing methods, ARIMA, etc, theo retically as well as with their reallife implementation.

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MODULE 13

DEEP LEARNING - REAL WORLD CASE STUDIES

- Case Study: Human Activity Recognition
- Case Study: Self Driving Car
- Case Study: Music Generation using Deep-Learning
- Case Study: Semantic Search Engine for Q&A [Design + Code]
- Case Study: Building a Smart Gym Assistant from scratch

MODULE 14

DEPLOYING ML/DL MODELS

- Overview and aspects of Model Deployment
- Deploying Machine Learning models using Streamlit
- Introduction to Amazon Web services
- Deploying and Machine Learning Deep Learning models using AWS
- Understanding Amazon Sagemaker
- Model Deployment using Sagemaker
- APIs for Model deployment

In this module on Model Deployment, you will learn how to deploy models from different domains ranging from Machine Learning to Deep Learning, Natural Language Processing (NLP) to Computer Vision (CV). To explain concepts of Model Deployment, we will cover a range of real-life projects from various indus tries like Banking, Healthcare, and much more. You will also learn different tools used for Model Deployment with hands-on

MODULE 15

STORYTELLING AND DASHBOARDING

- Learn to import and work with different kinds of data in Tableau
- Build bubble charts, geo-location charts, and many other charts
- Learn to create Dashboards in Tableau
- Master storyboarding in Tableau
- Learn to create engaging presentations
- Perform feature engineering in Tableau
- Become familiar with data manipulation in Tableau

No longer do we have to stick to static spreadsheet charts – we can now build interactive and beautiful visualizations and dashboards and share them within our organization in seconds. For this, we have two interactive tools, Tableau, that have changed the way industries analyze and present data. This module will teach you the art of storytelling with the help of Tableau.

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