Master Program in Applied AI, Gen AI & Data Science

Introduction to the course
What is Artificial Intelligence?
End goal of AI
Application of AI
AI Domains
Data Science Overview
Traditional vs AI
How to make money using AI?

Module 1: Python

Python Crash Course
Python Tools
Anaconda Software Installation
Python Basics
Assignment Operators
Control Structures
Oops- Functions and Class
List, Tuple
Python Libraries: Numpy, Pandas, Scikit-learn, Matplotlib, Seaborn, Opencv, Tensorflow, Keras, NLTK, Spacy, Pytorch.

Module 2: ML-Regression
Problem Identification in AI
Supervised Learning
Unsupervised Learning
Semisupervised Learning
Scenario based AI Problems with Solutions
Simple Linear Regression
Model Creation
Deployment Phase
Evaluation Metric
Multiple Linesr Regression
Support Vector Machine
Decision Tree
Random Forest
Boosting Algorithms
Cross Validation- Gridsearch
Evaluating Regression Models Performance

Module 3: ML-Classification
Confusion Matrix
Classification Algorithms
Logistic Regression
Navie Bayes
K-Nearest Neighbor(K-NN)
Support Vector Machine (SVM)

Kernel SVM
Decision Tree Classification
Random Forest Classification
Evaluating classification Model performance

Module 4: ML-Clustering

How to create Virtual Environment?
K-Means Clustering
Agglomerative Clustering
Hierarchical Clustering
Affinity propagation
Mean shift clutering
Spectral clustering
Optics clustering
Birch clustering

Module 5: Advanced ML-Feature Selection

Feature Selection
Select-K Algorithm
RFE
Advanced ML Flow

Module 6: Advanced ML-Dimensionality Reduction

Scalar and Vector
Principle Component Analysis
LDA
Advanced Techniques- Fitting methods
Overfitting, Underfitting and Best fitting

Module 7: DS-Univariate Analysis

Data Science Introduction
Loading Data set.
Missing Data.
Categorical Data.
Splitting Data set.
Feature Scaling
Quantitative and Qualitative
Central Tendency
Percentile
IQR
Outliers
Histogram, Skewness, Kurtosis
Data Preprocessing
Variance and Standard Deviation
Normal Distribution
Probability Density Function
Z-Score

Module 8: DS-Bivariate Analysis

Co-variance and Correlation

Multicolinearity
VIF
T-Test
Hypothesis Testing
ANAVO

Module 9: DS- Data Visualization

Scatter plot
Bar chart
Pie chart
Histogram
Line Plot
Area Plot
Box Plot
Violin Plot

Module 10: Web Development using Django

Web Development Demo
Create Project and App
HTML page
Backend view
Output page

Module 11: Recommendation System

User based recommendation
Item based recommendation
Content based recommendation
Popularity based recommendation
Uplift Modelling -How e-commerce sends offer mail to you
Customer Life Time Value -Which customer stays long

Module 12: Deep Learning

Introduction to DL
How Neural Network works?
Gradient Descent
Backpropagation
ANN
CNN
Pre-trained models
Transfer Learning
Real Time Project with handson
LSTM
RNN
Hands-on: (Opencv, Keras and Tensorflow Library)
Secure Face Recognition online payment using Deep Learning
Haemorrhage prediction using Deep Learning

Object Detection using Tensorflow Deep Learning Frame work
Image Generator using GAN
Module 13: Time Series Analysis
Intro to Time Series
Visualizing a Time Series
Patterns in a Time Series
Stationary and non-stationary Time Series
How to make a Time Series stationary?
How to test for stationarity?
Share Market Analysis
Components in Time Series
Non-Stationarity Series
EDA- Stock Data
Stationarity -Hypothesis
Auto Correlation
Partial Auto Correlation
Auto regression
Forecasting
Moving Average
ARMA
ARIMA
SARIMA
VAR
Advanced time series algorithms
Natural Language Processing Module 14: NLP
NLP Introduction
TF-IDF Vectorization
Sentimental Analysis
Text Preprocessing
Topic Modelling
Stop Words
Tokenization
Stemming and lemmatization
Bag of Words
Model Word Vectorizer
TF-IDF
POS Tagging
Named Entity Recognition
Word Cloud
Generative AI
Module 15: Prompt Engineering, LLM
What is API?
ChatGPT API Introduction
OpenAI API and Level 1 code
LLM Introduction

ChatGPT prompt
Chatbot model customized ChatGPT
Create end user ChatGPT with sharable link Building Systems with ChatGPT API-Introduction
BSWC Problem Statement
BSWC- Classify the inputs
BSWC- Moderation
BSWC- Chaining Prompting
BSWC- Chain promting-2
BSWC- Chainpromting Continuation
BSWC- Check Outputs
BSWC- End to End System
BSWC- Evaluate-1
BSWC- Evaluate-2

Module 16: Real time Application with ChatGPT API

Realtime Implementation Website Demo
Overview flow of Realtime Application
Integrate ChatGPT APi with Live website to create chatbot Website-AI Chatbot

Module 17: GenAI-Advanced Techniques

GAN
Transformers
RAG
Self attention Mechanism
Stable Diffusion
Auto Encoders
Variational Encoders
Conversational AI
Hugging Face
LlamaIndex
Ollama- Llama
LangChain
Gemini AI API

Module 18: Deployment on Cloud Platform

Deployment Cloud Procedures
Deployment on GCP App Engine Serverless Procedure Deployment GCP through Docker
Deployment GCP through Kubernetes
CI/CD - Introduction
Git-Download-CI/CD
GCPCloudBuild-CI/CD
How CI/CD making changes to the Deployment world Yaml-Explanation-CI/CD
Overall flow of CICD procedure

Module 19: SQL (MySQL)

SQL Overview
Installation Process for MySQL-Workbench
SQL Commands Segregation

Create Database and Tables in MySQL
Data Definition Language
Data Manipulation Language
Data Query Language
Transaction Control Language
Data Control Language
SQL Joins

Module 20: AI Agents

Fundamentals of AI Agents
AI Agent Architecture
Conversable Agent
Multi-Agent Conversation- Sequential Chat
Multi-Agent Conversation- Nested Chat
Flexible Conversation Patterns
Autogen

AI Projects

Project 1: AI in Finance
Project 2: AI in Healthcare
Project 3: AI in Marketing
Project 4: AI in Online Platforms
Project 5: Face Mask Detection
Project 6: Object Detection project
Project 7: Stock Market Analysis
Project 8: AQI
Project 9: Fake News Detection
Project 10: WhatsApp Chat Analyze
Project 11: ChatBot Creation
Project 12: Gen AI Project