COURSE OUTLINE:

Stage 0: Orientation Introduction to AI and ML What it AI? What is future going to be like? Intro to Machine Learning Types of Machine Learning Supervised learning Unsupervised Learning Reinforcement Learning Some Demos and interesting videos on it. Object detection Segmentation Classification Generative models Chat GPT Dall-e stable-diffusion Our Goal and Expectations from Students. Working plan. Work Ethics Practice sessions Evaluations Professional Grooming Stage 1: Introduction with the Tools Basics of NLP & LLMs Tokenization Embeddings Token Limit concept for LLMs Introduction to Chat GPT and Interaction with it. Introduction to Dall-E and interaction with it. Introduction to Stable Diffusion and interaction with it Prompt Engineering Prompt Anatomy Assignment At Initial stage the students should interact with Open.ai tools like Chat GPT and DALL-E- 2. This will greatly develop their interest and help them understand the products better. From this they will also learn the prompting which will help them later. Stage 2: Basics of python Introduction to Python programming Basic Variables Data types String manipulation List Loops Tuples Dictionary JSON Functions Built in Custom Code practice with Chat GPT Stage Evaluation Assignment Stage 3: Basics of API Introduction to API Basics of API Types of API Hands on practice with APIs Open.ai API Stable Diffusion API Stage 4: Introduction to Hugging Face Introduction to Hugging Face Installation and Setup Text Classification using Pipelines Hands on practice Name Entity Recognition (NER) with Pipelines Hand on practice Sentiment Analysis with Pipelines Hands on practice Assignment Stage 5: Basics of ML Introduction to Types Machine Learning Supervised Learning Video demo Semi-supervised Learning Video demo Un-supervised Learning Video demo Re-inforcement learning Video demo Assignment Stage 6: Basics of Data Visualizations Basic concepts of Pandas Exploratory Data Analysis (EDA) Data cleaning Techniques Mean Median Mode Inter Quartile Range (IQR) Correlations Analysis Dataset Types of Data sets (Structured, Unstructured) Examples of Datasets Data preprocessing Data Cleaning (Missing Values and Outliers) Dimensionality Reduction Data Transformation Introduction to Visualizations Line plot Scatter plot Regression plot Bar charts Distribution plots Box plot Creating Visualizations using Seaborn Data splitting into test train and validation sets. Assignment Stage 7: Basics of ML frame work Understanding of Scikit-learn for Machine Learning Models Working with Structured Data (ETL Pipeline) Using Scikit-Learn Data Cleaning (Missing Values and Outliers) Dimensionality Reduction Data Transformation Concept of classification and regression Difference and utilization Use case examples Creating Classification Models using Scikit-learn Logistic regression Decision Tree classifier Random Forest classifier Gradient Boosting Classifier Evaluating Classification Models Creating Regression Models using Scikit-learn Linear regression Decision Tree Regressor Random Forest Regressor Gradient Boosting Regressor Evaluating Regression Models Training process (Hands on) Testing process (Hands on) Evaluation Metric Loss functions Confusion matric Accuracy Precision Recall Assignment Stage 8: Tensor flow Introduction to Tensor flow Problems with Linear models Tensor flow playground Gradient Descent Hyper parameters Epochs Batch size Learning rate No of layers Artificial Neural Networks ANN using MNIST Dataset (Hands on) Training Testing Limitation of ANN Introduction to Convolutional Neural Networks Kernel/Filter Convolution Pooling Up sampling CNN using MNIST Dataset (Hands-on) Training Testing Auto-encoders Vanilla Auto Encoders Encoder Decoder Denoising Auto-encoders Vanilla Auto-Encoder using ANN, CNN Architecture Training Testing Denoising Auto Encoder using CNN Architecture Training Testing Assignment Stage 9: PyTorch Introduction to PyTorch Comparison of PyTorch and Tensor flow Linear regression using

PyTorch Classification using PyTorch Stage 10: Chatbots (LangChain, Streamlit, LlamaIndex) Introduction to LangChain Concept of chains Concept of retrieval chains Simple QA chain Retrieval QA chain with sources Document. Simple Chabot using Openai (Hands-on) Introduction to Streamlit Setup and installation of VS code and Anaconda Document GPT (Simple QA Chain) Document GPT (Retrieval QA Chain with Source Document) Introduction to LlamaIndex Functionalities of LlamaIndex Difference between LlamaIndex and LangChain Difference between Llama-2 and LlamaIndex Document GPT with LlamaIndex Assignment Stage 11: Transformers What are Transformers? How do Transformers work? The different types of Transformer architectures The benefits of using Transformers for Deep Learning tasks Hugging Face API What is the Hugging Face API? How to use the Hugging Face API to load and use Transformers models? How to fine-tune Transformers models with the Hugging Face API? How to use Transformers and the Hugging Face API to build a text classification model How to use Transformers and the Hugging Face API to build a question answering model How to use Transformers and the Hugging Face API to build a summarization model Stage 12: Server Deployment What is Server Deployment? Introduction to Server Deployment principles and practices The Server Deployment culture Server Deployment tools and technologies Version control systems (Git) Containerization (Docker) Cloud computing (AWS)