Artificial Intelligence - Adaovi

This course covers various topics, including machine learning, deep learning, natural language processing, and Big Data. The course includes hands-on programming exercises, projects, and case studies, allowing students to gain practical experience in building intelligent systems. The goal of this course is to equip individuals with the knowledge and skills needed to leverage artificial intelligence technologies in various domains and industries.

Session 2.5 hrs	Topics
Day 1	AI Course Introduction - AI in Industry - AI Paradigms - Job opportunities in AI - AI Applications Editors and Environment setup - Jupyter Notebook - Google Colab

Day 2	Python Basics
	- Data Types
	  - Numbers, Strings
	  - Lists
	  - Tuples
	  - Sets
	  - Dictionaries
	- Comparison Operators
	- If, elif, else statements
	- range()
	- loops
	
	OOPS
	- Classes and Objects
	- Methods

Day 3	Python for Machine Learning
	- High-level Introduction
	  - Pandas
	  - Numpy
	  - Matplotlib

	- Seaborn - Scikit learn - Tensorflow - Pytorch - NLTK
Day 4	Data Analysis - Numpy - Numpy Array - Numpy Indexing and Selection - Numpy Operations - Numpy Exercises
Day 5	Data Analysis - Pandas - Series - Dataframes - Data Input and Output - Handling Missing Data - Group By - Merging Dataframes - Pandas Exercises
Day 6	Data Analysis - Pandas - Pandas Operations Data Visualization - Pandas Builtin - Histogram - Line Plot - Scatter - Pie
Day 7	Data Visualization - Matplotlib - Basic Plotting - Scatter plot - Bar Chat - Histogram - Box Plot - KDE Plot - Matplotlib Exercises
Day 8	Introduction to Machine Learning - Types of Machine Learning - Supervised - Unsupervised - Semi-Supervised - Reinforcement - Features and Labels/Targets - Training, Testing, and Validation Data

Day 9	Supervised Machine Learning - Regression - Classification Machine Learning Algorithms - Part 1 - Linear Regression - Logistic Regression
Day 10	Machine Learning Algorithms - Part 2 - KNN - Decision Tree - Random Forest - Support Vector Machines

Day 11	Performance Metrics
	- Regression Metrics
	  - MAE
	  - MSE
	  - R-squared
	  - Adjusted R-squared
	- Classification Metrics
	  - Confusion Matrix
	  - Accuracy
	  - Precision
	  - Recall
	  - F1-score

Day 12	Unsupervised Machine Learning - Clustering - Dimensionality Reduction Unsupervised ML Algorithms - Part 1 - K-means - DBSCAN
Day 13	Unsupervised ML Algorithms - Part 2 - Hierarchical Clustering Finding optimal cluster - Elbow method - Silhouette Score
Day 14	Mini Project - 1 - Passenger Survival (Classification) - Salary Prediction (Regression)

Day 15	Introduction to Deep Learning - Perceptron Model - Neural Networks - Cost Function and Gradient Descent - Overfitting and Underfitting
Day 16	Artificial Neural Networks - Activation Functions - Optimizers - Loss Functions - Regularization
Day 17	Convolution Neural Networks - Activation Functions in CNN - Convolutional Layers - Filters - Pooling Layers
Day 18	Transfer Learning - Motivation behind transfer learning - Popular pre-trained models - Leveraging Pre-trained models
Day 19	Mini Project - 2 - Lung Cancer Detection
Day 20	Introduction to NLP - Tokenization - Stemming - Lemmatization - Bag of Words - TF-IDF - Word Embeddings
Day 21	Streamlit - Basic setup - Interactive Widgets - Data visualization
Day 22	High level Introduction to Big Data - Hadoop - Spark - Kafka - Airflow

Day 23	Recent Trends in AI - Current AI - ChatGPT underhood - LLMs
Day 24 and 25	Final Project / Evaluation / QnA