TechyEdz Solutions

Training | Consulting | Developement | Outsourcing

Artificial Intelligence

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Artificial Intelligence (AI)

✦ Course Overview:

This Introduction to AI provides an overview of AI concepts and workflows, machine learning, deep learning, and performance metrics. You'll learn the difference between supervised, unsupervised, and reinforcement learning; be exposed to use cases, and see how clustering and classification algorithms help identify AI business applications.

✦ What you will learn:

By the end of this AI training, you will be able to accomplish the following:

- ❖ Understand the meaning, purpose, scope, stages, applications, and effects of Artificial Intelligence
- ❖ Design and build your own intelligent agents, applying them to create practical Artificial Intelligence projects, including games, machine learning models, logic constraint satisfaction problems, knowledge-based systems, probabilistic models, and agent decision-making functions
- ❖ Master the essential concepts of Python programming, including data types, tuples, lists, dicts, basic operators, and functions
- ❖ Learn how to write your own Python scripts and perform basic hands-on data analysis using Jupyter notebook
- ❖ Gain an in-depth understanding of Data Science processes: data wrangling, data exploration, data visualization, hypothesis building, and testing
- ❖ Perform high-level mathematical and technical computing using the NumPy and SciPy packages and data analysis with the Pandas package
- ❖ Master the concepts of supervised and unsupervised learning models, including linear regression, logistic regression, clustering, dimensionality reduction, K-NN and pipeline, recommendation engine, and time series modeling
- ❖ Understand the concepts of TensorFlow, its main functions, operations, and the execution pipeline
- ❖ Master advanced topics in Artificial Intelligence, such as convolutional neural networks, recurrent neural networks, training deep networks, and high-level interfaces

✦ Course Outline:

Introduction to Python

- ➢ Concepts of Python programming
- ➢ Configuration of Development Environment
- ➢ Variable and Strings
- ➢ Functions, Control Flow and Loops
- ➢ Tuple, Lists and Dictionaries
- ➢ Standard Libraries

Data Science Fundamentals
- ➢ Introduction to Data Science
- ➢ Real world use-cases of Data Science
- ➢ Walkthrough of data types
- ➢ Data Science project lifecycle

Introduction to NumPy
- ➢ Basics of NumPy Arrays
- ➢ Mathematical operations in NumPy
- ➢ NumPy Array manipulation
- ➢ NumPy Array broadcasting

Data Manipulation with Pandas
- ➢ Data Structures in Pandas-Series and Data
- ➢ Frames
- ➢ Data cleaning in Pandas
- ➢ Data manipulation in Pandas
- ➢ Handling missing values in datasets
- ➢ Hands-on: Implement NumPy arrays and
- ➢ Pandas Data Frames

Data Visualization in Python
- ➢ Plotting basic charts in Python
- ➢ Data visualization with Matplotlib
- ➢ Statistical data visualization with Seaborn
- ➢ Hands-on: Coding sessions using Matplotlib,
- ➢ Seaborn package

Exploratory Data Analysis
- ➢ Introduction to Exploratory Data Analysis (EDA) steps
- ➢ Plots to explore relationship between two variables
- ➢ Histograms, Box plots to explore a single variable
- ➢ Heat maps, Pair plots to explore correlations

Introduction to Machine Learning

- ➢ What is Machine Learning?
- ➢ Use Cases of Machine Learning
- ➢ Types of Machine Learning - Supervised to Unsupervised methods
- ➢ Machine learning workflow

Linear Regression

- ➢ Introduction to Linear Regression
- ➢ Use cases of Linear Regression
- ➢ How to fit a Linear Regression model?
- ➢ Evaluating and interpreting results from Linear Regression models
- ➢ Predict Bike sharing demand

Logistic Regression

- ➢ Introduction to Logistic Regression
- ➢ Logistic Regression use cases
- ➢ Understand use of odds & Logic function to perform logistic regression
- ➢ Predicting credit card default cases

Decision Trees & Random Forest

- ➢ Introduction to Decision Trees & Random Forest
- ➢ Understanding criterion (Entropy & Information Gain) used in Decision Trees
- ➢ Using Ensemble methods in Decision Trees
- ➢ Applications of Random Forest

Model Evaluation Techniques

- ➢ Introduction to evaluation metrics and model selection in Machine Learning
- ➢ Importance of Confusion matrix for predictions
- ➢ Measures of model evaluation - Sensitivity, specificity, precision, recall & f-score
- ➢ Use AUC-ROC curve to decide best model

Dimensionality Reduction using PCA

- ➢ Introduction to Curse of Dimensionality
- ➢ What is dimensionality reduction?
- ➢ Technique used in PCA to reduce dimensions
- ➢ Applications of Principle component Analysis (PCA)
- ➢ Optimize model performance using PCA on SPECTF heart data

KNearestNeighbours

- ➢ Introduction to KNN

- ➤ Calculate neighbours using distance measures
- ➤ Find optimal value of K in KNN method
- ➤ Advantage & disadvantages of KNN

Naive Bayes Classifier
- ➤ Introduction to Naïve Bayes Classification
- ➤ Refresher on Probability theory
- ➤ Applications of Naive Bayes Algorithm in Machine Learning
- ➤ Classify spam emails based on probability

K-means Clustering
- ➤ Introduction to K-means clustering
- ➤ Decide clusters by adjusting centroids
- ➤ Understand applications of clustering in Machine Learning
- ➤ Segment hands in Poker data

Support Vector Machines
- ➤ Introduction to SVM
- ➤ Figure decision boundaries using support vectors
- ➤ Identify hyper plane in SVM
- ➤ Applications of SVM in Machine Learning

Time Series Forecasting
- ➤ Components of time series data
- ➤ Interpreting autocorrelation & partial autocorrelation functions
- ➤ Introduction to Time Series analysis
- ➤ Stationary vs non stationary data
- ➤ Stationary data and implement ARIMA model

Apriori Algorithm
- ➤ Applications of Apriori algorithm
- ➤ Understand Association rule
- ➤ Developing product recommendations using association rules
- ➤ Analyse online retail data using association rules

Recommendation Systems
- ➤ Introduction to Recommender systems
- ➤ Types of Recommender systems - collaborative, content based & Hybrid
- ➤ Types of similarity matrix (Cosine, Jaccard, Pearson correlation)

> ➢ Build Recommender systems on Movie data using KNN basics

Linear Discriminant Analysis
> ➢ Recap of dimensionality reduction concepts
> ➢ Types of dimensionality reduction
> ➢ Dimensionality reduction using LDA
> ➢ Apply LDA to determine Wine Quality

Anomaly Detection
> ➢ Introduction to Anomaly detection
> ➢ How Anomaly detection works?
> ➢ Types of Anomaly detection: Density based, Clustering etc. NET Based Commands
> ➢ Detect anomalies on electrocardiogram data

Ensemble Learning
> ➢ Introduction to Ensemble Learning
> ➢ What are Bagging and Boosting techniques?
> ➢ What is Bias variance trade off?
> ➢ Predict wage (annual income) classes from adult census data

Optimization
> ➢ Optimization techniques: Linear Programming using Excel solver
> ➢ Optimization in ML
> ➢ Neural networks
> ➢ Workflow of a Neural network & analogy with biological neurons

> ➕ **Prerequisites:**

Participants in this program should have:

- An understanding of the fundamentals of Python programming
- Basic knowledge of statistics

> ➕ **Who can Attend:**

- Developers aspiring to be an Artificial Intelligence Engineer or Machine Learning Engineer
- Analytics Managers who are leading a team of analysts
- Information Architects who want to gain expertise in Artificial Intelligence algorithms

- Analytics professionals who want to work in machine learning or artificial intelligence
- Graduates looking to build a career in Artificial Intelligence and machine learning
- Experienced professionals who would like to harness Artificial Intelligence in their fields to get more insight

🔸 **Number of Hours: 60hrs**

🔸 **Key Features:**
➢ One to One Training
➢ Online Training
➢ Fastrack & Normal Track
➢ Resume Modification
➢ Mock Interviews
➢ Video Tutorials
➢ Materials
➢ Real Time Projects
➢ Virtual Live Experience
➢ Preparing for Certification