Artificial Intelligence Expert Module

What are the learning objectives of this Artificial Intelligence Course?

Becoming an Artificial Intelligence Engineer puts you on the path to an exciting, evolving career that is predicted to grow sharply into 2025 and beyond. Artificial intelligence and Machine Learning will impact all segments of daily life by 2025, with applications in a wide range of industries such as healthcare, transportation, insurance, transport and logistics and even customer service.

The need for AI specialists exists in just about every field as companies seek to give computers the ability to think, learn and adapt.

Why become an AI engineer?

The current and future demand is staggering.

The New York Times reports a candidate shortage for certified AI Engineers, with fewer than 10,000 qualified people in the world to fill these jobs, which according to Paysa earn an average salary of $172,000 per year in the U.S. (**or Rs.17 lakhs to Rs. 25 lakhs in India**) for engineers with the required skills.

By the end of this Artificial Intelligence Course, you will be able to accomplish the following:

- Design and build your own intelligent agents and apply them to create practical AI projects including games, machine learning models, logic constraint satisfaction problems, knowledge-base systems, probabilistic models, agent decision-making functions and more
- Understand the concepts of TensorFlow, its main functions, operations and the execution pipeline
- Understand and master the concepts and principles of machine learning, including its mathematical and heuristic aspects
- Implement deep learning algorithms in TensorFlow and interpret the results,
- Understand neural networks and multi-layer data abstraction, empowering you to analyze and utilize data like never before.
- Comprehend and differentiate between theoretical concepts and practical aspects of machine learning.
- Master and comprehend advanced topics such as convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces
- Learn about major applications of Artificial Intelligence across various use cases in various fields like customer service, financial services, healthcare etc.

- Implement classical Artificial Intelligence techniques, such as search algorithms, minimax algorithm, neural networks, tracking, robot localization
- Ability to apply Artificial Intelligence techniques for problem-solving and explain the limitations of current Artificial Intelligence techniques
- Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, etc)
- Master skills and tools used by the most innovative AI teams across the globe as you delve into specializations, and gain experience solving real-world challenges

Program Description:

Course 1: Data Science with Python

● Course Overview

● Data Science Overview

● Data Analytics Overview

● Statistical Analysis and Business Applications

● Python: Environment Setup and Essentials

● Python Data Types, Control Statements, Loops, Functions, Imports and Modules

● Mathematical Computing with Python (NumPy)

● Scientific computing with Python (Scipy)

● Data Manipulation with Python (Pandas)

● Machine Learning with Python (Scikit–Learn)

● Natural Language Processing with Scikit-Learn

● Data Visualization in Python using Matplotlib

● Data Science with Python Web Scraping

● Python integration with Hadoop, MapReduce and Spark

Course 2: Machine Learning

● Introduction to Artificial Intelligence and Machine Learning

● Techniques of Machine Learning

● Data Preprocessing

● Math Refresher

● Regression (Simple Linear, Multiple Linear, Polynomial, SVR, Decision Tree & Random Forest Regression) with hands-on examples

for each regression type

● Classification (Logistic, K-NN, SVM, Kernel SVM, Naive Bayes, Decision Tree & Random Forest Classifications) with hands-on examples

for each Classification type

● Unsupervised learning - Clustering (k-Means & Hierarchical Clustering) with hands-on examples for each Clustering type

● Association Rule Learning (Apriori & Eclat)

● Reinforcement Learning (Upper Confidence Bound & Thompson Sampling)

● Natural Language Processing

● Introduction to Deep Learning

Course 3: Deep Learning with TensorFlow

● Introduction to TensorFlow

● Perceptrons

● Activation Functions

● Artificial Neural Networks

● Gradient Descent and Backpropagation

● Optimization and Regularization

● Intro to Convolutional Neural Networks

● Intro to Recurrent Neural Networks

● Deep Learning applications

Additional Course 4: Data Science with R

- Introduction to Business Analytics
- Introduction to R
- R Programming
- R Data Structure
- Apply Functions
- Data Visualization
- Introduction to Statistics
- Hypothesis Testing I
- Hypothesis Testing II
- Regression Analysis
- Classification
- Clustering
- Association

Additional Course 5: Apache Spark & Scala

- Introduction to Spark
- Introduction to Programming in Scala
- Using RDD for Creating Applications in Spark
- Running SQL Queries Using Spark SQL
- Spark Streaming
- Spark ML Programming
- Spark GraphX Programming

This Artificial Intelligence Master's program includes 5+ real-life, industry-based projects on different domains to help you master concepts of Artificial Intelligence like

Supervised Learning, Unsupervised Learning, Reinforcement Learning, Support Vector Machines, Deep Learning, TensorFlow, Neural Networks, Convolutional Neural Networks, Recurrent Neural Networks. A few of the projects, that you will be working on are mentioned below:

Project 1: Predicting house prices in California
Domain: Machine Learning
Description: Build a model that predicts median house values in California districts, given metrics such as population, median income, median housing price, etc for each block group in California

Project 2: Learn how Stock Markets like NASDAQ, NSE, BSE, leverage on Artificial Intelligence and Machine Learning to arrive at a consumable data from complex datasets
Domain: Stock Market
Description: As a part of the project, you need to import data using Yahoo data reader of the following companies: Yahoo, Apple, Amazon, Microsoft, and Google. Perform fundamental analytics including plotting closing price, plotting stock trade by volume, performing daily return analysis, and using pair plot to show the correlation between all the stocks.

Project 3: See how Artificial Intelligence and Data Science is used in the field of engineering by taking up this case study of MovieLens Dataset Analysis.
Domain: Engineering
Description: The GroupLens Research Project is a research group in the Department of Computer Science and Engineering at the University of Minnesota. The researchers of this group are involved in many research projects related to the fields of information filtering, collaborative filtering, and recommender systems.

Project 4: Learn how leading Healthcare industry leaders make use of Artificial Intelligence and Data Science to leverage their business.
Domain: Health Care
Description: Predictive analytics can be used in healthcare to mediate hospital readmissions. In healthcare and other industries, predictors are most useful when they can be transferred into action. But historical and real-time data alone are worthless without intervention. More importantly, to judge the efficiency and value of forecasting a trend and ultimately changing behavior, both the predictor and the intervention must be integrated back into the same system and workflow where the trend originally occurred.

Project 5: Understand how the Insurance leaders like Berkshire Hathaway, AIG, AXA, etc make use of Artificial Intelligence by working on a real-life project based on Insurance.
Domain: Insurance
Description: Use of predictive analytics has increased greatly in insurance businesses, especially for the biggest companies, according to the 2013 Insurance Predictive Modelling Survey. While the survey showed an increase in predictive modelling throughout the industry, all respondents from companies that write over $1 billion in personal insurance employ predictive modeling, compared to 69% of companies with less than that amount of premium.

Project 6: See how banks like Citigroup, Bank of America, ICICI, HDFC make use of Artificial Intelligence to stay ahead of the competition.
Domain: Banking
Description: A Portuguese banking institution ran a marketing campaign to convince potential customers to invest in a bank term deposit. Their marketing campaigns were conducted through phone calls, and sometimes the same customer was contacted more than once. Your job is to analyze the data collected from the marketing campaign.