# Building Intelligent Applications with AI and ML - Level 1 Training

Duration: **3 Day**

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## Overview

**Exclusive - Learn the fundamentals of Artificial Intelligence and Machine Learning to develop intelligent applications.**

Intelligent applications that are developed using Artificial Intelligence and Machine Learning are helping businesses take critical initiatives. These applications incorporate the power of predictive and prescriptive analytics, consumer data, and cutting-edge technologies. They are used by many organizations and enterprises to automatically discover, learn and give predictions and recommendations. Examples of such applications include risk analysis, fraud detection, and prevention, personalized health services, etc.

This course focuses on covering the fundamentals like Statistics, probability, and a variety of machine learning algorithms that form the building blocks for the development of intelligent applications.

**Is This The Right Course?**

- Basic familiarity with Python programming.
- Basic understanding of Data Terminologies.
- Familiarity with enterprise IT.
- Foundational knowledge in mathematical concepts like linear algebra and probability.
- Basic linux skills.
- Basic SQL skills.

**Who Should Attend?**

This is an introduction-level hands-on course suitable for everyone who wants to explore the field of Artificial Intelligence (AI) and Machine Learning (ML). This course covers the foundations of AI, ML, programming, search, and logic along with their applications to computational problems. This is a level 1 course in building your skills for developing Intelligent applications using Machine Learning and Artificial Intelligence. Anyone who wants to shift their career to AI and ML can attend this course such as

- Business Analysts
- Data Analysts
- Developers
- Administrators
- Architects
- Managers
- Anyone new to AI and ML who wants to understand the foundations of ML and AI for developing ML applications.

## Prerequisites

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## What You Will Learn

- Explore Jupiter notebooks and Python
- Recall and Remember Statistics and Probability concepts and explore coding in Python for data analysis
- Understand advanced probability concepts and data visualizations using libraries such as Matplotlib, seaborn
- Understand various Machine Learning Algorithms and their applications
- Understand various Predictive Models
- Apply Machine Learning algorithms to build predictive models
- Understand Recommendation Systems
- Understand how to deal with data in the real world
- Apply Machine Learning on Big Data using Apache Spark
- build UI and REST APIs for ML models

## Outline

1. **Getting Started with Jupitor Notebooks and Python**
    - Installing Python 3.x and Data Science environment
    - Importing required modules
    - Writing and executing Python code in Jupiter notebook
    - Understanding Data Visualizations using Matplotlib and seaborn.
    - Running Python scripts
    - Statistics and Probability Essentials
        - Understanding Descriptive and Inferential Statistics and the difference between them
        - Understanding Data types - quantitative and qualitative
        - How to understand the spread of data with measures of Central Tendency and dispersion
        - Understanding dirty data - missing values and outliers
        - Understanding probability distributions, Probability density function and probability mass function
        - Understanding the spread and distribution of data using Python.
        - Introduction to Percentiles and Moments and why they are important?
        - Understanding Hypothesis Testing and various types of Hypothesis tests with their applications.
    - Advanced Probability Concepts
        - Covariance and Correlation and their role in understanding Data
        - How Conditional Probability helps in predictive analytics?
        - Baye's Theorem and it's applications
2. **Machine Learning Algorithms**

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- Understanding Different Types of Machine Learning Algorithms - Supervised, Semi-Supervised, UnSupervised, Reinforcement Learning
- Distinguish between Linear and Non-Linear, Distance-based, Parametric and Non-Parametric machine learning models
- Understanding different phases of building Machine Learning Models
- Differentiate between Classification and Regression
- An overview of linear and logistic regressions
- An overview of decision trees and random forests
- An overview of KNN and SVM
- How to Build Predictive Models with available data?
  - Understanding your data - Data loading and descriptive analysis
  - Dealing with unclean data - Data Cleaning and Pre-processing
  - Building machine learning models with Linear Regression and Logistic Regression
  - Understand when to apply Polynomial Regression and build a model
  - Building a predictive model using multivariate regression
  - Multi-level models

3. **Evaluating and Tuning your models with advanced Machine Learning with Python**
   - Understanding model fit - overfitting and underfitting, Bias-Variance Trade-Off
   - Understanding model evaluation metrics for regression and classification
   - Understanding K-fold cross-validation to avoid overfitting
   - Bayesian models
   - Implementing Email spam classifier with Naïve Bayes Classifier
   - Understand K-Nearest Neighbors Algorithm and using KNN for predictive analytics
   - Understand Gradient Descent, Stochastic Gradient Descent, and tune your model
   - Understand ensemble methods, bagging and boosting
   - Understand various boosting algorithms
   - Unsupervised Machine Learning
     - Understanding Clustering
     - Understand K-Means Clustering with a case study
     - Understanding Dimensionality Reduction and Principal Component Analysis
     - Applying PCA on a real world dataset
   - Understanding and Building Recommendation Systems
     - What are recommendation Systems
     - Understanding User-based and Item-based Collaborative Filtering
     - Finding similar movies
     - Improving the results of movie similarities
     - Making movie recommendations to people
     - Improving our recommendation results