



MACHINE LEARNING & DEEP LEARNING PRODEGREE

Imarticus Learning is an
EdTech Partner of:



INDUSTRY LANDSCAPE

Machine learning marks a major technological breakthrough in the field of computer science, big data and artificial intelligence. Machine learning enables organizations to improve and optimize their products and services. It is key in analyzing and understanding the data that organizations collect to empower their business.

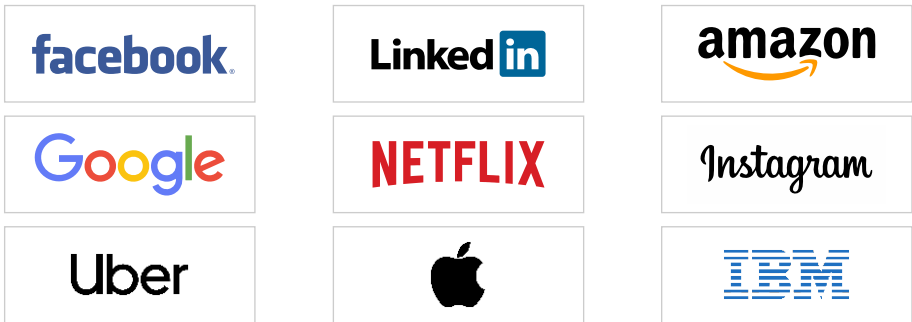
IN DEMAND SKILL SETS

- Neural Networks
- Predictive Modeling
- Mathematics
- Statistics
- Machine Learning
- Deep Learning

The machine learning market size is expected to grow **\$8.8 Billion** by **2022**, at a Compound Annual Growth Rate (CAGR) of **44.1%** during the forecast period.

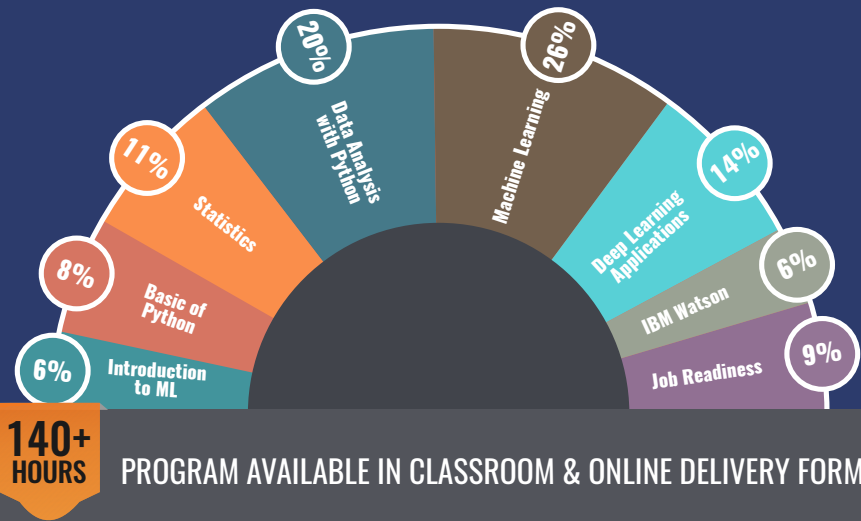
Artificial Intelligence will create **2.3 million** Machine Learning jobs by **2020**, growing exponentially every year. Finding and attracting Machine Learning and Data Science talent has become a strategic imperative for every company.

TOP COMPANIES EXPLOITING MACHINE LEARNING & DEEP LEARNING



OVERVIEW OF PROGRAM

The Machine Learning & Deep Learning Prodegree, in association with IBM as the EdTech Partner, is a first-of-its-kind 140+ hour program providing in-depth exposure to Data Science, Machine Learning and Deep Learning through a rigorous industry-aligned curriculum featuring Python and IBM Watson.



CURRICULUM

LEVEL 1. INTRODUCTION TO MACHINE LEARNING & BASICS OF PYTHON

OVERVIEW OF MACHINE LEARNING	ML Spectrum & Journey Intro to Modeling Lifecycle Intro to Supervised Learning Intro to Unsupervised Learning
INTRODUCTION TO PYTHON	Python Basics Spyder IDE Jupyter Notebook Floats and Strings Simple Input & Output Variables Single and Multiline Comments
CONTROL STRUCTURES	Booleans and Comparisons Conditional Statements (IF ELSE) Operator Precedence Lists - Operations and Functions
FUNCTIONS AND MODULES	Function Arguments Comments and doc strings Functions as Objects Modules Standard Lib and Pip
EXCEPTIONS AND FILES	Exception Handling Raising Exceptions Assertions Working With Files

LEVEL 2. INTRODUCTION TO STATISTICS

BASIC PROBABILITY AND TERMS	Rules of Probability Permutations and Combinations Bayers Theorem Descriptive Statistics Compound Probability Conditional Probability
PROBABILITY DISTRIBUTIONS	Types of Distributions Functions of Random Variables Probability Distribution Graphs Confidence Intervals
DATA TRANSFORMATION	Merge, Rollup, Transpose and Append Missing Analysis and Treatment Outlier Analysis and Treatment
EXPLORATORY DATA ANALYSIS	Summarizing and Visualizing the Important Characteristics of Data Hypothesis Testing Visualizations Univariate, Bivariate Crosstabs, Correlation

LEVEL 3. DATA ANALYSIS WITH PYTHON FOR MACHINE LEARNING

PANDAS	Introduction to Pandas IO Tools Basics of NumPy NumPy Functions Pandas - Series and Dataframes
DATA VISUALIZATION	Basics of Data Visualization Line Plots Bar Charts Pie Charts Histograms Scatter Plots Parallel Coordinates
LINEAR REGRESSION	Implementing Simple & Multiple Linear Regression with Python Making Sense of Result Parameters Model Validation Handling other Issues/Assumptions in Linear Regression: Handling Outliers, Categorical Variables, Autocorrelation, Multicollinearity, Heteroskedasticity Prediction and Confidence Intervals Use Cases
LOGISTIC REGRESSION	Logistic Regression with Python Making Sense of Result Parameters: Wald Test, Likelihood Ratio Test Statistic, Chi-Square Test Goodness of Fit Measures Model Validation: Cross Validation, ROC Curve, Confusion Matrix
DECISION TREES	Implementing Decision Trees using Python Homogeneity Entropy Information Gain Gini Index Standard Deviation Reduction Vizualizing & Prunning a Tree
TIME SERIES	Handling Time Series Data Holt-Winters Model ARIMA Model ACF/PACF Functions

PROJECT 1 **LINEAR REGRESSION** ▶ Property Price Prediction Using Linear Regression

PROJECT 2 **LOGISTIC REGRESSION** ▶ Identifying Good & Bad Customers for Granting Credit

PROJECT 3 **TIME SERIES** ▶ Forecasting and Predicting the Sales of Furniture for a Superstore

PROJECT 4 **DECISION TREES** ▶ Identifying Good & Bad Customers for Granting Credit

LEVEL 4. MACHINE LEARNING

INTRODUCTION TO MACHINE LEARNING

Machine Learning | ML Modelling Flow | How to Treat Data in ML | Parametric & Non-Parametric ML Algorithm | Types of Machine Learning | Performance Measures | Bias-Variance Trade-Off | Overfitting & Underfitting | Bootstrap Sampling | Bagging Aggregation | Boosting

OPTIMISATION TECHNIQUES

Constant Learning Rate Procedures | Adaptive Learning Procedures | Batch Gradient Descent | Mini-Batch Gradient Descent | Stochastic Gradient Descent | Nesterov Accelerated Gradient | Root Mean Squared Propagation | Adaptive Moment Estimation Procedure

ML ALGORITHM - SUPERVISED LEARNING AND UNSUPERVISED LEARNING

Linear Regression with Stochastic Gradient Descent | Logistic Regression with Stochastic Gradient Descent | K-Nearest Neighbour | Eager Methods vs. Lazy Methods | Nearest Neighbor Classification | Building kD-Trees | Support Vector Machine | Perceptron Algorithm. What is Clustering? | K-means Algorithm | K-means Clusters

ENSEMBLE ALGORITHMS

Ensemble Techniques | Bootstrap Aggregation | Random Forest | Boosting

NEURAL NETWORKS

Neural Networks | The Biological Inspiration Perceptron Learning & Binary Classification | Backpropagation Learning | Learning Feature Vectors for Words | Object Recognition

LEVEL 5. DEEP LEARNING

KERAS

Keras for Classification and Regression in Typical Data Science Problems | Setting up KERAS | Different Layers in KERAS | Creating a Neural Network | Training Models and Monitoring Artificial Neural Networks

PROJECT 5

ANN ON KERAS

► Credit Default Using ANN on Keras

TENSORFLOW

Introducing Tensorflow | Neural Networks using Tensorflow Debugging and Monitoring | Convolutional Neural Networks | Unsupervised Learning

PROJECT 6

CNN ON TENSORFLOW

► Handwriting/Facial Recognition Using CNN on TensorFlow

RNN

Recurrent Neural Network | Application Areas | Case Study

LONG SHORT TERM MEMORY (LSTM)

Introducing LSTM | Application Areas | Case Study

LEVEL 6. JOB READINESS

RESUME WRITING

The Why, the What and the How of Resumes | Personal Branding Tips and Resources | Using Social Media | CV Discussion

MOCK INTERVIEWS - DOMAIN

1:1 or Panel Mock Interviews with Faculty to Clear the Technical Round of Interviews to Give You Confidence to Face Real World Scenarios

LEVEL 7. THE FUTURE WITH IBM WATSON

IBM WATSON DEVELOPER

Fundamentals of IBM Watson | Advantages of IBM Watson | Use Cases of Cognitive Services | Applications on IBM Watson

PROJECT 7

IBM WATSON

► Application on Watson

CAPSTONE PROJECT

PROJECT	PROBLEM STATEMENT	GOAL	TECHNIQUES
Predicting Consumers' Buying Behaviour on an E-Commerce Portal.	How can Machine Learning help in modeling and predicting human buying behavior?	Use historical customer order data of eCommerce giant, GroceryKart, to predict which previously purchased products will be reordered during the next checkout by a user.	Use various Machine Learning techniques taught during the course of this Prodegree.

KEY HIGHLIGHTS



COMPREHENSIVE COVERAGE

The Machine Learning Prodegree is a 140-hour industry-endorsed program covering Machine Learning with Python. Aspirants also learn about Deep Learning concepts with Keras & Tensorflow, and tools such as IBM Watson.



COLLABORATION WITH IBM

The Machine Learning and Deep Learning Prodegree is co-created with IBM as the EdTech Partner, who are at the forefront of technology innovation.



PROJECT-BASED LEARNING

The program provides an edge through our unique project-based methodology, focusing on real life projects. The Prodegree features seven projects covering tools such as Python, Keras, Tensorflow and IBM Watson and teaches you how to apply predictive models to massive datasets typically found in healthcare, financial services, retail, social media and many more!



CLOUD LAB

Learn on a state-of-the-art virtual lab, with 24/7 access to all required software. The platform is agnostic of machine configuration, with no installation and compatibility issues, learn anytime, anywhere!



JOB READINESS

The Imarticus Career Assistance Services (CAS) team prepares you to be job-ready through extensive mock interviews and resume building workshops.



MENTORSHIP

Industry experts from leading companies act as your personal mentor to advise and guide you in your journey towards job-readiness.

TWO DELIVERY MODES TO CHOOSE FROM:
CLASSROOM DELIVERY OR ONLINE DELIVERY

CASE STUDIES

MODELS

PROBLEM STATEMENT

Decision Tree and
Random Forest

Predicting Term Deposit Subscriptions for a Bank

KNN

Predicting Occurance of Breast Cancer

Linear Regression

Predicting House Prices using Real Estate Data

Logistic regression

Classifying Type of Flower based on Botanical Data

Neural Network

Predicting the Close Value of a Financial Firm's Stock

SVM

Predicting Credit Card Default for a Bank

Unsupervised Learning

Predicting Brand of a Car by its Specifications

FACULTY

ARUN UPADHYAY

Arun has over 14 years experience in IT and has conducted SAS training for Infosys, Wipro, IBM, Genpact, ICICI Bank, Reliance Mutual

Fund. He is a certified, accredited IT professional who has successfully trained more than 10,000 students in different technologies like Python, SAS and R. He has cleared many Microsoft international certifications such as MCAD, MCPD, MCTS etc. and is a Microsoft-certified trainer.

VINAY BORHADE

Vinay's tech expertise includes AI - Machine Learning, Python, PL-SQL, and Big Data - Netezza, Java/J2EE. Having served more than 10 years with Bank of America (Merrill Lynch), he has worked on projects like Finance, Liquidity and Capital Risk (Regulatory Reporting) and has won repeat business from clients for BOA using technologies like Machine Learning, Capitalize: Data Analytics, Quartz, Python, IBM Netezza, Oracle (Hexadata).

Y LAXMI PRASAD

With close to eight years of experience as the director of Clinital, YL Prasad is an expert in machine Learning & SAS programming. Based in Hyderabad, he has worked extensively in the SAS programming and consulting sector. Educated at JNTU, YL Prasad started off his career as a consultant with Cognizant before working as a SAS Consultant with Siro Clinipharm.

★ Indicative Faculty ★

PLACEMENT ASSISTANCE

Imarticus provides 100% assistance throughout the program to guide and help navigate ample career options and help you get job-ready from Day 1.



RESUME BUILDING

Refine and polish your resume with experts tips to help you land your coveted job



INTERVIEW PREP

Prepare you to ace HR and technical interview rounds with interview Q&A and career mentorship



MOCK INTERVIEWS

Preparing candidates to face interview scenarios through 1:1 mock interviews with industry veterans

COLLABORATION WITH IBM



COGNITIVE CLASS

Get access to IBM's state-of-the-art content made and delivered by the experts.



IBM PLATFORMS

Aspirants are provided access to IBM Cloud Platforms featuring IBM Watson and other software for 24/7 practice.



IBM CERTIFICATION

All candidates earn IBM Badges on completion of the Prodegree with an option of additional IBM certifications.

IBM is a cognitive solutions and cloud platform company that leverages the power of innovation, data and expertise to improve business and society. For more information, visit www.ibm.com

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