

# ANSH INFOTECH

Development | Training | Consultancy  
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Course Name - **Machine Learning**

Category - **Professional**

Duration - **2 Months**

## PRE REQUISITES

- Basic python
- Machine learning

## COURSE CONTENT

### PYTHON

- Values and Variables
- Integer and String Values
- User Input
- String Formatting
- Expressions and Arithmetic Expressions
- Arithmetic Examples
- Conditional Statements Boolean expressions
- If/Else statement
- Other Conditional Expressions
- Iteration Loops
- Using Functions
  - Introduction to Using Functions
  - Functions and Modules
  - Writing Functions
  - Function Basics
  - Parameter Passing
  - Custom Functions vs. Standard Functions
- Global Variables
- Objects Using Objects
- String, File Objects
- Lists
- Tuples, Dictionaries, and Sets

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- Class Design Composition and Inheritance

## MACHINE LEARNING

- Basics
  - Unsupervised, Supervised, and Reinforcement
  - Overfitting, Underfitting
  - Bias-Variance Trade-Off
- Gradient Descent- Stochastic, Batch
  - Principal Component Analysis (PCA)
  - Linear Discriminant Analysis (LDA)
  - Learning Vector Quantization (LVQ)
  - Kernel Smoothing Methods
  - Regularisation Methods- Ridge,LASSO
  - Partial Least Squares
  - Ordinary Least Squares
  - Ensemble Learning- Bagging (bootstrap aggregation), Boosting, Blending, Stacking
  - Kernel Density Estimation
  - AIC, BIC
  - Radial Basis Functions
  - K-fold Cross-Validation
  - Generalised Additive Models (GAMs)
  - Gradient Boosting
  - Multivariate Adaptive Regression Splines (MARS)

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- NLP
- Word Sense Disambiguation
- Machine Translation
- Pronoun Resolution
- Regular Expressions
- Tokenization
- Lemmatization
- Stemming
- Evaluation Metrics
  - Precision
  - AUC
  - Recall
  - Mean Absolute Percentage Error
  - Specificity
  - Root Mean Square Error
- Algorithms
  - Logistic Regression
  - Linear regression: Usually performed through OLS
  - Naive Bayes
  - K Means Clustering
  - K-Nearest Neighbors
  - Classification and Regression Trees(CARTs)
  - AdaBoost
  - Support Vector machines
  - Random Forest
  - Decision Trees
  - ARIMA

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- ID3
- C4.5, C5.0
- CHAID
- Hierarchical Clustering
- Miscellaneous
  - Curse of Dimensionality
  - Occam's Razor
  - No Free Lunch Theorem
- Deep Learning
  - Bayesian Neural Nets
  - Neural Networks
  - Deep Boltzmann Machine (DBM)
  - Convolutional Neural Networks
  - Deep Belief Networks (DBN)
- Mathematics
  - Stochasticity
  - Hypothesis Testing

## PRACTICALS:-

- Implementation of ML libraries on different datasets.
- Implementation of Linear Regression using gradient descent.
- Implementation of Linear Regression using sklearn.
- Implementation of Logistic Regression using gradient descent.
- Implementation of Logistic Regression using sklearn.
- Implementation of latent space methods on real time datasets.
- Implementation of Neural Networks using Classification.
- Implementation of NLP using Pytorch.
- Implementation of NLP using Tensorflow.
- Implementation of Clustering using K-Means algorithm.
- Implementation of Clustering using Mean shift algorithm.
- To make a Recommendation system using set of algorithms.
- To read and write images using OpenCV in Computer Vision.

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- To read and write videos using OpenCV in Computer Vision.
- To read and write images using OpenCV in Computer Vision.
- To detect object using OpenCV in Computer Vision.
- Motion detection and tracking using OpenCV in Computer Vision.
- Face detection using OpenCV in Computer Vision.
- Implementing deep learning using Bayesian Neural Nets.
- Implementing deep learning using DBM.
- Implementing deep learning using DBN.

