The IoT Academy
Connecting The Unconnected

Offline | 180Hrs

Curriculum List

Machine Learning With Python Course

Week 01 (5 Hrs.) Introduction to Data Science

- Introduction to Data Science
- Introduction to Programming

Week 02 & 3 (6 Hrs.) Python - Basics

- Introduction to Python: Installation and Running (Jupyter Notebook, .py file from terminal, Google Colab)"
- Data types and type conversion
- Variables
- Flow Control : If, Elif, Else
- Loops

Week 02 & 3 (6 Hrs.) Python

- List, List of Lists and List Comprehension
- Set and Tuple
- Dictionary and Dictionary comprehension
- Functions

Week 02 & 3 (6 Hrs.) Python 2

- Error / Exception Handling
- File Handling

Week 04 (6 Hrs.) SQL

- Basics of DBMS
- Basics of SQL
- SELECT WHERE Statements
- JOINS
- GROUP BY and ORDER BY
- PARTITION BY

Week 05 (9 Hrs.) Python Essential Packages

- NumPy
- Pandas
- Data Visualization Library: Matplotlib, Seaborn

Statistics

Week 06 (8 Hrs.) Statistics Basics

- Descriptive Statistics: Central Tendency
- Variance, Standard Deviation
- Covariance
- Perason's and Spearman Correlation Coefficients
- Correlation vs. Causation
- Different types of Plots for Continuous, Categorical variable

Week 07 (8 Hrs.) Probability Theory

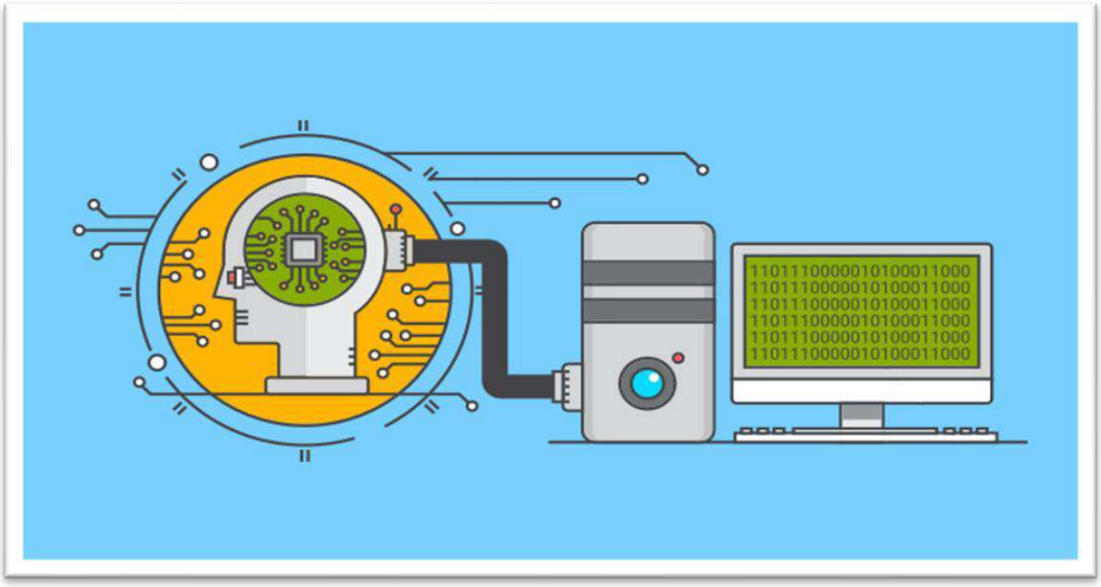
- Basic Count based Probability
- Conditional Probability
- Bayes Rule
- Probability Distribution: Discrete and Continuous
- Normal Distribution
- Bernouli and Binomial Distribution

Week 08 (8 Hrs.) Statistics Advanced

- Population and Sample
- Sampling Distribution and Central Limit Theorem
- Standard Error
- Confidence Interval
- Hypothesis testing: One tail, Two tail and p-value
- Z-test, t-test

Week 09 (8 Hrs.) Exploratory Data Analysis

- Introduction one, two practical dataset
- Missing values treatment
- Outlier detection and treatment
- Plotting (univariate, bi-variate)
- Column Standardization
- Treating Categorical Variable
- Understanding Feature Importance conceptually



Machine Learning

Week 10 (6 Hrs.) Machine Learning

- Types of Machine Learning Methods
- Classification problem in general
- Validation Techniques: CV,OOB
- Different types of metrics for Classification
- Curse of dimensionality
- Feature Selection
- Imabalnced Dataset and its effect on Classification
- Bias Variance Tradeoff

Week 11-13 (14 Hrs.) Machine Learning-1

- Linear Regression
- Logistic Regression
- k-Nearest Neighbour classifier
- Naive Bayes classifier
- Decision Tree
- Support Vector Machine

Week 13-15 (18 Hrs.) Ensempling Techniques

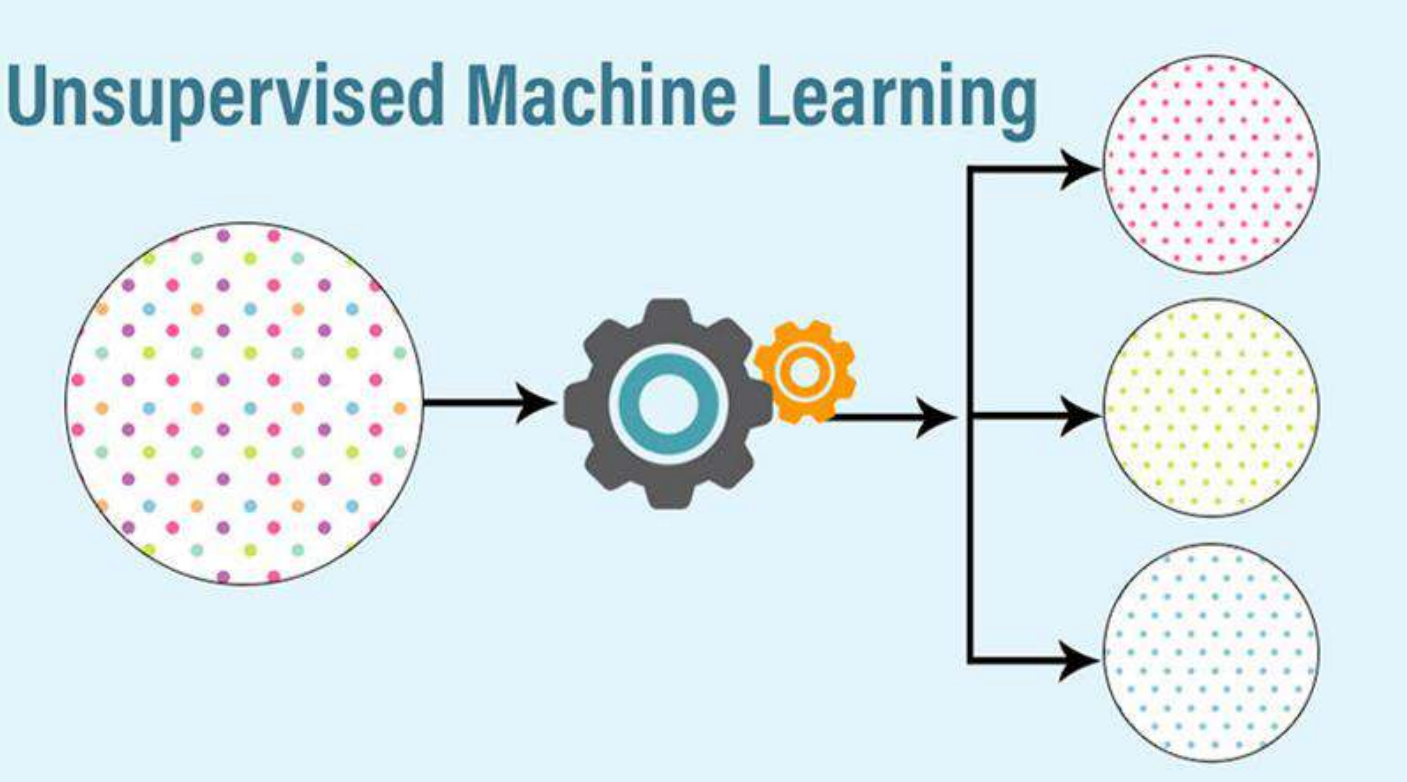
- Ensemble: Bagging
- Random Forest Regressor and Classifier
- Ensemble: Boosting
- Gradient Boosting: AdaBoost
- XGBoost
- Creating your own Ensemble Classifier

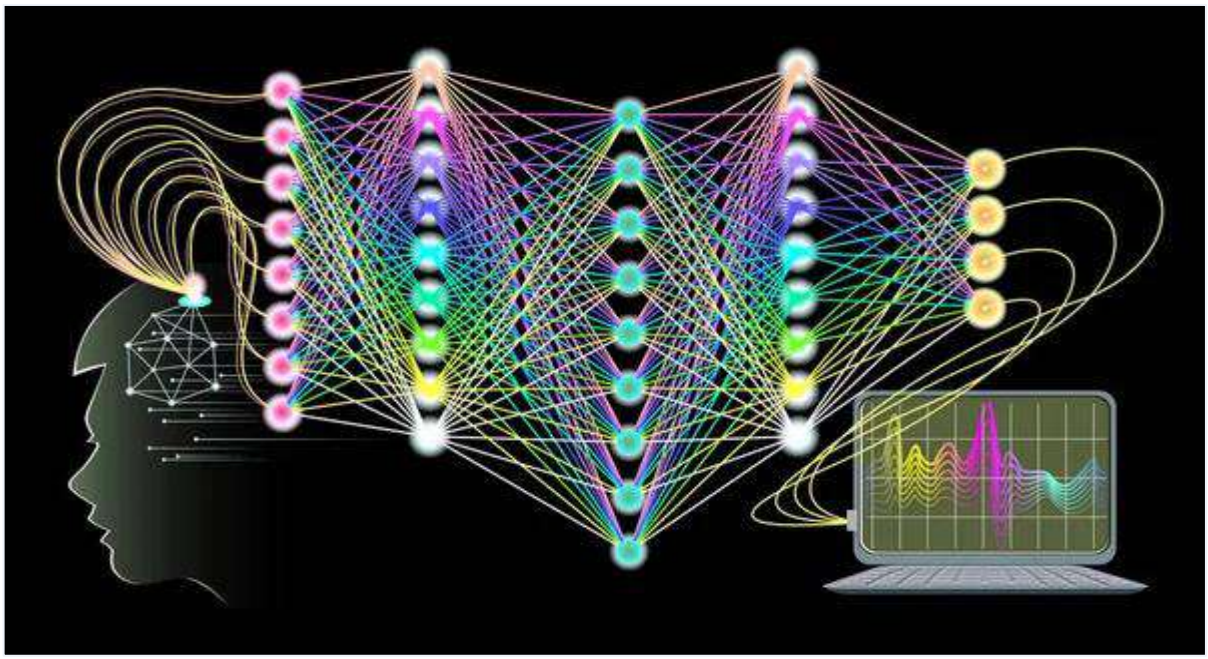
Week 16 (6 Hrs.) Unsupervised Learning -1

- Basics of Clustering: Clustering Metrics, applications
- K Means Algorithm
- Density Based Clustering DBSCAN
- Hierarchical Clustering: Agglomerative

Week 17 (9 Hrs.) Unsupervised Learning -2

- Mathematical Prerequisite: Constraint Optimization Covariance Matrix Matrix Calculus
- Principal Component Analysis
- Singular Value Decomposition





Deep Learning

Week 18 (6 Hrs.) — ANN

- Biological and Artificial Neuron
- Perceptron and its learning rule and drawbacks
- Multilayer Perceptron, loss function
- Activation Functions
- Training MLP: Backpropagation
- Introduction to Tensorflow and Keras
- Vanishing and Exploding Gradient Problem

Week 18 (3 Hrs.) — ANN-1

- Regularization
- Optimizers
- Hyperparameters and tuning of the same

Week 19 (3 Hrs.) — CNN-1

- Images as matrix
- Histogram of images
- Basic filters applied on the images

Week 19 (6 Hrs.) CNN-2

- Convolutional Neural Networks (CNN)
- ImageNet Dataset
- Project: Image Classification
- Different types of CNN architectures
- Using pre-trained model: Transfer Learning

Natural language Processing

Week 20 (6 Hrs.) NLP

- Texts, Tokens
- Bag of Words
- Basic text classification based on Bag of Words
- n-gram: Unigram, Bigram
- Word vectorizer basics, One Hot Encoding

Week 21 (6 Hrs.) NLP-1

- Count Vectorizer
- TF-IDF Vectorizer
- Word2Vec
- Text classification using Word2Vec

Week 22 (6 Hrs.) — RNN & NLP-3

- Recurrent Neural Network (RNN)
- Back Propagation through time
- Different types of RNN: LSTM, GRU
- Biirectional RNN
- Seq 2 Seq model (Encoder Decoder)
- Text generation and classification using Deep Learning

Week 23 (9 Hrs.) — Time Series and Forecasting

- Different Components of Time Series
- Statistical Models of time series forecasting AR MA ARMA ARIMA
- Time Series Forecasting using Stats model library
- Time Series Forecasting using Deep Learning

Capstone Project & Presentation

Week 24 (13 Hrs.) — Project

- Project Discussion
- Presentation

Which tools and technologies will we be using?

Python	NumPy	matplotlib
pandas	seaborn	TensorFlow 2.0
Random Forest	Decision Tree	jupyter

OUR ALUMNI WORK AT

HSBC	KPMG	IBM	wipro
Moody's Analytics	accenture	genpact	ORACLE
kotak Kotak Mahindra Bank	Honeywell	tcs	HDFC BANK
ICICI Bank	WNS	accenture	Deloitte.

Thank You!

Program Information:

Machine Learning with Python

By The IoT Academy

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