



CODING

- Basics of Coding:
- What are variables
- What are operators
- Data types in Python
- Print command
- If-else, loops introduction and small programs

Intermediate coding

- Conditional statements (if-else, elif)
- Nested conditions
- For loop
- While loop
- Break

Introduction to Functions

- Using prebuilt functions (min,max etc.)
- Writing user defined functions
- What is lambda function?
- Map, reduce & Filter functions in Python

Introduction to libraries

- NumPy
- Pandas
- Matplotlib
- Plotly

Machine learning

- What is machine learning.
- ML vs DL.
- How does machine learning work?

Types of machine learning

- Supervised Learning with example.
- Unsupervised Learning with example.
- Reinforcement Learning with example.

Jupyter Notebook Tutorial and Installation.

- How to treat missing values
- How to treat outliers
- Feature to feature relationship
- Correlation
- Seasonality and trends

Algorithms Linear Regression

- Linear Regression with one variable and multiple variables.
- Model Representation.
- Cost function.
- Gradient descent algorithm.
- Use case with model development.

Logistic Regression.

- Model Representation.
- Decision Boundary.
- Cost function.
- Gradient descent algorithm.
- Use case with model development.

Regularization

- The problem of Over fitting.
- Cost Function.
- Regularized Linear regression.
- Regularized Logistic regression.



Support Vector Machine.

- Optimization Objective.
- Large margin intuition and mathematics behind it.
- Kernel.
- Use case with model development.

Dimensionality reduction

- Data compression and Visualization.
- Principle component analysis and its algorithm.
- Choosing the number of principle components.
- Reconstruction from compressed data.
- Use case with model development.

Anomaly Detection.

- Gaussian distribution and its algorithm.
- Developing and evaluating anomaly detection.
- Choosing what features to use.
- Use case with model development.

Recommender System

- Problem formulation.
- Content based recommendation.
- Collaborative filtering.
- Use case with model development.

Neural Networks

- Nonlinear Hypothesis.
- Model Representation.
- Cost Function.
- Backward Propagation.
- Use case with model development

MODEL EVALUATION

- Feature Engineering
- Model Selection
- Model Evaluation Metrics

Model Evaluation Metrics

- Accuracy
- RMSE
- ROC
- AUC
- Confusion Matrix
- Precision
- Recall
- F1 Score
- Over fitting
 - Bias-Variance trade-off
 - Cross Validation



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