

ML Algorithms

➤ Regression Models:

Algorithms	Youtube Source	Scikit Learn Source
Linear Models		
Linear Regression	<ul style="list-style-type: none"> • Linear Regression Theory • Linear Regression Mathematics • Regression Metrics • 	<ul style="list-style-type: none"> • Linear Regression
Ridge Regression (L2 regularization)	<ul style="list-style-type: none"> • Ridge Regression Theory • Ridge Regression Mathematics • Ridge Regression Gradient Descent • Other important points 	<ul style="list-style-type: none"> • What is ridge • Ridge Model • Ridge Regression
Lasso Regression (L1 regularization)	<ul style="list-style-type: none"> • Lasso Regression Theory • Why Lasso creates sparsity 	<ul style="list-style-type: none"> • What is Lasso • Lasso Regression
ElasticNet Regression (L1 + L2)	<ul style="list-style-type: none"> • ElasticNet Regression 	<ul style="list-style-type: none"> • Elastic Net
Polynomial Regression (via feature transformation)	<ul style="list-style-type: none"> • Polynomial Regression 	<ul style="list-style-type: none"> • Polynomial Features
Tree-Based Models		
Decision Tree Regressor	<ul style="list-style-type: none"> • Decision Trees Theory • DT Hyperparameters • 	<ul style="list-style-type: none"> • What is decision Trees • Decision Tree Regressor
Random Forest Regressor	<ul style="list-style-type: none"> • Random Forest Introduction • Bias-variance tradeoff in Random Forest • Bagging vs Random Forest • Random Forest Hyperparameters 	<ul style="list-style-type: none"> • Random Forest Regressor

	<ul style="list-style-type: none"> • Random Forest Hyperparameter Tuning 	
Gradient Boosting Regressor	<ul style="list-style-type: none"> • Gradient Regression Theory • Gradient Boosting Regression 	<ul style="list-style-type: none"> • Gradient Regressor
XGBoost Regressor	<ul style="list-style-type: none"> • XGBoost Introduction • XGBoost Regression 	<ul style="list-style-type: none"> • XGBoost Documentation • XGBoost Medium • XGBoost GFG
Support Vector Machines		
Support Vector Regressor (SVR)	<ul style="list-style-type: none"> • Introduction to SVM 	<ul style="list-style-type: none"> • SVR
Instance-Based Learning		
K-Nearest Neighbors Regressor (KNN)	<ul style="list-style-type: none"> • KNN Introduction 	<ul style="list-style-type: none"> • KNN Regressor
Ensemble Methods		
Voting Regressor	<ul style="list-style-type: none"> • Voting Theory • Voting Ensemble Regression 	<ul style="list-style-type: none"> • Voting Regressor
Bagging Regressor	<ul style="list-style-type: none"> • Bagging Introduction • Bagging Regressor 	<ul style="list-style-type: none"> • Bagging Regressor
AdaBoost Regressor	<ul style="list-style-type: none"> • Adaboost Step By Step 	<ul style="list-style-type: none"> • AdaBoost Regressor

➤ **Classification Models:**

Algorithms	Youtube Source	Scikit Learn Source
Linear Models		
Logistic Regression	<ul style="list-style-type: none"> • Logistic Regression Part 1 • Logistic Regression Part 2 	<ul style="list-style-type: none"> • Logistic Regression
Linear Discriminant Analysis (LDA)		<ul style="list-style-type: none"> • LDA
SGD Classifier		<ul style="list-style-type: none"> • SGD Classifier
Ridge Classifier		<ul style="list-style-type: none"> • Ridge Classifier
Perceptron		<ul style="list-style-type: none"> • Perceptron
Tree-Based Models		

Decision Trees Classifier	Same as Regression video Links	• Decision Tree Classifier
Random Forest Classifier	Same as Random Forest Regressor video	• Random Forest Classifier
Gradient Boosting Classifier	• Gradient Boosting Classifier	• Gradient Boosting Classifier
XGBoost Classifier	• XGBoost Classifier	
Support Vector Machines		
SVM (SVC)	<ul style="list-style-type: none"> • SVM Theory • SVM Kernel Trick • SVM Geometric Intuition 	• SVC
Naive Bayes (Naive Bayes Theory)		
Gaussian Naive Bayes		• Gaussian Naive
Multinomial Naive Bayes		• Multinomial Naive Bayes
Instance-Based Learning		
K-Nearest Neighbors (KNN)	• KNN	• KNN Classifier
Ensemble Methods		
Voting Classifier	• Voting Classifier	• Voting Classifier
Bagging Classifier	• Bagging Classifier	• Bagging Classifier
AdaBoost Classifier	• Adaboost Classifier	• Adaboost Classifier

➤ **Some Other Things to learn before attempting models:**

- Feature Preprocessing → [Scikit Learn Documentation](#)
- Feature Engineering

a) Feature Transformation

▪ Missing Values Imputation

Algorithms	Youtube Source	Scikit Learn Source
Simple Imputer	Simple Imputer (Numerical) Simple Imputer (Categorical)	Simple Imputer
Missing Indicator	Missing Imputer	Missing Indicator
KNN Imputer	KNN Imputer	KNN Imputer
Iterative Imputer	Iterative Imputer	Iterative Imputer

▪ Outlier Detection

- Z-score Method
- IQR Based
- Percentile
- Winsorization

▪ **Mathematical Transformation on data**

- **Function Transformer**

Algorithms	Youtube Source	Scikit Learn Source
Function Transformer	Function Transformer	Function Transformer

- **Power Transformer**

Algorithms	Youtube Source	Scikit Learn Source
Power Transformer	Power Transformer	Power Transformer

▪ **Encoding Categorical Data**

- **Ordinal Encoding**

Algorithms	Youtube Source	Scikit Learn Source
Ordinal Encoder	Ordinal and label Encoder	Ordinal Encoder
Label Encoder	Same video as given above	Label Encoder

- **Nominal Encoding**

Algorithms	Youtube Source	Scikit Learn Source
One Hot Encoder	One Hot Encoder	One Hot Encoder

▪ **Encoding Numerical Data**

- **Discretization and Binarizer**

Algorithms	Youtube Source	Scikit Learn Source
Discretization	Discretizer and Binarizer	KBinsDiscretizer
Binarizer	Same as above	Binarizer

- **Feature Scaling**
 - **Standard Scalar**

Algorithms	Youtube Source	Scikit Learn Source
Standard Scaler	Standard Scaler	Standard Scaler

- **Normalizer**

Algorithms	Youtube Source	Scikit Learn Source
Normalizer	Normalizer	Normalizer

b) **Feature Selection** → [Feature Selection Scikit Learn Documentation](#)

c) **Feature Extraction**

- **PCA:**

→ [Scikit Learn Documentation](#)

→ Videos:

- [Part 1](#)
- [Part 2](#)
- [Part 3](#)

- Gradient Descent (all including SGD) (**Important**)
 - a)
- ROC Curve
- Handle Imbalanced Data → [Video Link](#)
- Metrics and Scoring → [Scikit Learn Documentation](#)

➤ **IIT Madras Lecture Videos:**

- [Playlist](#)

➤ **Git Hub Repo Campus X:**

- [Git Hub Repo](#)