Data

X & y --> Supervised Machine learning
X --> unsupervised machine learning

Task

Target (y) - is continuous - Regression
Target (y) is categorical --> Classification

Model

Regression - LinearRegression, SGDRegressor
Classification - LogisticRegression, KNN Classifier

Loss

Sum of squared error is minimum - LinearRegression
Maximum Likelihood Estimation - LogisticRegression

Learning

SGD Regressor - Gradient Descent

LogisticRegression - Gradient Ascent

Evaluation

Regression - mae , mse , rmse , r2_score
Classification - Accuracy, precision, recall, f1 score, precision_recall curve, confusion matrix

Intuition Behind Logistic Regression

- Initialize the parameters (w) randomly.
- **Repeat until convergence:**
  - Calculate the gradient of the log-likelihood function with respect to the parameters (w). The gradient tells us the direction of steepest increase in the log-likelihood.
  - Update the parameters in the direction of the gradient:

    `w = w + alpha * gradient(ll(w))`

    where alpha is the learning rate (controlling the step size).