

Regression

Regression is a supervised machine learning technique which is used to predict continuous values.

Classification

Classification is a supervised machine learning method where the model tries to predict the correct label of a given input data.

Clustering

The process of grouping similar data points together without predefined categories, helping to discover hidden patterns and structures within a dataset.

- Grouping data points into clusters based on their similarity or common characteristics.

Underfitting

→ Underfitting is when the training error is high.

→ Underfitting means that your model makes accurate, but initially incorrect predictions.

Overfitting

Overfitting is when the testing error is high.

Overfitting means that your model makes not accurate predictions.

Optimizations-

Optimizers are algorithms that adjust the model's parameters during training to minimize a loss function. They enable neural networks to learn from data by iteratively updating weights and biases.

Types of Optimizers:-

- Stochastic Gradient Descent
- Adam
- RMSprop
- AdaGrad
- Momentum

Three Main Functions:-

- Parameters
- Loss function
- Optimization function.

Gradient Descent:

Gradient descent is an iterative optimization algorithm for finding the local minimum of a function.

Stochastic Gradient Descent:-

Stochastic gradient descent is an optimization algorithm often used in machine learning applications to find the model parameters that correspond to the best fit between predicted and actual outputs.

Gradient Descent

Stochastic Gradient Descent.

→ All points in calculating loss and derivatives.

→ Single point in loss function and its derivative randomly

Logistic Regression

A process of modeling the probability of a discrete outcome given an input variables.

∴ To predict a binary outcomes such as Yes or No.

Loss function of Regression.

→ Mean square loss

→ Mean absolute loss.

Loss function of Classification

→ Sigmoid loss

→ Hinge loss

→ Logistic loss

Loss function of Multiclass:

- Softmax
- Cross entropy

Hyperparameters:

Hyperparameters are parameters whose value are set before starting the model training process.

Regularization:

A regularization is a technique used to prevent overfitting and improve the generalization of neural networks.

∴ Regularization for hyperparameters helps modify the gradient so that it does not step in directions that lead it to overfit.

- Dropout
- Drop Connect
- L_1 penalty
- L_2 penalty