Name:- Bharti Dhote Rollno:- 2023KUCP1049

ASSIGNMENT

Logistic Regression Implementation

→ Hypothesis Function

$$h_\theta(x) = \frac{1}{1 + e^{-(\theta^T x)}}$$

This gives the probability that the output $y = 1$ given input x.

→ Cost Function

The cost function for Logistic Regression is

$$J(\theta) = -\frac{1}{m} \sum_{i=1}^{m} [y^{(i)} \log(h_\theta(x^{(i)})) + (1 - y^{(i)} \log(1 - h_\theta(x^{(i)}))]$$

Where: m = no. of training examples

$y^{(i)}$ = actual label (0 or 1)

$h_\theta(x^{(i)})$ = predicted probability

Q.1 Can Logistic Regression be used for Regression problems?

Ans No, despite its name, Logistic Regression is not used for regression tasks.

It is used for classification problems, especially binary classification (0 or 1).

It predicts the probability of a class rather than a continuous output.

How is Logistic Regression different from Linear Regression?

Feature	Linear Regression	Logistic Regression
Purpose	Predicts continuous value	Predicts probabilities / classes
Output range	$(-\infty, +\infty)$	$(0, 1)$
Activation function	None	Sigmoid function $\frac{1}{1+e^{-x}}$
Cost function	Mean squared error	Log Loss
Use Case	Regression problems	Classification problems