

Computer Science & Information Systems

Machine Learning - Lab sheet - Module 4

EXERCISE 2 - LOGISTIC REGRESSION USING GRADIENT DESCENT

1 Objective

The objective is to

- implement Logistic regression using gradient descent algorithm on a given dataset.

2 Steps to be performed

Tool Python3

Libraries required numpy, matplotlib, pandas, sklearn

Input Admission.csv

Machine Learning Model Logistic Regression

Implementation ML_Lab 8 LogisticRegression_GradientDescent.ipynb

Steps .

- Understand the problem.
- Import required Python libraries.
- Import the dataset and convert to as dataframe.
- Preprocess the data. Extract columns as X and y .
- Visualize the dataset.
- Implement Sigmoid function.

$$g(z) = \frac{1}{1 + e^{-z}}$$

- Compute the hypothesis.

$$h_{\theta}(x) = g(\theta^T x)$$

- Compute the cost function.

$$J(\theta) = \frac{1}{m} (-y^T \log(h) - (1 - y)^T \log(1 - h))$$

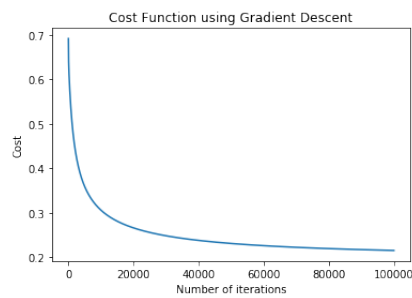
- Implement gradient descent algorithm to update the weights.
repeat until convergence

$$\theta_1 = \theta_1 - \alpha \frac{1}{m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)}) * x^{(i)}$$
$$\theta_0 = \theta_0 - \alpha \frac{1}{m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)})$$

- Visualize the model and the results.
- Measure the performance of the model.

3 Results

- A logistic regression model is fitted for the given dataset.



4 Observation

- The machine learning model is implemented using gradient descent algorithm.