GHARDA INSTITUTE OF TECHNOLOGY

Department of Computer Engineering

Machine Learning Lab BE Computer (Semester-VII)

Experiment No.3 : Logistic Regression

Aim- To study, understand and implement a logistic regression algorithm.

Theory-

Logistic regression aims to solve classification problems. It does this by predicting categorical outcomes, unlike linear regression that predicts a continuous outcome.

In the simplest case there are two outcomes, which is called binomial, an example of which is predicting if a tumor is malignant or benign. Other cases have more than two outcomes to classify, in this case it is called multinomial. A common example for multinomial logistic regression would be predicting the class of an iris flower between 3 different species.

General Terms:

Below are statistical concepts commonly used in testing.

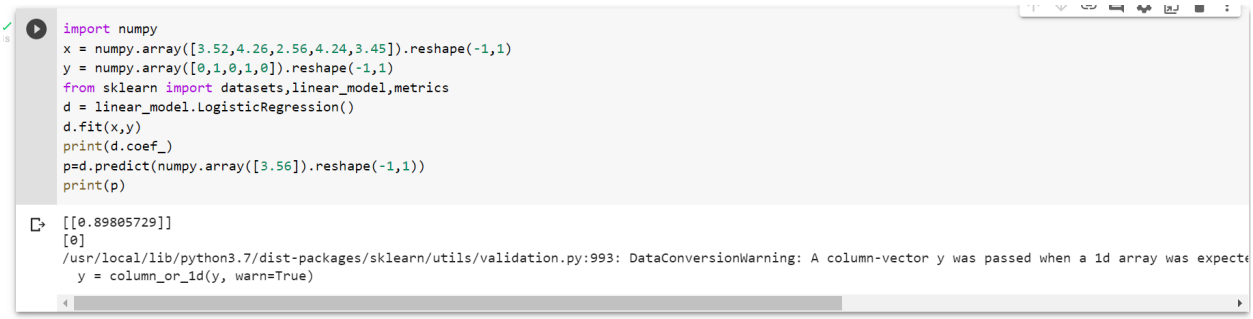
Sigmoid: A sigmoid function is an activation function. The output of the sigmoid function is always between a range of 0 to1.

Optimization: optimization is a process that maximizes or minimizes the variables or parameters of a machine learning model with respect to the selected loss function.

Code -

```
import numpy
x = numpy.array([3.52,4.26,2.56,4.24,3.45]).reshape(-1,1)
y = numpy.array([0,1,0,1,0]).reshape(-1,1)
from sklearn import datasets,linear_model,metrics
d = linear_model.LogisticRegression()
d.fit(x,y)
print(d.coef_)
p=d.predict(numpy.array([3.56]).reshape(-1,1))
print(p)
```

Results-



Discussion-

Logistic regression is used to predict the class of the individuals based on one or multiple predictor variables. Which can have only two possible values: 0 or 1.

Conclusion-

The concept of logistic regression is studied and implemented using sigmoid functions as well as python built-in functions.

References-

1. https://www.w3schools.com/python/python_ml_logistic_regression.asp
2. https://www.analyticsvidhya.com/blog/2022/02/implementing-logistic-regression-from-scratch-using-python/
3. https://towardsdatascience.com/logistic-regression-from-scratch-in-python-ec66603592e2
4. https://dhirajkumarblog.medium.com/logistic-regression-in-python-from-scratch-5b901d72d68e