Terna Engineering College

Department of Artificial Intelligence and Data Science

Program : Sem VI

Course: Machine Learning Lab

Experiment No.05

PART A

(PART A: TO BE REFERRED BY STUDENTS)

A.1 Aim: To implement Logistic Regression using Python.

A.2 Theory:

Regression:

Regression in Machine Learning is a supervised learning technique. There are various types of regression like linear, logistic, polynomial, stepwise, ridge, lasso, etc.

Logistic Regression:

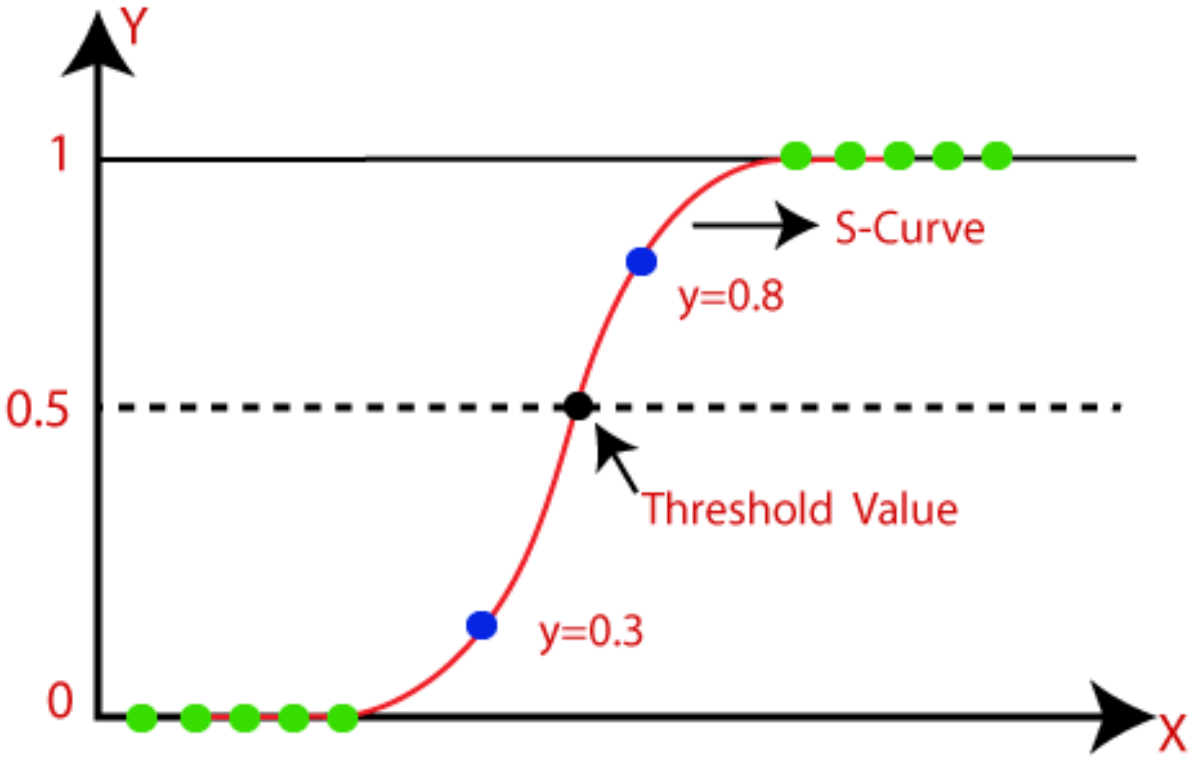
Logistic regression is a supervised machine learning algorithm used for classification tasks where the goal is to predict the probability that an instance belongs to a given class or not. Logistic regression is a statistical algorithm which analyze the relationship between two data factors.

Types of Logistic Regression

On the basis of the categories, Logistic Regression can be classified into three types:

1. **Binomial:** In binomial Logistic regression, there can be only two possible types of the dependent variables, such as 0 or 1, Pass or Fail, etc.
2. **Multinomial:** In multinomial Logistic regression, there can be 3 or more possible unordered types of the dependent variable, such as “cat”, “dogs”, or “sheep”

3. **Ordinal:** In ordinal Logistic regression, there can be 3 or more possible ordered types of dependent variables, such as “low”, “Medium”, or “High”.



PART B

(PART B: TO BE COMPLETED BY STUDENTS)

(Students must submit the soft copy as per following segments within two hours of the practical. The soft copy must be uploaded on the Blackboard or emailed to the concerned lab in charge faculties at the end of the practical in case the there is no Black board access available)

Roll. No. A12	Name: Sufiyan Khan
Class: TE – AI & DS	Batch: A1
Date of Experiment: 12/02/24	Date of Submission: 24/02/24
Grade:	

B.1 Input and Output:

Code :

```
import numpy as np
from sklearn import linear_model

X =
np.array([3.78,2.44,2.09,0.14,1.72,1.65,4.92,4.37,4.96,4.52,3.69,5.88]
).reshape(-1,1)

y = np.array([0,0,0,0,0,0,1,1,1,1,1,1])

logreg = linear_model.LogisticRegression()
logreg.fit(X,y)

def logit2prob(logreg, X):
    log_odds = logreg.coef_ * X + logreg.intercept_
    odds = np.exp(log_odds)
    probability = odds / (1 + odds)
    return probability

print(logit2prob(logreg,X))
```

Output:

```
[Running] python -u "c:\Users\Zeeshan\Downloads\ML & DAV Exps\logistic_regression.py"
[[0.60749955]
 [0.19268876]
 [0.12775886]
 [0.00955221]
 [0.08038616]
 [0.07345637]
 [0.88362743]
 [0.77901378]
 [0.88924409]
 [0.81293497]
 [0.57719129]
 [0.96664243]]
```

B.2 Conclusion:

Thus we have successfully implemented logistic regression in Python and understood how the model is fitted to the given data.