

Experiment–7

Aim:

Program to implement regularized and non linear regression.

Code:

```
1 import pandas as pd
2 import numpy as np
3 import matplotlib.pyplot as plt
4 import seaborn as sns
5 from sklearn.datasets import load_iris
6 from sklearn.model_selection import train_test_split
7 from sklearn.linear_model import LinearRegression, Ridge, Lasso
8 from sklearn.preprocessing import PolynomialFeatures
9 from sklearn.pipeline import make_pipeline
10 from sklearn.metrics import r2_score, mean_squared_error
11
12 # Load Iris
13 iris = load_iris(as_frame=True)
14 df = iris.frame
15 df.columns = ['sepal_length', 'sepal_width', 'petal_length',
16 ↪ 'petal_width', 'species']
17
18 X = df[['petal_length']] # Feature
19 y = df['petal_width'] # Target
20
21 X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
22 ↪ random_state=42)
23
24 results = []
25
26 # 1. Ordinary Linear Regression
27 lr = LinearRegression()
28 lr.fit(X_train, y_train)
29 y_pred_lr = lr.predict(X_test)
30 r2_lr = r2_score(y_test, y_pred_lr)
31 results.append(['Linear', r2_lr])
32
33 # 2. Ridge Regression (L2)
34 ridge = Ridge(alpha=1.0)
35 ridge.fit(X_train, y_train)
36 y_pred_ridge = ridge.predict(X_test)
37 r2_ridge = r2_score(y_test, y_pred_ridge)
38 results.append(['Ridge (L2)', r2_ridge])
39
40 # 3. Lasso Regression (L1)
41 lasso = Lasso(alpha=0.01, max_iter=10000)
```