
ASSIGNMENT NO. 6

Title: Assignment on Regression technique.

Download temperature data from the link below.

<https://www.kaggle.com/venky73/temperaturesof-india?select=temperatures.csv>

This data consists of temperatures of INDIA averaging the temperatures of all places month wise. Temperatures values are recorded in CELSIUS

- a) Apply Linear Regression using a suitable library function and predict the Month-wise temperature.
- b) Assess the performance of regression models using MSE, MAE and R-Square metrics
- c) Visualize a simple regression model.

Software/Libraries Used:

- Python
- pandas
- scikit-learn
- matplotlib

Theory/Methodology:

Linear Regression is a fundamental technique used for modeling the relationship between a dependent variable and one or more independent variables. In this practical, we'll utilize linear regression to predict month-wise temperatures in India based on historical temperature data.

Advantages:

- Linear regression is simple and easy to implement.

- It provides interpretable results, allowing for insights into the relationship between variables.

Limitations/Examples:

- Linear regression assumes a linear relationship between variables, which may not always hold true.
- It may not perform well with non-linear data.

Working/Algorithm::

1. Data Loading: Download the temperature data and load it into a DataFrame.
2. Data Preprocessing: Handle missing values and convert categorical variables into numerical format if necessary.
3. Feature Selection: Select relevant features for the regression model (e.g., month).
4. Model Training: Split the data into training and testing sets. Initialize and train a linear regression model using the training data.
5. Model Evaluation: Assess the performance of the regression model using metrics such as Mean Squared Error (MSE), Mean Absolute Error (MAE), and R-Squared.
6. Visualization: Visualize the regression model by plotting the actual temperatures against the predicted temperatures.

Conclusion:

By applying linear regression to historical temperature data, we can predict month-wise temperatures in India. Evaluation metrics such as MSE, MAE, and R-Squared provide insights into the performance of the regression model. Additionally, visualizing the regression model enhances our understanding of the relationship between variables and the accuracy of predictions.