Document covering the problem statement, packages used, methodology, advantages and applications, limitations/examples, working/algorithm, a diagram, and a conclusion.

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\*\*Problem Statement:\*\*

Predict month-wise temperatures of India using linear regression techniques applied to temperature data.

\*\*Packages:\*\*

- Pandas: For data manipulation and analysis.

- Scikit-learn: For machine learning models and metrics.

- Matplotlib: For data visualization.

\*\*Methodology:\*\*

1. \*\*Data Preparation:\*\* Load the temperature dataset and prepare it for modeling.

2. \*\*Feature Selection:\*\* Drop irrelevant columns and select features and target variables.

3. \*\*Split Data:\*\* Divide the dataset into training and testing sets.

4. \*\*Model Training:\*\* Train a linear regression model using the training data.

5. \*\*Model Evaluation:\*\* Assess the model's performance using Mean Squared Error (MSE), Mean Absolute Error (MAE), and R-Squared metrics.

6. \*\*Visualization:\*\* Visualize the model's predictions against actual temperatures.

\*\*Advantages and Applications:\*\*

- Linear regression is simple and easy to implement.

- Provides insights into the relationship between variables.

- Widely used in forecasting and prediction tasks.

- Useful in understanding the impact of independent variables on the dependent variable.

\*\*Limitations/Examples:\*\*

- Assumes a linear relationship between variables.

- Sensitive to outliers.

- May not perform well with non-linear data.

- Example: In cases where the relationship between temperature and other factors is non-linear, linear regression may not provide accurate predictions.

\*\*Working/Algorithm:\*\*

- Load the temperature dataset.

- Select relevant features and the target variable (annual temperature).

- Split the dataset into training and testing sets.

- Train a linear regression model on the training data.

- Evaluate the model's performance using MSE, MAE, and R-Squared metrics.

- Visualize the model's predictions against actual temperatures.

\*\*Diagram:\*\*

\*(Include a simple diagram illustrating the workflow of the methodology, e.g., Data Preparation → Feature Selection → Model Training → Model Evaluation → Visualization)\*

\*\*Conclusion:\*\*

Linear regression applied to the temperature dataset successfully predicts month-wise temperatures of India. However, its performance may vary based on the linearity of the relationship between variables and the presence of outliers. Further improvements can be made by exploring more sophisticated regression techniques or incorporating additional features.