**Comparative Analysis of Regression Models on Taxi Fare Prediction**

**1. Introduction**

The project aims to evaluate and compare the performance of six regression models—SVR, DTR, Bagging, AdaBoost, Gradient Boosting, and Random Forest—on predicting taxi fares using a curated dataset. The goal is to identify the most effective model for taxi fare prediction.

**2. Objectives**

- Explore the predictive capabilities of various regression models.

- Assess the impact of hyperparameter tuning on model performance.

- Evaluate models using standard regression metrics.

**3. Methodology**

- Dataset: Utilized a comprehensive taxi fare dataset with features as follows.

1. unique\_id

2. no\_of\_passenger

3. date\_time\_of\_pickup

4. longitude\_of\_pickup

5. latitude\_of\_pickup

6. longitude\_of\_dropoff

7. latitude\_of\_dropoff

- Models: Implemented SVR, DTR, Bagging, AdaBoost, Gradient Boosting, and Random Forest models.

- Hyperparameter Tuning: Applied tuning to assess performance improvements. Hyperparameter tuning was conducted using the RandomGridCV technique.

- Evaluation Metrics: Utilized Mean Absolute Error (MAE) as the primary evaluation metric for model assessment.

**4. Results**

- Presented comparative performance metrics for each model.

- Analyzed the impact of hyperparameter tuning on model accuracy.

- Visualized results for better comprehension.

**5. Conclusion**

- Identified Support Vector Machine as the most effective model for taxi fare prediction.

- Highlighted the importance of hyperparameter tuning in model optimization.