DEPARTMENT OF APEX INSTITUTE OF TECHNOLOGY

PROJECTPROPOSAL

1. Project Title: - Ola Bike Ride Request Forecast System Using Machine Learning

2. Project Scope: -

The project aims to develop an innovative machine learning-based forecasting system for predicting Ola Bike ride requests across multiple urban environments in India. By analyzing historical ride data alongside contextual information such as weather conditions, special events, and geographical characteristics, this system will generate accurate short-term and long-term demand forecasts to optimize resource allocation and enhance service quality.

The scope includes:

1. **Data Collection and Integration**: Gathering and integrating historical ride request data from five major Indian cities (Delhi, Mumbai, Bangalore, Hyderabad, and Pune) over an 18-month period, along with complementary datasets including weather information, event calendars, traffic data, and holiday schedules.
2. **Feature Engineering**: Developing comprehensive temporal features (time-based patterns, lag features, rolling statistics), spatial features (geographical zones, zone characteristics, spatial lag features), and external features (weather conditions, event indicators, holiday flags) to capture the complex relationships influencing ride demand.
3. **Model Development**: Creating a hybrid ensemble forecasting framework that combines multiple techniques including time series models (ARIMA, SARIMA, Prophet), traditional machine learning algorithms (Gradient Boosting Machines, XGBoost, Random Forest), and deep learning architectures (LSTM networks, Temporal Convolutional Networks).
4. **Multi-horizon Prediction**: Implementing models capable of generating accurate forecasts across different time horizons, from short-term predictions (30 minutes to 6 hours ahead) to support immediate operational decisions, to longer-term forecasts (1-7 days ahead) for strategic planning purposes.
5. **Spatial-temporal Analysis**: Developing forecasting capabilities that account for both temporal dependencies and spatial relationships in demand patterns, enabling location-specific predictions across diverse urban environments.
6. **Deployment and Integration**: Implementing the forecasting system as a microservice architecture that can be integrated with operational systems to support real-time decision-making for fleet management and service optimization.

The proposed system aims to achieve a significant improvement in prediction accuracy compared to traditional methods, with target Mean Absolute Percentage Error (MAPE) below 10% for short-term forecasts and robust performance across different conditions including peak hours and special events.

3. Requirements: -

- Hardware Requirements
  1. High-performance computing servers with minimum 16-core processors and 64GB RAM for model training
  2. Cloud computing infrastructure for model deployment and real-time prediction generation
  3. Data storage systems with minimum 1TB capacity for historical and real-time data management

- Software Requirements

  1. Python programming environment with data manipulation libraries (pandas, NumPy) and machine learning frameworks (scikit-learn, PyTorch, TensorFlow)

  2. Database management systems (PostgreSQL/MongoDB) for structured and unstructured data storage

  3. Microservice architecture frameworks for system deployment and API integration

STUDENTS DETAILS

Name	UID	Signature
Anunay Kumar	21BCS6078	
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APPROVAL AND AUTHORITY TO PROCEED

We approve the project as described above, and authorize the team to proceed.

Name	Title	Signature (With Date)