

Project 5 - Mobile API

1. Objective

Develop a predictive system that monitors the Mobile API's performance, detects instances of slowness, and forecasts potential future issues, enabling preventive maintenance and ensuring optimal API performance.

2. Functional Requirements

- **Data Collection & Monitoring**
 - Continuously gather performance metrics from the Mobile API, including response time, throughput, error rates, and server logs.
 - Store collected data in a centralized database or data lake for analysis.
- **Feature Engineering**
 - Extract relevant features from raw performance data such as latency patterns, request frequency, and server load metrics.
 - Normalize and preprocess data for model consumption.
- **Prediction Model Development**
 - Build machine learning models (e.g., time-series forecasting, anomaly detection, regression models) to:
 - Detect current slowness or degraded performance.
 - Predict future slowness or performance degradation within a predefined time window.
 - Train and validate the models using historical performance data.
- **Alerting & Notification**
 - Generate real-time alerts when slowness is detected.
 - Provide predictive insights indicating potential future performance issues.
 - Notify relevant teams via email, dashboards, or messaging platforms.
- **Dashboard & Reporting**
 - Develop dashboards displaying current API performance metrics, detected issues, and predictions.
 - Provide periodic reports on overall API health and predictive insights.
- **Preventive Maintenance Actions**
 - Suggest or automate maintenance actions based on predictions, such as scaling resources, optimizing code, or clearing caches.

3. Non-Functional Requirements

- **Accuracy & Reliability**
 - Achieve high prediction accuracy and low false-positive rates.
- **Scalability**
 - Support increasing data volumes and API traffic.
- **Performance**
 - Ensure minimal latency in monitoring, prediction, and alerting processes.
- **Security & Compliance**

- Securely handle data and access credentials.
- Comply with relevant data privacy regulations.

4. Deliverables

- Data collection and processing scripts/tools.
- Predictive models with training and validation workflows.
- Real-time monitoring and alerting system integration.
- User dashboards and reports.
- Documentation:
 - System architecture and setup instructions.
 - Usage and maintenance guidelines.
 - Model validation and performance metrics.