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CORE IDEA

- LINKED DUTY SCHEDULING
- UNLINKED DUTY SCHEDULING
- ROUTE PLANNING
- OPTIMIZING RESOURCE UTILIZATION

PROBLEM REQUIREMENTS

- PEAK-TIME and DOWN-TIME FLEXIBILITY
- TRAFFIC BASED SCHEDULING
- SIMPLE AND PORTABLE IoT SYSTEM FOR DATA AQUISITION
- SERVER TO OPERATOR COMMUNICATION (MQTT)

ADDRESSING THE PROBLEM (KEY FEATURES)

- BIOMETRIC POWERED EFFICIENCY
- REAL-TIME PREDICTIVE TRAFFIC MODELS
- SEAMLESS TRANSITION SYSTEM DESIGN

UNIQUENESS and INNOVATION

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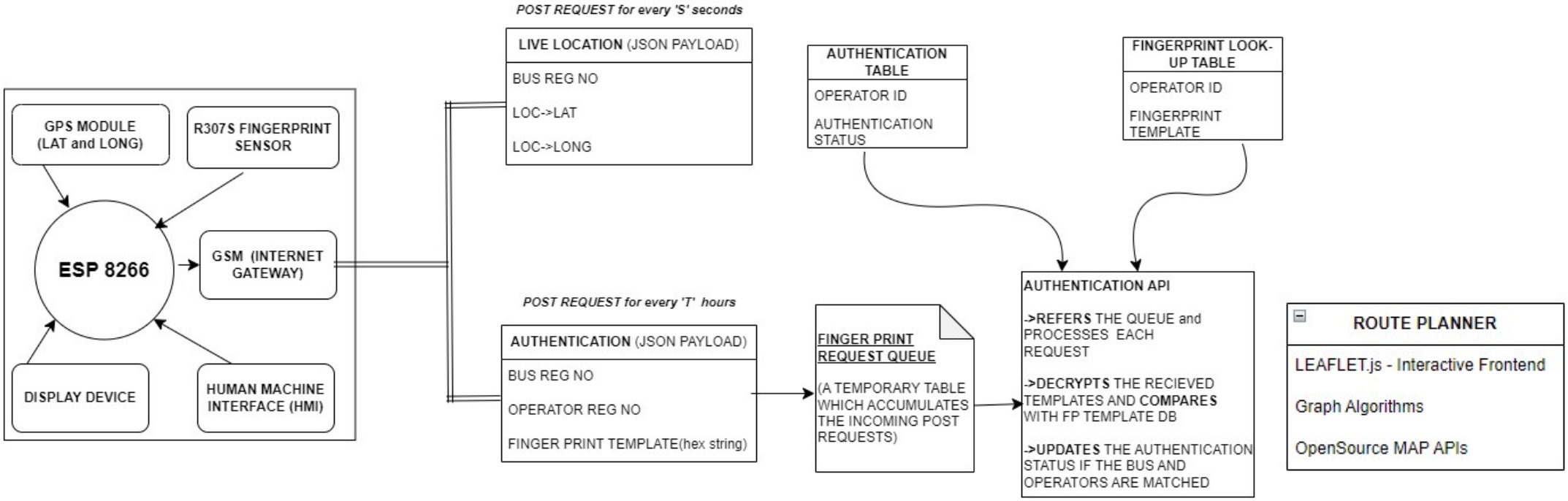
LOW LEVEL SYSTEM DESIGN (LLD-1)



python

POSTMAN

twilio

OpenStreetMap

SQLite Database

EXPRESS Js

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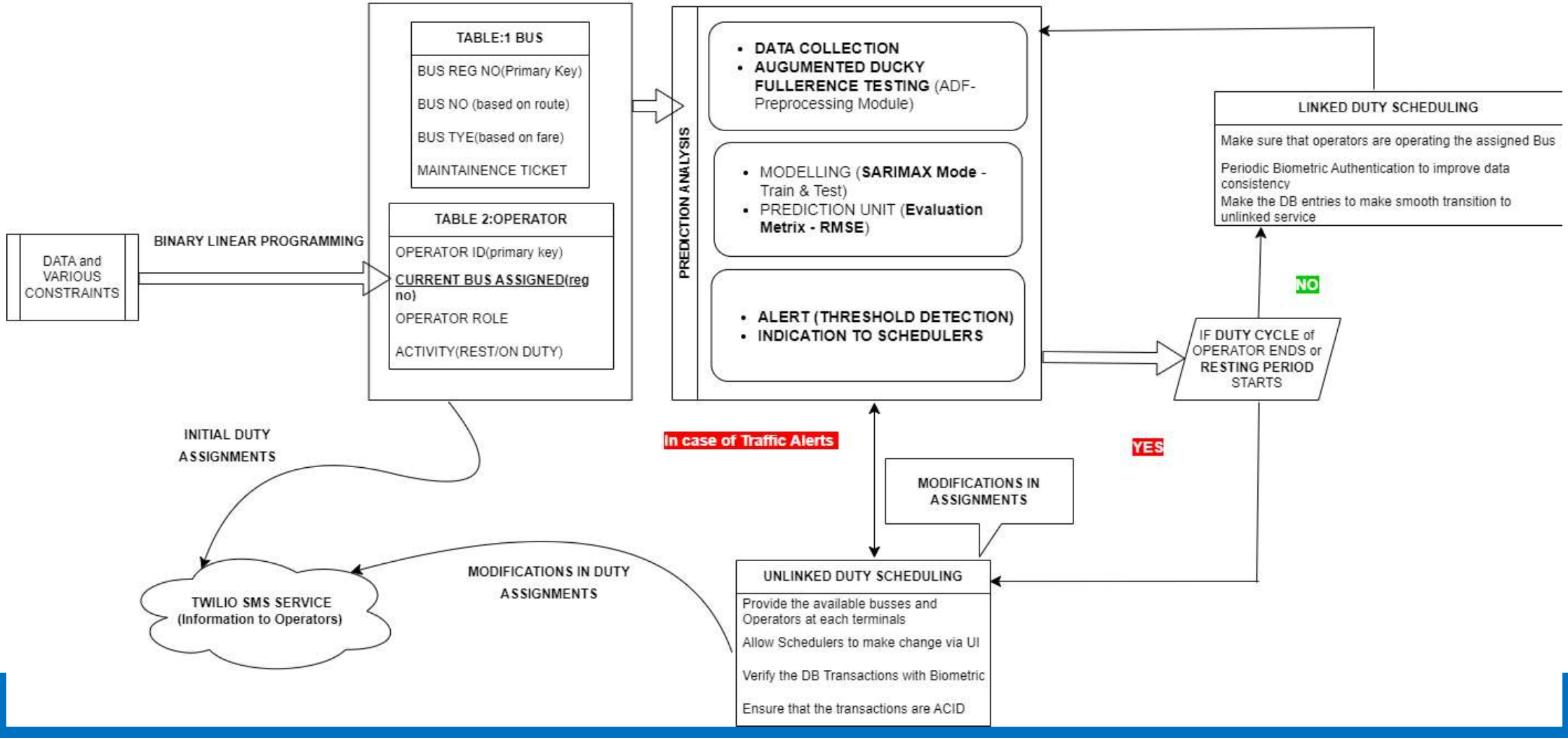
LLD-2 (CORE SERVICE)

REAL-TIME OPTIMIZATION LOOP



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FEASIBILITY AND VIABILITY

Implemented Cryptographic Encryption with, **Magic square, Chaotic sequence** and **Differential Encoding**

Transmission of **Fingerprint templates** over internet causes **Cyber Threats**

NULLIFYING the MINUS with PLUS!

Following the **CAP theorem** in **LLDs** helped the system to handle node failures by giving preference to either **Availability** or **Consistency**

System failure could occur in case of high request and more **database transaction workloads**

By choosing right **network protocol** and enabling **Emergency Mechanisms** could withstand the **network collapse**

Dependency on Internet connectivity for entire operation causes system collapse in case of **Network partition**.

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IMPACT AND BENEFITS

TAILORED FOR HIGH POPULATION DENSITY

- **Delhi** (The region with **highest population density** in the country.)
- Rigorous Prediction Model takes the data feed in real-time and generates **the fitting curves** according to the needs which **aids smart decision making.**

EMISSION CONTROL && ADAPTIBLE for **SMART BUSSES**

- Helps in **reduction in service** as required. This controls the **unnecessary emission**.
- The **IoT system** would get even better as the Delhi is **making transitions** to **Smart Busses** with **more sensors** and **data logging services**, which **enhances our software**.

REDUCES HUMAN RESOURCE REQUIREMENT

- **Cellular Network** enables **flexible monitoring** from any part of the city hence reduces the offices across the city
- This **discards the practice of manual entry** for operators and **attendance overhead**, **reducing the manpower requirements**.

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RESEARCH AND REFERENCES

SIH

OVERVIEW OF DTC:

- **Function:** Operates public bus services in Delhi, managing a large fleet with complex route structures.
- **Current Approach:** Manual scheduling and route planning with legacy systems.

DIFFERENCES FROM OTHER STATES

- **High Demand:** Higher population density and diverse user needs.
- **Integration:** Coordination with other transport bodies like DMRC.
- **Modernization:** Faster adoption of new technologies (e.g., electric buses).

CURRENT TECH

- **Large User Base:** High data volume and varied needs.
- **Legacy Systems:** Integration with existing infrastructure.

DEMANDED TECH

- **Data Accuracy:** Ensuring real-time data integration.
- **System Reliability:** Robustness and scalability requirements.
- **Public Communication:** Ensuring smooth user transition.

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