Automated Bus Scheduling and
Route Management System for Transportation

BACHELOR OF TECHNOLOGY (CSE)
(2024-2025)

SUBMITTED BY- ADITYA ZALPURI
ANANYA THAKUR
RAKSHIT GUPTA
ANKUSH RAINA
AYUSHMAAN SINGH JAMWAL
KHUSHI

MODEL INSTITUTE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
JAMMU AND KASHMIR

Automated Bus Scheduling and Route Management System

Unique Value Propositions

Cost Efficiency:	Accurate demand prediction reduces fuel, labor, and bus wear by optimizing deployment.
Sustainability:	Smarter routing cuts down on unnecessary trips, lowering emissions and supporting a greener environment.
Dynamic Scheduling:	By auto-scheduling based on real-time data, the system cuts delays, improving punctuality and passenger satisfaction.
Minimized Delays:	Dynamic rerouting helps buses avoid traffic, ensuring smoother operations and fewer delays, boosting service reliability.

Problem Resolution:

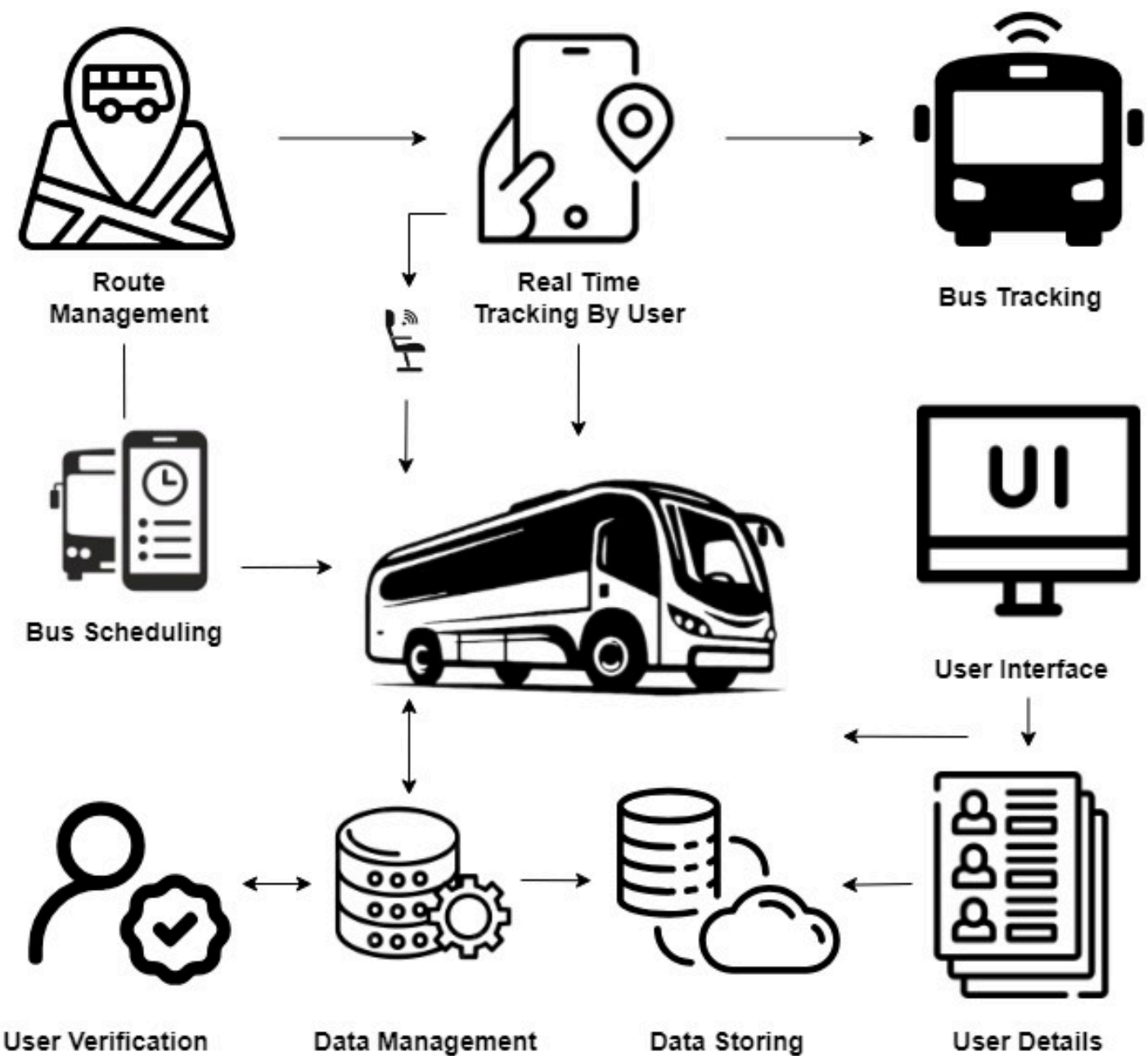|	
Traffic Data Integration	The system uses real-time traffic data to adjust bus routes, avoiding delays and keeping buses on schedule. This reduces wait times and travel duration
Demand Prediction	By analyzing past data and external factors like weather, the system predicts demand, deploying the right number of buses at the right time, optimizing usage and cutting costs.
Dynamic Rerouting	The system automatically reroutes buses in real-time to avoid traffic, ensuring they stay on time and reach destinations faster.
GPS Tracking	Real-time GPS tracking lets passengers know exactly where their bus is, while operators monitor and adjust routes for efficient service.

Proposed Solution:

Leverages real-time data to dynamically adjust bus routes based on traffic conditions and road closures, predicts passenger demand to optimize bus deployment, and reroutes buses to avoid delays.

With GPS tracking, passengers can monitor bus locations in real time, while operators maintain full control over fleet movements. It efficiently handles both online and offline bookings, ensuring a seamless experience for all users.

This system enhances overall service reliability, improves passenger satisfaction, and ensures smooth, efficient operations across all booking channels.
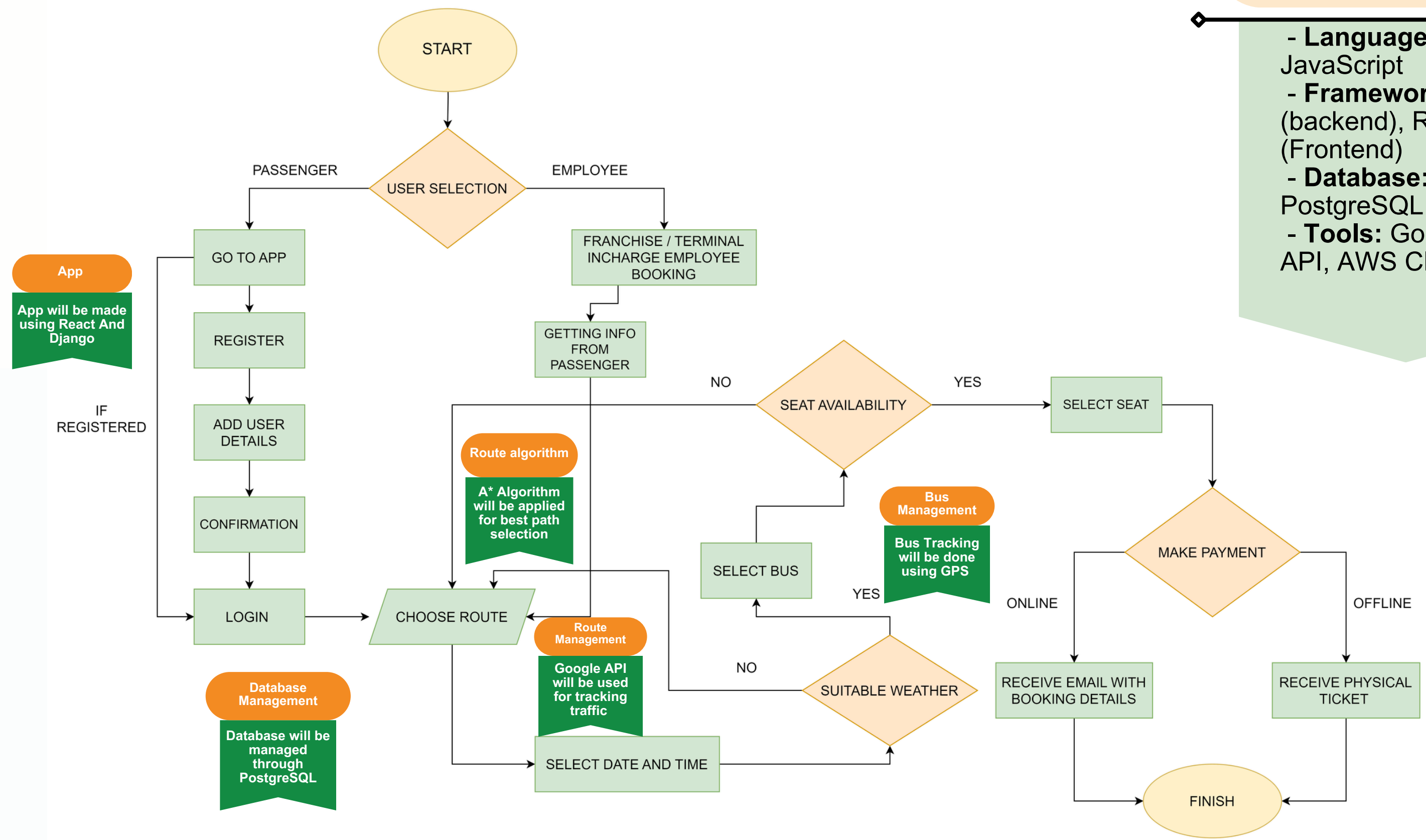
Work Flow :

Route Management → Real Time Tracking By User → Bus Tracking

Bus Scheduling

User Interface

User Verification — Data Management → Data Storing — User Details
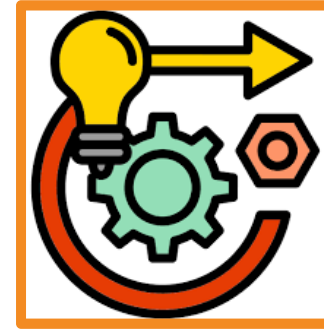
TECHNICAL APPROACH

FEASIBILITY AND VIABILITY

Technical Feasibility:

- Uses widely adopted technologies (Python, Django, React).
- Scalable with cloud infrastructure (AWS).

Operational Feasibility:

- Real-time data integration improves service efficiency.
- Easily integrates with existing transport infrastructure.

Financial Viability:

- Reduced operational costs by optimizing bus routes.
- Cost-effective implementation using existing cloud solutions

IMPACT AND BENEFITS

Improved Commuter Experience:
Reduced wait times and enhanced service reliability.

Operational Efficiency:
Optimized bus deployment ensures better service with fewer resources.

Real-Time Updates:
Passengers can track buses in real-time.

Potential Impact on the Target Audience:

Benefits of the Solution:

Social:
Increased public satisfaction with improved transport services.

Economic:
Cost savings for DTC through fuel efficiency and optimized routes.
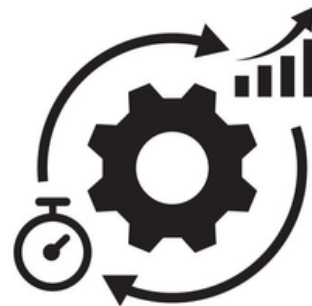
Environmental:
Reduced emissions by avoiding overcrowded or underutilized buses.

RESEARCH AND REFERENCES

- Delhi Transport Corporation, *Annual Report 2023*, New Delhi, India, May 2023. Available: [DTC Annual Report](#)

- Delhi Transport Corporation, *Delhi Bus Services Overview*, New Delhi, India, Jan. 2022. Available: [DTC Services Overview](#)

- S. Gupta, R. Singh, and M. Verma, "Public transport system in Delhi: A case study," *Journal of Transport Geography*, vol. 19, no. 4, pp. 623-635, July 2021. Available: [Journal of Transport Geography](#)

- A. Kumar, P. Meena, and S. Sharma, "A survey on bus scheduling and route management systems," *IEEE Transactions on Intelligent Transportation Systems*, vol. 14, no. 2, pp. 489-500, May 2022. Available: [IEEE Xplore](#)

- S. Gupta, A. Jha, and R. Sharma, "Smart city solutions for urban transportation," *Journal of Urban Transport Systems*, vol. 12, no. 3, pp. 345-356, Mar. 2022. Available: [Urban Transport Systems](#)

- H. Wang, T. Chen, and J. Zhang, "Optimization techniques for bus scheduling and route management," *Operations Research Letters*, vol. 45, no. 1, pp. 112-119, Jan. 2022.

- N. Prasad, J. Mathew, and S. Iyer, "Artificial intelligence and machine learning in bus scheduling optimization," *ACM Transactions on Transportation Systems*, vol. 16, no. 3, pp. 1400-1420, Apr. 2023.