AI- DRIVEN VEHICLE HELTH AND SERVICE INTELIGENCE SYSTEM

Project ID: 25-26J-396

Project Proposal Report

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B.Sc. (Hons) Degree in Information Technology Specializing in Information Technology

Department of Information Technology

Sri Lanka Institute of Information Technology
Sri Lanka

August 2025

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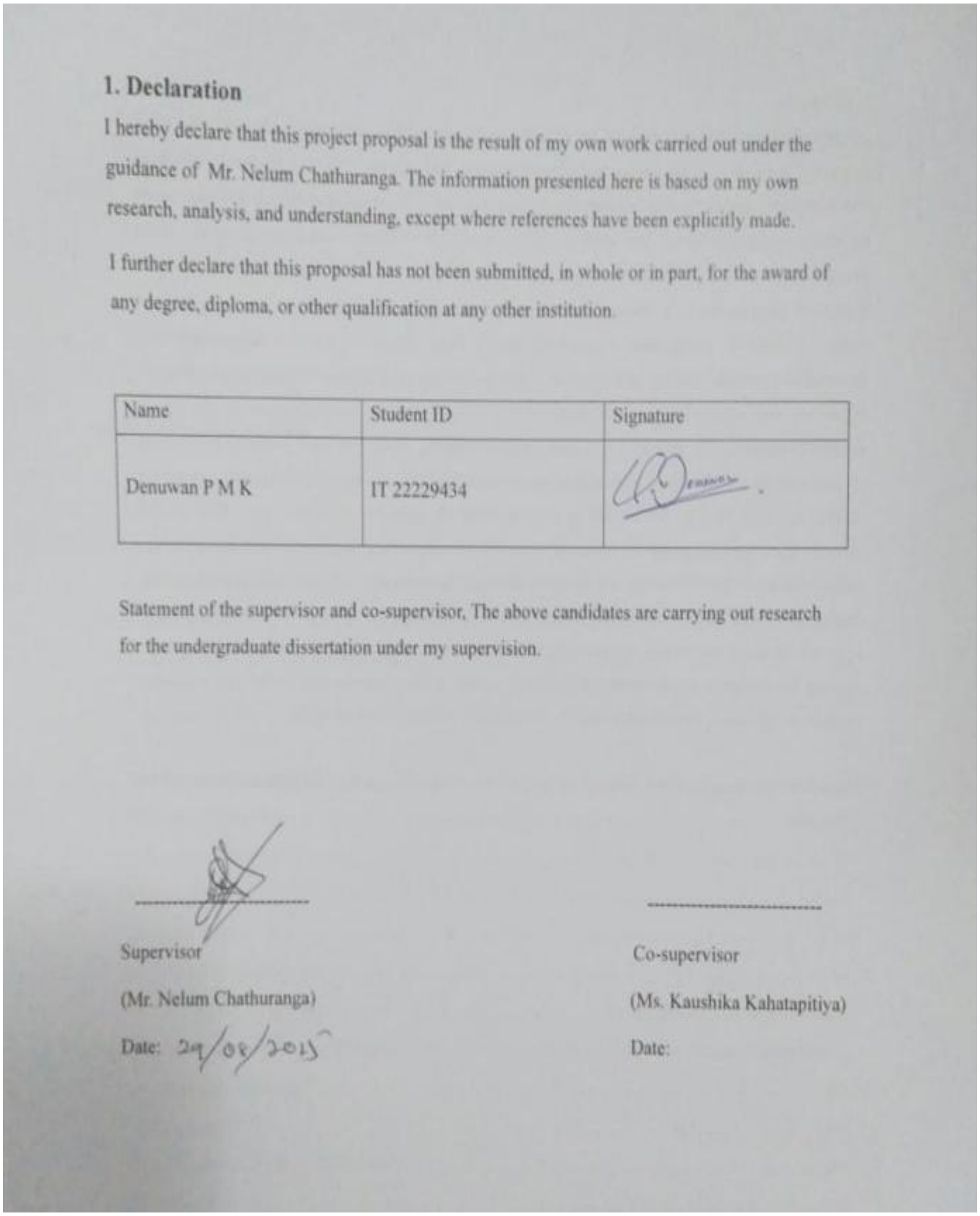
DECLARATION



1. Declaration

I hereby declare that this project proposal is the result of my own work carried out under the guidance of Mr. Nelum Chathuranga. The information presented here is based on my own research, analysis, and understanding, except where references have been explicitly made.

I further declare that this proposal has not been submitted, in whole or in part, for the award of any degree, diploma, or other qualification at any other institution.

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Statement of the supervisor and co-supervisor, The above candidates are carrying out research for the undergraduate dissertation under my supervision.

Supervisor

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Date: 29/08/2015

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Date:

ABSTRACT

Efficient vehicle assistance is critical for drivers who experience sudden vehicle issues, particularly in Sri Lanka where most garages operate independently without real-time coordination. At present, available digital solutions are limited to providing static garage listings or phone-based support, leaving drivers uncertain about where to go, how long repairs will take, or whether their vehicle can be safely driven. This lack of intelligence in existing platforms creates unnecessary delays, risks on the road, and inefficiencies for both customers and garages.

This project introduces an AI-powered mobile platform that integrates conversational fault reporting, predictive analytics, and location-based recommendations into a single solution. A chatbot interface allows drivers to describe problems in natural language, such as "My car engine is overheating." The system then identifies the fault category, checks whether the car can be driven, and either dispatches a mechanic/tow truck or recommends the most suitable nearby garage. Recommendations are generated using Google Maps for travel time, alongside machine learning models that predict repair duration and rank garages based on availability, queue length, expertise, and user ratings. Users can book services, track progress in real time, and provide feedback, while the data collected continuously retrains the models to improve accuracy. By offering Sri Lanka's first intelligent garage recommendation and repair time estimation system, the project enhances driver safety, reduces downtime, and builds trust between vehicle owners, mechanics, and garages.

Keywords: Conversational AI, Garage Recommendation System, Repair Time Prediction, Machine Learning, Vehicle Assistance in Sri Lanka

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LIST OF ABBREVIATIONS

Abbreviation	Description
NLP	Natural Language Processing
ETA	Estimated Time of Arrival
GPS	Global Positioning
DL	Deep Learning
AI	Artificial Intelligence

1.0 INTRODUCTION

Quick Reliable and timely vehicle assistance is a critical factor in ensuring road safety, minimizing downtime, and enhancing the convenience of vehicle ownership. Traditional methods of handling breakdowns in Sri Lanka—such as calling roadside hotlines or searching for repair shops—are often inefficient, inconsistent, and provide limited transparency. These approaches leave drivers uncertain about repair times, service quality, and costs.

With rapid advancements in artificial intelligence (AI) and mobile technologies, smarter alternatives are emerging globally. For example, conversational chatbots are increasingly being used in the automotive industry to capture user complaints, provide repair guidance, and automate service bookings. Similarly, GPS-enabled mobile applications connect drivers with nearby mechanics and garages, offering faster support. However, in Sri Lanka, the landscape is still underdeveloped. Existing platforms such as MyMech and AA Ceylon Breakdown Service provide only basic functionalities—either static garage listings or traditional roadside dispatch—without predictive repair-time estimation, workload analysis, or intelligent triage of whether a vehicle can still be driven. This creates a significant service gap for local drivers, especially in emergencies.

To address this need, our project proposes an AI-driven mobile application designed to intelligently guide vehicle owners during breakdowns. Using a conversational chatbot powered by Natural Language Processing (NLP), users can describe issues in their own words (e.g., “My engine is overheating”). The system identifies the fault type and determines whether the car is drivable. If drivable, it recommends the most suitable nearby garages by combining Google Maps API with a machine learning ranking model that considers factors such as queue length, availability of skilled staff, repair time predictions, and user ratings. If the vehicle is not drivable, the platform automatically dispatches the nearest available mechanic with real-time tracking. Through this approach, the system improves transparency, reduces delays, and ensures drivers receive reliable, data-driven recommendations when they need them most.

1.1 Background and Literature Survey

The rapid The integration of intelligent systems into automotive services has significantly transformed how breakdowns are managed worldwide. Several platforms highlight this shift, but most remain limited in scope. For example, MyMech Sri Lanka **[1]** operates mainly as a digital marketplace that connects vehicle owners to garages, but it lacks intelligent features such as real-time workload assessment or repair-time prediction. Similarly, the AA Ceylon Breakdown Service **[2]** continues to rely on traditional phone-based roadside assistance, which is reactive and does not leverage predictive analytics or AI-driven decision support. Internationally, platforms like Mercedes Me Connect **[3]** provide advanced telematics and fleet-level diagnostics, but these are restricted to premium vehicles, making them inaccessible to most Sri Lankan drivers. Likewise, global mobile mechanic services such as YourMechanic **[4]** depend on manual category selection and mechanic-provided estimates, offering little in terms of predictive accuracy or intelligent triage.

Academic research supports the potential of AI to revolutionize this domain. Aru et al. **[5]** demonstrated that AI-based fault diagnosis significantly reduces manual intervention while improving accuracy. Mirzaei et al. **[6]** applied fuzzy logic and Monte Carlo simulations to predict repair times and assess availability, highlighting the value of predictive models in service planning. Similarly, Hidayat et al. **[7]** employed machine learning to forecast repair durations in manufacturing settings—an approach that can be adapted for garage operations. In addition, Liu et al. **[8]** showed how engine sound analysis with ML can detect faults, while Zhang et al. **[9]** proposed neural network-based remote fault diagnosis, further emphasizing AI's role in real-time automotive support.

In the Sri Lankan context, existing digital solutions remain basic, offering little more than static garage listings or emergency contact services. Unlike international systems such as OnStar or Bosch Car Service, which combine telematics, AI-driven diagnostics, and mechanic dispatching, local platforms lack predictive repair-time estimation, intelligent garage ranking, and conversational interfaces for fault reporting. Moreover, challenges such as limited datasets, infrastructure gaps, and affordability issues prevent direct adoption of global solutions in Sri Lanka.

Therefore, a significant research gap exists. No system in Sri Lanka currently integrates conversational AI for fault recognition, machine learning models for predictive repair-time estimation, and intelligent garage recommendation based on real-time operational data. Our project aims to bridge this gap by developing an AI-powered Garage Recommendation and Repair Time Estimation System tailored to the Sri Lankan context. By combining NLP-based fault reporting, drivability decision-making, and intelligent recommendations, the system delivers a localized, data-driven solution that enhances safety, reliability, and user convenience.

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1.2 Research Gap

Digital Although digital automotive service platforms have been introduced both locally and globally, significant limitations remain in the Sri Lankan context. Most existing applications are limited to directory-style listings of garages or simple location-based searches, offering little to no intelligent decision-making support. These solutions do not help users identify the nature of vehicle faults, estimate repair times, or match with the most suitable garage based on workload, expertise, or proximity. As a result, drivers still face uncertainty in emergencies, often relying on guesswork or time-consuming phone calls.

International platforms demonstrate how artificial intelligence, real-time diagnostics, and predictive analytics can transform vehicle assistance. However, such systems are either unavailable or unsuitable for Sri Lanka due to high costs, lack of localized datasets, and infrastructure constraints. Additionally, the few applications that exist locally do not integrate chatbots or conversational interfaces, which could make fault reporting and garage booking more intuitive and accessible to non-technical users.

Therefore, there is a clear research gap in developing an AI-powered, user-friendly, and context-specific solution that not only connects users with nearby garages but also intelligently interprets faults, predicts repair timelines, and enhances overall service efficiency. Addressing this gap has the potential to modernize the Sri Lankan automotive service ecosystem and provide a reliable, scalable framework for future innovations.

System/ Platform	NLP Fault Diagnosis	Repair Time Prediction	AI Garage Ranking	Real-time Tracking via online	Intelligent Drivability Assessment
MyMech (Sri Lanka) **[1]**	No (Manual problem description)	No time estimation	No (Basic listing only)	No (Phone call updates)	No
AA Ceylon Breakdown Service **[2]**	No (Phone-based reporting)	No	No (Fixed partner network)	No	No (Manual assessment)
OEM Fleet Management Systems	Basic diagnostic codes	Historical data-based	Authorized dealers only	Telematics integration	No public access
Uber for Mechanics Apps	No (Category selection)	No (Mechanic estimates only)	Rating + distance	GPS tracking only	No
PROPOSED SYSTEM	Rasa NLP + Intent Recognition	XGBoost + Historical Data	Learning-to-Rank Algorithm	WebSocket Real-time Portal	Multi-factor Decision Tree

Table 1.2 Research Gap

1.3 Research Problem

In Sri Lanka, vehicle breakdowns are a common challenge faced by daily commuters, long-distance travellers, and even occasional drivers. When such issues occur, many individuals struggle to properly identify the fault in their vehicle, often leading to confusion, stress, and delays in decision-making. While some mobile applications and online platforms exist to provide garage listings or connect users with nearby mechanics, these solutions are limited in scope. They typically function only as location directories without offering meaningful guidance on the type of fault, the urgency of the situation, or whether the vehicle remains drivable.

This lack of intelligent support creates significant inconvenience for users. A driver may be uncertain whether an overheating engine requires immediate towing, or if a weak battery can still allow short-distance driving. Without clear direction, vehicle owners are left to rely on guesswork, which may result in costly mistakes, safety risks, and wasted time. Furthermore, the absence of an integrated system that connects fault detection with repair recommendations reduces trust in the effectiveness of existing platforms.

Therefore, the research problem lies in the absence of a comprehensive, AI-driven solution that can interpret user-described vehicle symptoms, determine the drivability of the vehicle, and intelligently match the issue with the most suitable garage. Addressing this problem is crucial to improving user experience, reducing delays, and creating a more reliable automotive support system for Sri Lankan drivers.

2.0 Objectives

2.1 Main Objective

The primary objective of this research is to develop an AI-driven Garage Recommendation and Repair Time Estimation System with a Conversational Chatbot Interface, designed to provide intelligent, real-time support for Sri Lankan drivers during unexpected vehicle faults. The system will integrate natural language processing for fault identification and drivability assessment, machine learning models for predicting repair time, and multi-criteria optimization for ranking nearby garages based on expertise, employee availability, queue length, and travel distance.

By combining conversational AI with predictive analytics and location-based services, the platform aims to bridge the gap between raw fault reporting and actionable decision support. Instead of offering static garage listings or manual decision-making, the system guides drivers' step by step: detecting the fault from user input, determining whether the vehicle can be safely driven, and providing either a ranked list of suitable garages with repair time estimates or dispatching a mechanic/towing service if needed.

Through this integration, the system seeks to enhance driver safety, reduce waiting times, and improve trust between drivers, mechanics, and garages. Ultimately, it aims to transform the current fragmented and reactive vehicle assistance process in Sri Lanka into a seamless, intelligent, and proactive service that ensures timely repairs, minimizes risks on the road, and optimizes garage efficiency.

2.2 Specific Objectives

1. To study the common challenges faced by drivers in Sri Lanka when dealing with vehicle breakdowns and identify recurring pain points, such as difficulty in fault recognition, uncertainty about drivability, and lack of trust in garage selection.

2. To develop a natural language chatbot interface that allows users to explain the vehicle symptoms in simple everyday terms, without requiring technical automotive knowledge. This will make the system accessible to a wider range of users.

3. To design and integrate a drivability-checking feature that advises whether a vehicle can be safely driven to a garage or requires immediate towing, helping drivers make informed and safe decisions on the road.

4. To build a garage recommendation engine that matches users with the most suitable garages by analysing fault type, location, repair expertise, availability, and estimated service time, ensuring drivers receive quick and reliable assistance.

5. To implement a booking and job-tracking system that allows users to reserve services at selected garages and monitor the repair progress, reducing uncertainty and improving transparency in service delivery.

6. To create a user-friendly interface with strong usability and accessibility so that drivers of all backgrounds can benefit from the system without facing technological barriers.

7. To conduct user testing and collect feedback to evaluate the system's effectiveness, usability, and practicality, and refine it into a reliable real-world solution that genuinely improves the driver experience.

3.0 Proposed Methodologies

3.1 Data Collection

The success of this project relies heavily on the availability and quality of data. The primary data required includes common vehicle issues, their symptoms as reported by drivers, and the corresponding repair requirements. This data will be collected through multiple sources. First, secondary research will be conducted using existing datasets and automotive diagnostic knowledge bases that document frequent mechanical issues and repair solutions. In addition, publicly available APIs such as Google Maps API will be used to gather location-based information like travel time and garage proximity. Where possible, feedback from small-scale garage owners and vehicle users will be incorporated through structured interviews and informal surveys, providing practical insights into real-world repair scenarios. The design of the chatbot also requires a dataset of natural language inputs (for example, “my engine is overheating” or “brakes not working”) which will be collected from sample users and refined through iterative testing. Together, these approaches ensure that the data collected will be both technically accurate and practically relevant for developing an AI-driven garage recommendation system.

3.2 System Design

The system design forms the backbone of this project, as it outlines how data flows between various components and how user interactions are transformed into meaningful outputs. At a high level, the system architecture diagram illustrates the major modules, including the user-facing mobile application, the natural language processing (NLP) chatbot, the decision-making engine, and the supporting services such as Google Maps API and machine learning models. The architecture shows how these components interact to deliver real-time recommendations and dispatch instructions.

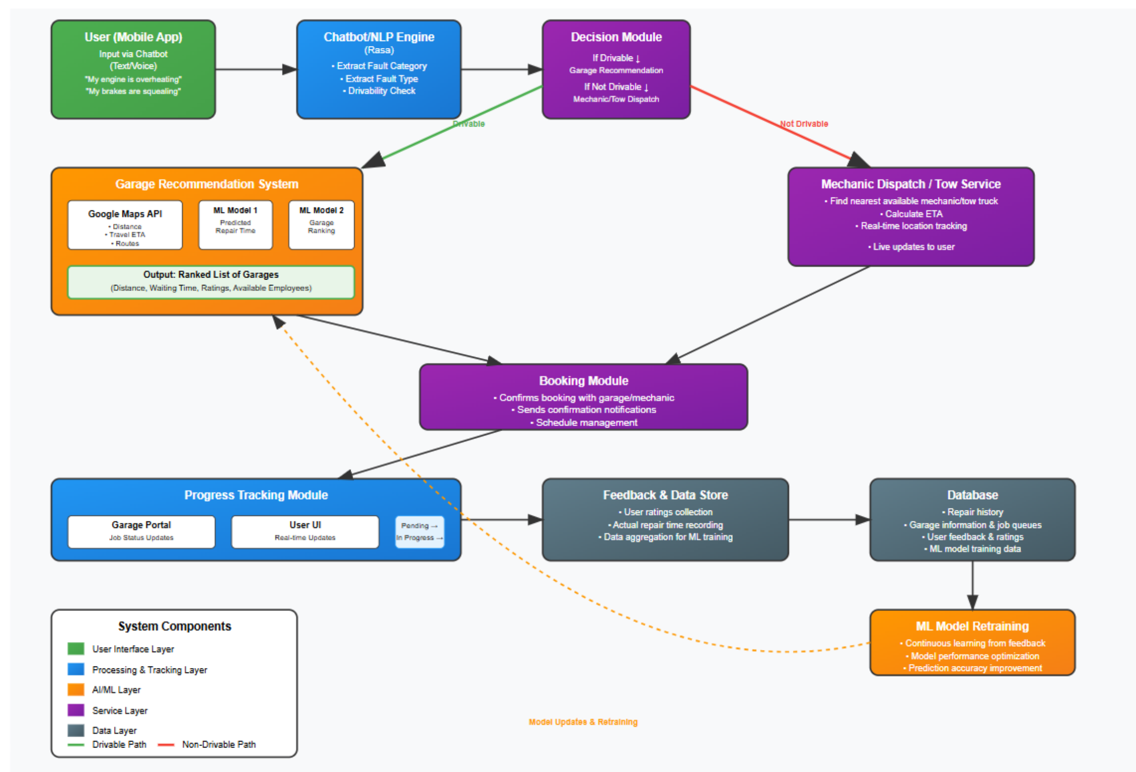

Figure 3.2.1 System Architecture Diagram

To provide further clarity, data flow diagrams (DFDs) have been developed to represent the movement of data within the system. The Level 0 diagram captures the overall interaction between the user and the system, emphasizing inputs (problem descriptions) and outputs (garage recommendations or mechanic dispatch). The Level 1 diagram expands on this by detailing how the chatbot processes user queries, how the decision engine evaluates drivable versus non-drivable conditions, and how the recommendation module integrates with Google Maps API and machine learning models to generate outputs. If necessary, Level 2 diagrams may further break down internal processes, such as ranking garages based on distance and repair time predictions. These diagrams provide a structured view of how processes are connected and ensure that the system design is both transparent and scalable.

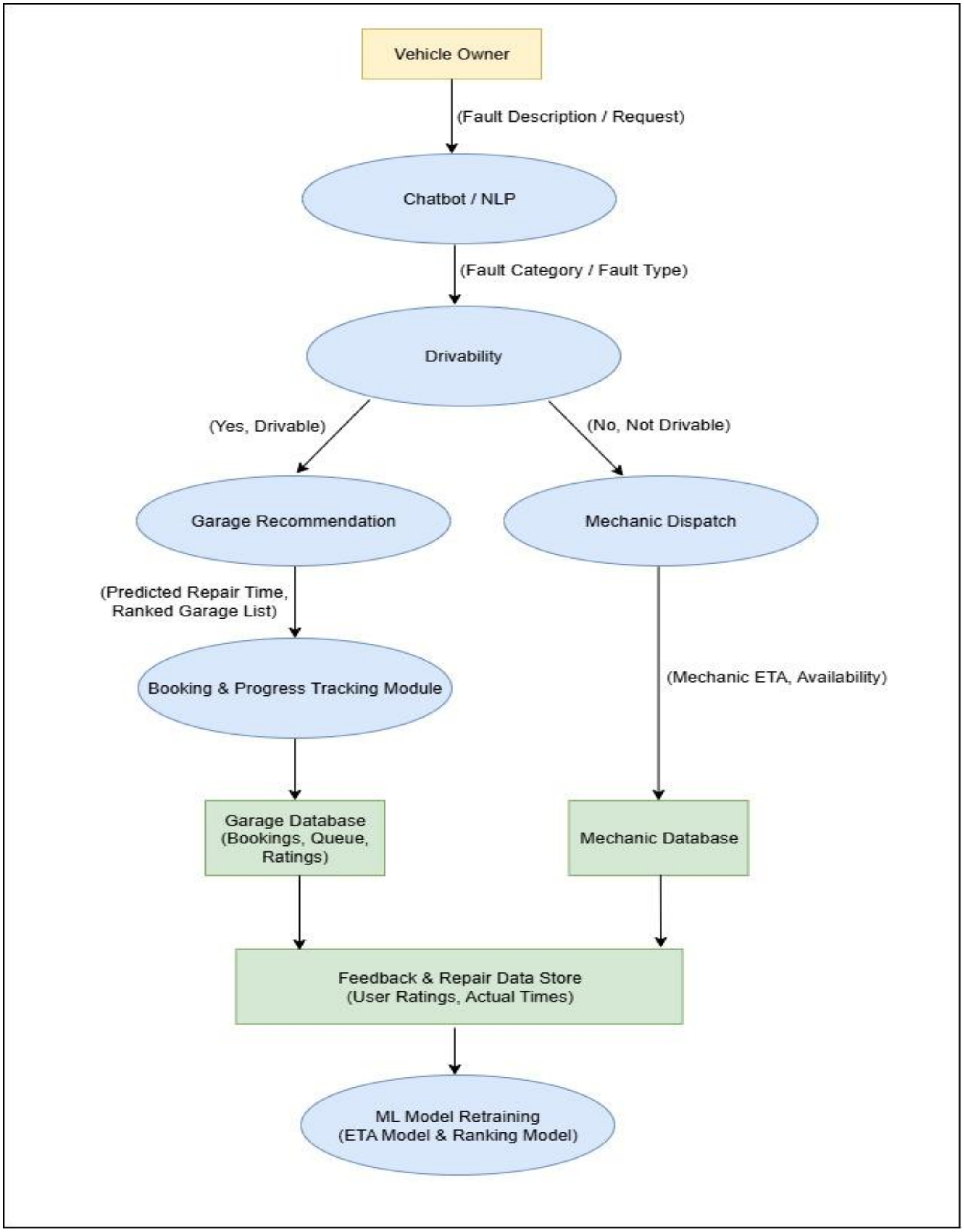

Figure 3.2.2 Data Flow Diagram

3.3 Individual System Components

The system is divided into the following major components

3.2.1 Chatbot/ NLP Engine

The chatbot is the main point of interaction for users. It allows them to type or speak their vehicle problem in simple language, for example, “My engine is overheating.” Using natural language processing, the chatbot identifies the type of fault and its category, then asks follow-up questions such as “Can your car still be driven?” This conversational approach makes the system intuitive and easy to use, even for people who are not familiar with technical terms.

3.3.2 Drivability Decision Module

Based on the user’s response, the system determines whether the vehicle is safe to drive. If the car is drivable, the system moves the user to the garage recommendation path. If not, it triggers the mechanic dispatch path. This ensures the safety of the driver and prevents further damage to the vehicle.

3.3.3Garage Recommendation System

When the vehicle is drivable, the system provides a ranked list of nearby garages. It uses Google Maps to calculate distance and travel time and machine learning models to predict repair time. The ranking also considers factors such as waiting times, user ratings, and available skilled employees. This ensures that the user receives a list of garages that are convenient, reliable, and efficient.

3.3.4 Booking Module

Once the user selects a garage, the booking module confirms the appointment and notifies the garage. This keeps the process organized and ensures that the garage is prepared for the incoming vehicle.

3.3.5 Progress Tracking Module

The garage updates the repair status through this module, with stages like Pending, In Progress, and Completed. The system informs the user in real time, allowing them to monitor the repair progress and stay updated.

3.3.6 Feedback and Repair Data Store

After the service is completed, users can provide ratings for garages or mechanics. Actual repair times are recorded in the database. This data is valuable for retraining the machine learning models, helping the system improve over time and deliver more accurate recommendations.

3.3.7 Mechanic Dispatch System

It the vehicle is not drivable, the system identifies nearby mechanics, shows their distance and estimated arrival time, and dispatches the selected mechanic. Users can track the mechanic's location live, ensuring timely on-site assistance. After the service, user feedback updates the mechanic's profile.

3.3.8 ML Model Retraining

The machine learning models are updated continuously with data from completed repairs and user feedback. This helps improve the accuracy of repair time predictions and garage rankings, making the system smarter and more reliable over time.

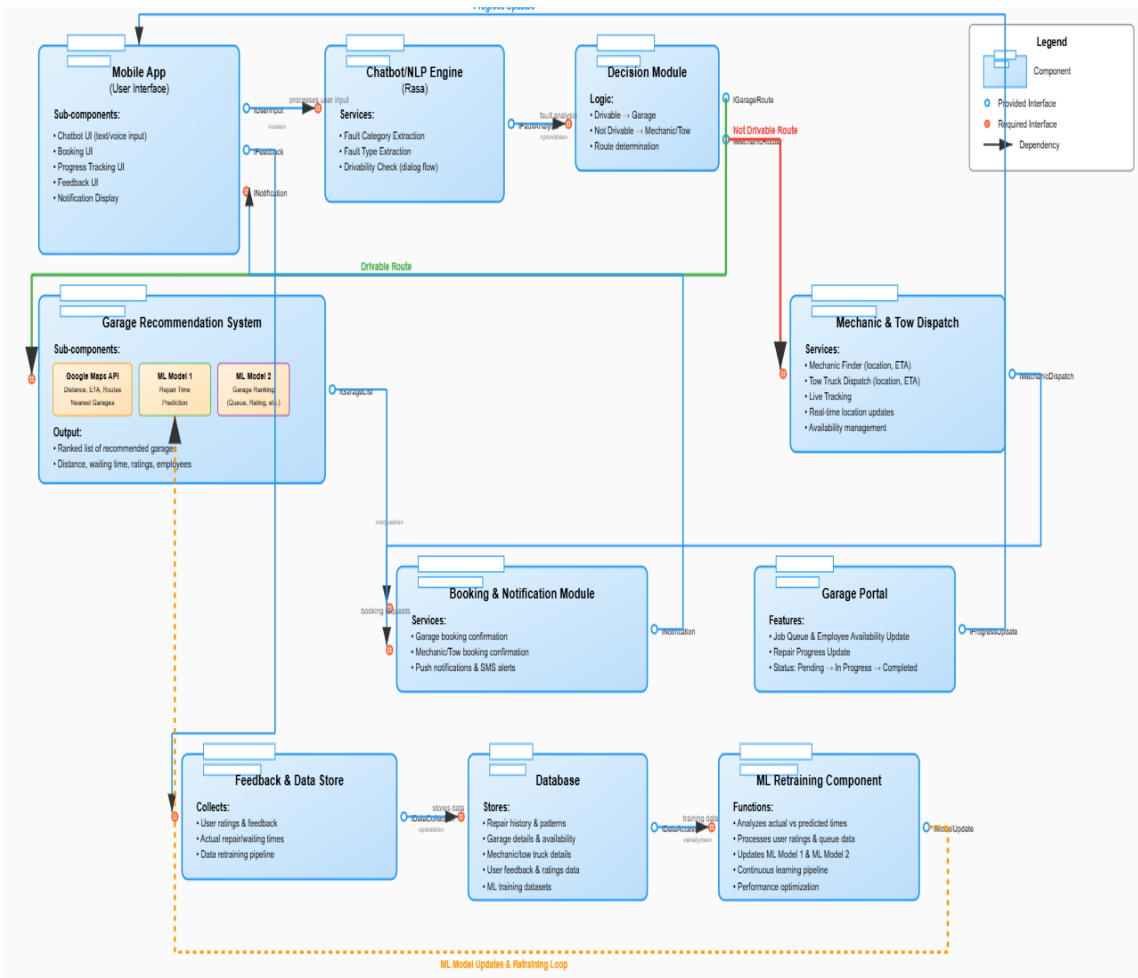

Figure: Component Diagram

3.4 Anticipated Outcomes

The anticipated outcomes of this project include the successful development of a fully functional AI-driven system designed to provide reliable garage recommendations and, where necessary, initiate mechanic dispatch services. By enabling drivers to quickly determine whether a vehicle is safe to drive, the system aims to significantly reduce vehicle downtime while ensuring timely access to appropriate repair facilities. Its ability to recommend the most suitable garage based on location, distance, and predicted repair time enhances both efficiency and convenience for vehicle owners.

A central of the system is the integration of a conversational chatbot, which creates a user-friendly experience by allowing drivers to describe vehicle issues in natural language, such as “the engine is overheating” or “the brakes are not working properly.” This intuitive approach lowers the barrier for less technically experienced users, ensures accurate guidance without overwhelming drivers with technical jargon, and streamlines communication, improving overall usability and accessibility- critical factors for real-world adoption.

In practical application, the project has the potential to positively impact multiple areas. It can improve road safety by advising drivers when their vehicle is unfit for travel, optimize repair logistics by efficiently matching drivers with garages, and support small-scale garages and workshops by integrating them into a connected digital ecosystem. Future enhancements, such as preventive maintenance advice, cost estimation, or direct booking with garages, could transform the system into a comprehensive digital assistant for vehicle owners, establishing it as a sustainable, scalable, and innovative solution within the automotive service industry.

4.0 Project Requirements

The following requirements are specifically assigned for the AI-Based Garage Recommendation and Repair Time Estimation System with Chatbot Interface for Sri Lanka.

1.1 Functional Requirements

1. Fault Reporting

- Accept user input via text or voice describing vehicle problems.
- Extract fault category and type using NLP (Rasa-based chatbot).
- Support both minor issues (e.g., flat tyre, battery low) and major issues (e.g., engine overheating, brake failure).
- Allow optional location sharing for service recommendations.

2. Drivability Assessment

- Conduct a structured conversation to decide whether the car is:
  - Drivable → Garage Recommendation
  - Drivable but minor → Mechanic Dispatch
  - Not drivable (serious) → Tow Service + Garage
- Ask context-specific follow-up questions (e.g., "Do you see smoke from the bonnet?").

3. Garage Recommendation

- Use Google Maps API to find nearby garages within a user-defined radius.
- Rank garages based on distance, repair queue, available mechanics, skills, and predicted repair ETA.
- Provide top 3 ranked garages with estimated waiting and repair times.
- Allow users to book services directly through the chatbot.

4. Repair Time Prediction

- Predict expected repair time using ML models trained on historical repair jobs, vehicle types, and fault categories.
- Continuously improve accuracy with new data collected from garages.

- Show time range (e.g., "3–4 hours for repair").

5. **Mechanic / Tow Dispatch**

- Assign a mechanic if fault is minor and can be fixed roadside.
- Assign a tow truck if vehicle is immobile or unsafe to drive.
- Integrate with partner dispatch systems for real-time availability.

6. **Job Tracking & Updates**

- Garage/Mechanic portal to update job progress (Pending → In Progress → Completed).
- Real-time notifications to the user about repair status.
- Allow customers to provide feedback and ratings after service.

7. **User Management**

- User registration with phone/email/social accounts.
- Role-based access for drivers, mechanics, garages, and admins.
- Secure profile management (past jobs, ratings, preferences).

4.2 Non-Functional Requirements

1. **Performance**

- NLP chatbot response within 2 seconds.
- Garage ranking and ETA prediction processed in <5 seconds.
- System uptime of 95% or higher.

2. **Accuracy**

- Fault classification accuracy of >85%.
- Repair ETA prediction accuracy within ±15 minutes of actual time.
- Garage ranking validated through user feedback (≥80% satisfaction) Maintain audit logs of service requests and recommendations.

3. **Security**

- Encrypt all communications (TLS 1.3).

- Protect sensitive data (user location, car details) with anonymization.
- Maintain audit logs of service requests and recommendations.

4. Scalability

- Support up to 1000 concurrent chatbot conversations.
- Handle 200 garage service requests per hour.
- Cloud deployment (AWS/GCP/Azure) with horizontal scaling.

5. Usability

- Simple conversational interface with multilingual support (English, Sinhala, Tamil).
- Clear garage comparison table for decision-making.
- Mobile-first design with voice-enabled interaction.

4.3 User Requirements

1. Drivers / Vehicle Owners

- Report vehicle problems easily via text or voice.
- Receive garage recommendations with predicted repair times.
- Book services and track progress in real-time.
- Rate service providers and view history of past jobs.

2. **Garages**

- Receive job requests with fault details, customer info, and ETA.
- Update job status dynamically (Pending → Completed).
- Access repair history for repeat customers.

3. Mechanics

- Get notified of roadside job requests (minor fixes).
- Update task completion and collect feedback.

4. **Tow Services**

- Receive dispatch requests with location and vehicle details.
- Confirm towing completion through portal/app.

5. **Administrators**

- Manage users, garages, and mechanics.
- Monitor system health, logs, and data quality.
- Evaluate ML model performance and retraining cycles.

4.4 System Requirements

Hardware:

- Minimum 8-core CPU, 32GB RAM, 1TB SSD storage.
- GPU-enabled server for ML model training.
- Stable internet with >50 Mbps for API calls & live updates.

Software:

- Backend: Python (Flask), Rasa for NLP.
- ML: Scikit-learn, XGBoost for ETA prediction, Learning-to-Rank for garage ranking.
- Database: MySQL for structured data.
- Frontend: React Native (mobile app) & Web dashboard.
- Integration: Google Maps API, SMS/Email notification APIs.
- Hosting: AWS/GCP Cloud with Dockized microservices

4.5 Use Cases

UC1: Report Fault → Garage Recommendation

- Actor: Driver
- Flow: User reports fault → NLP extracts fault type → System checks drivability → Finds nearby garages → Ranks garages → User books service.

UC2: Dispatch Mechanic or Tow

- Actor: Driver, Mechanic/Tow Partner
- Flow: User reports serious issue → System detects non-drivable → Assigns tow truck or mechanic → Job completed → User feedback.

UC3: Repair Tracking

- Actor: Garage, Driver
- Flow: Garage updates repair progress → Driver notified → Repair completed → Invoice + rating.

4.6 Test Cases

TC1: Fault Extraction

- Input: "My car is overheating, and smoke is coming out."
- Expected: NLP identifies → Fault Category: Engine | Fault Type: Overheating | Severity: Serious.

TC2: Garage Ranking

- Input: User location + garages in 5km radius.
- Expected: Ranked list considering distance, available employees, repair queue.

TC3: Repair ETA Prediction

- Input: Vehicle: Toyota Corolla 2012, Fault: Engine Overheating.
- Expected: Predicted repair time: 4–5 hours.

TC4: Mechanic Dispatch (Minor Case)

- Input: "Car won't start, but battery light is blinking."
- Expected: NLP detects minor → Mechanic dispatched.

TC5: Tow Dispatch (Serious Case)

- Input: "Brake failure while driving, cannot move."
- Expected: Tow truck dispatched + garage assigned.

5.0 Grantt Chart

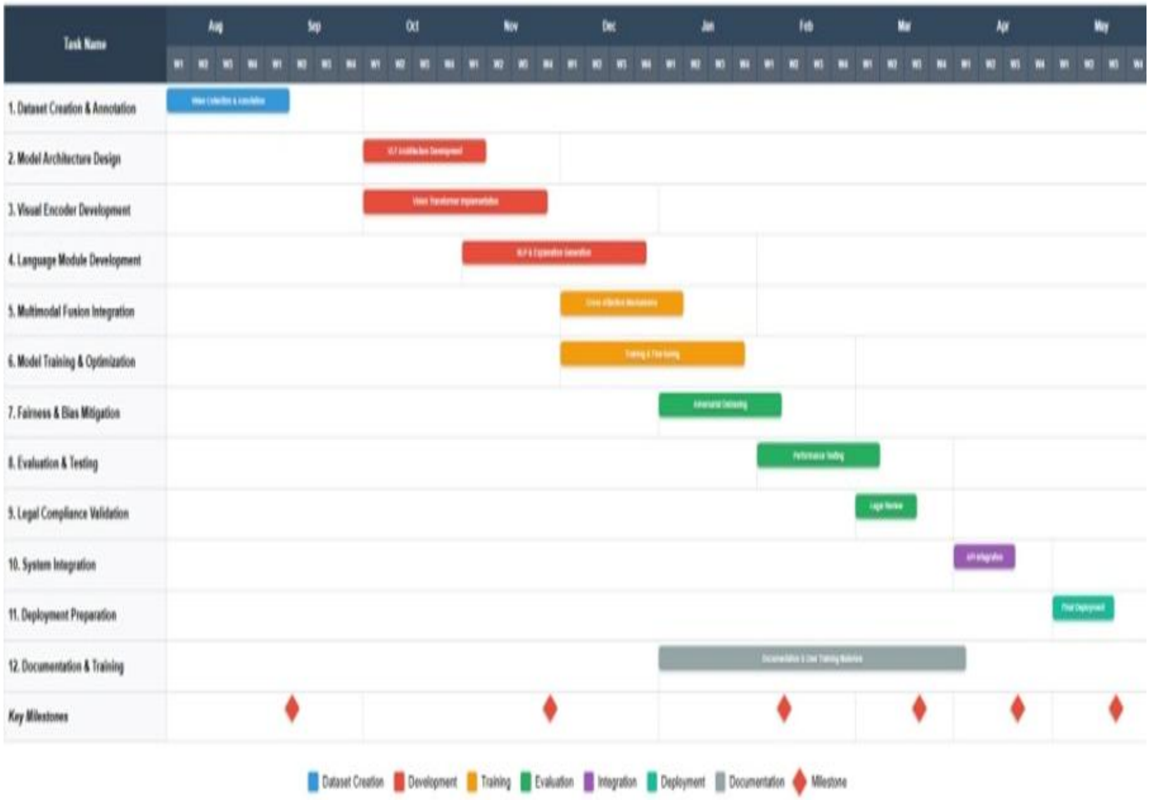

Figure 5.1 Grantt Chart

6.0 Work Breakdown Chart

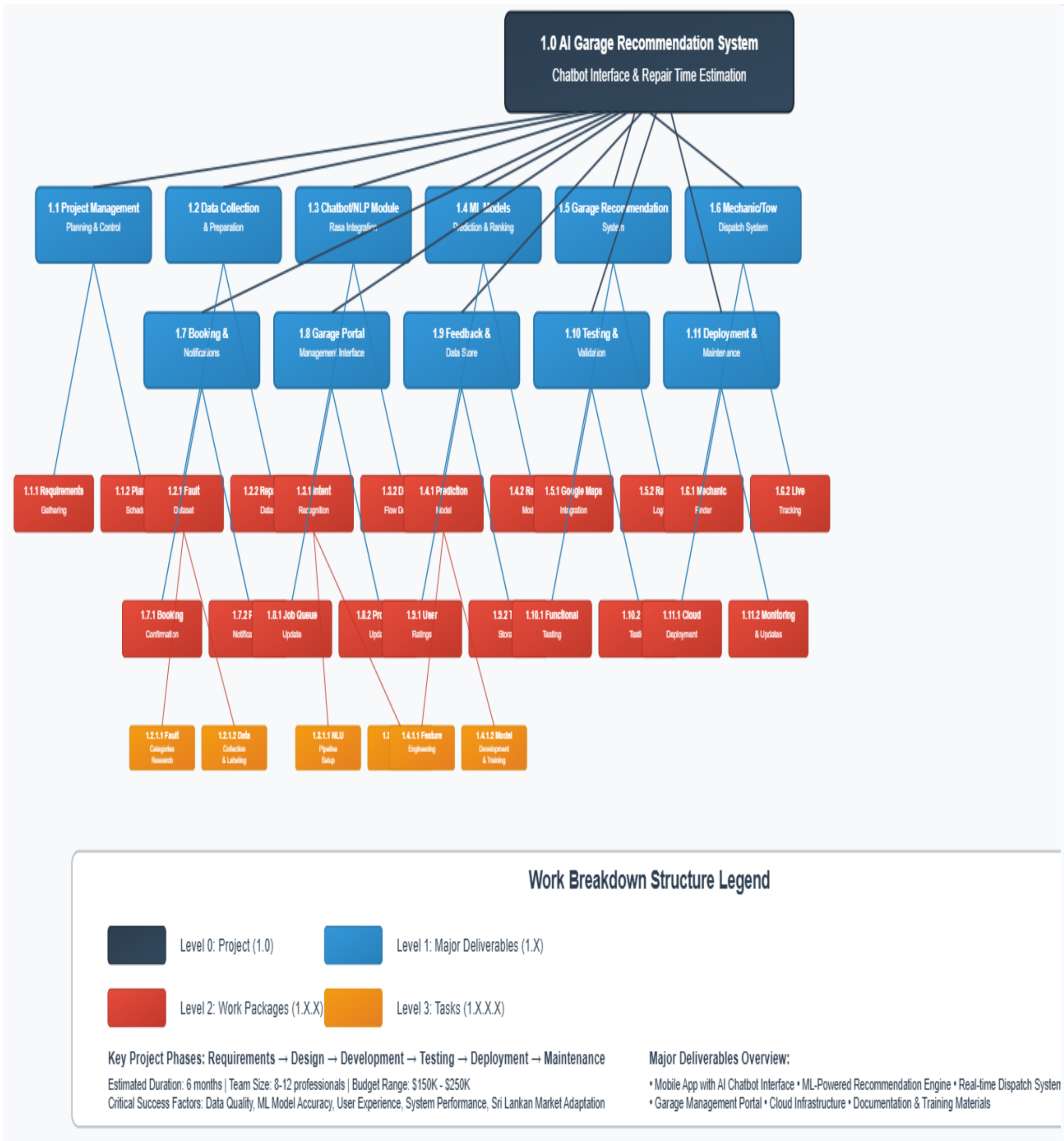

Figure 6.1 Work Breakdown Chart

7.0 Budget and Commercialization

Component	Cost (LKR)	Notes
Data Collection & Annotation	Rs. 10,000	Fault type classification, repair time history from garages
Hardware & Infrastructure	Rs. 120,000	Cloud hosting, model training (GPU), and mobile app backend servers
API Services (Google Maps)	Rs. 25,000	Annual API subscription fees for maps and location services
Development Tools & Licenses	Rs. 15,000	Software tools, testing platforms, and security certificates
Maintenance & Updates	Rs. 30,000	Continuous system updates, bug fixes, and feature improvements

Table 7.1 Budget

7.1 Commercialization Strategy

Our system can be scaled beyond an academic prototype into a commercially viable service. The commercialization strategy includes:

- Freemium User Model: Vehicle owners can access basic garage recommendations for free; premium subscription provides repair time prediction and live tracking.
- B2B Partnerships (Garages & Workshops): Garages subscribe to our platform for prioritized listing, real-time job allocation, and customer feedback integration.
- B2C Services (End Users): Drivers pay a small service fee when booking through the app (commission-based revenue model).
- Insurance & Fleet Companies: Offer API integration for insurers and fleet managers to get accurate downtime predictions and trusted garage recommendations.

- Government & Roadside Assistance Integration: Partner with local authorities (e.g., AA Ceylon, police emergency dispatch) to provide breakdown + towing services via our app.

7.2 Target Audience

Our target market is broad and multi-stakeholder:

- Vehicle Owners/Drivers: Everyday drivers who need quick, reliable garage recommendations and repair time estimates.
- Garages & Mechanics: Workshops that want to attract more customers, optimize workload distribution, and build trust through transparent service.
- Insurance Providers: Companies that require accurate downtime predictions to improve claim processing and cost estimation.
- Fleet Operators & Businesses: Taxi services, logistics companies, and corporates with large fleets needing predictive repair insights.
- Government & Emergency Services: Agencies needing integrated breakdown, towing, and roadside safety services.

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