Project Scope Definition

The project focuses on the development of an expert system, presented in chatbot format, capable of diagnosing common vehicle problems. The main idea is to provide guidance to users with little or no technical knowledge about automotive maintenance, helping them to identify the probable cause of a problem in their vehicle and offering basic recommendations for its solution.

The system will be designed to solve common and simple vehicle problems that do not require specialized equipment. The main problems it will address include, but are not limited to:

- Starting problems (such as when the vehicle attempts to start but fails to start).
- Air conditioning operation problems (e.g., refrigerant blow-by or bad odors).
- Problems with the vehicle lights (flashing lights or blackouts).
- Engine problems.
- Electrical problems, such as malfunctioning or low power in vehicle electrical systems.

Target Audience

The system is aimed primarily at young adults between the ages of 18 and 30, who may have no experience or technical knowledge in automotive mechanics. This user segment is often interested in digital and practical solutions that allow them to solve problems on their own without necessarily having to go to a specialist.

Target audience characteristics include:

- Need for quick and easy-to-understand solutions.
- Preference for digital interaction rather than extensive manuals or guides.
- Possible limited knowledge of automotive mechanics.

Functional Requirements.

Interaction Chatbot:

The system must function as an intuitive chatbot, where the user can enter symptoms observed on the vehicle.

The chatbot must be able to handle multiple symptoms at once to provide a more accurate diagnosis.

It should provide explanations of each symptom and possible causes, along with recommendations for actions the user can try.

Symptom-Based Diagnosis:

The system should include at least 20 diagnostic problems, 10 of which should be based on multiple conditions, increasing diagnostic accuracy.

The system must offer solutions that can be performed without specialized equipment and are safe for the user.

User Friendly Interface:

The interface should be designed for a young audience, be visually appealing and easy to use.

It should allow the user to select or enter symptoms without complexity.

Non-functional Requirements

Accessibility and Availability:

The system must be accessible at any time to serve users at the time they are presented with the automotive problem.

The application must be easy to use and accessible to people with basic knowledge in the use of technology.

Scalability:

The system must be ready to receive and process queries efficiently as the number of users increases.

Maintainability:

The system should be easily upgradable to include new problems and solutions in the future, according to evolving problems and user needs.

Functionality and User Interaction Flow

The system should present an interaction flow where the user can enter one or more symptoms, after which the chatbot will analyze the information and suggest possible diagnoses and solutions. This flow should follow the following steps:

Symptom Entry: the user describes the observed problem (e.g., "the car won't start").

Additional Analysis and Questions: In case more details are needed, the system can ask the user to refine the diagnosis.

Diagnosis and Solutions: The chatbot suggests one or more probable causes and provides recommendations that the user can make to solve the problem.

Preventive Advice and Advice to Consult a Professional: If the problem is complex or may involve risks, the chatbot will advise to consult a professional and provide preventive advice.