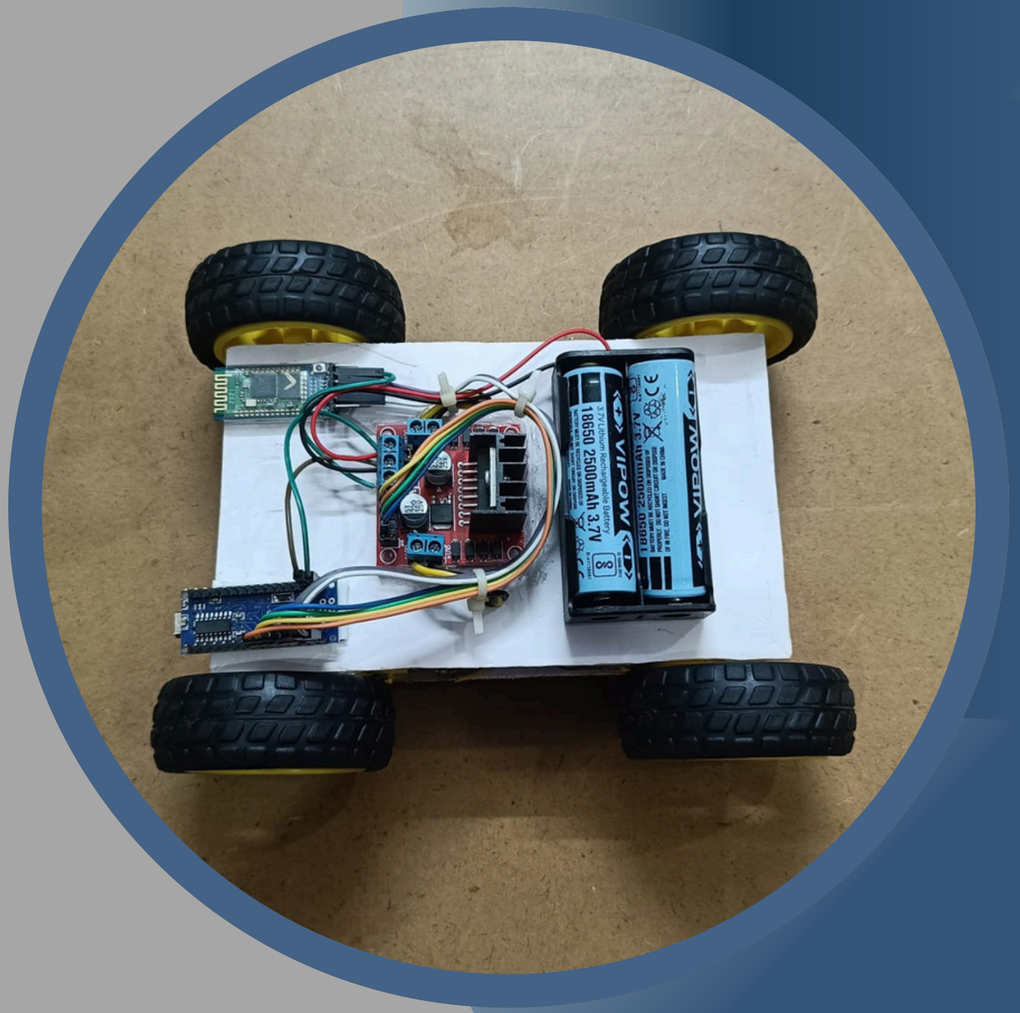
23KD1A04I9

VOICE CONTROL CAR

SMART AND SAFE JOURNEY



Presented by
V. GEETHANJALI

EMPATHY

Designing a voice-controlled car starts with understanding people and their needs, emotions, and challenges. This stage helps reveal hidden frustrations and desires, especially for users interacting with voice systems in vehicles.

User Groups Studied:

Elderly drivers facing physical limitations

Visually impaired or differently-abled users

Busy professionals who multitask often

Parents needing safer multitasking

Key Insights:

Frustration with current systems: Touchscreens and buttons distract drivers.

Desire for natural conversation: Users want casual, accent-friendly interaction.

Need for dignity and accessibility: Voice control empowers users with limitations.

Safety concerns: All groups value distraction-free, safer driving

DEFINE

Users shared a wide range of concerns, from physical difficulty using controls to frustration with unresponsive systems. A clear need for a safer, simpler, and more natural way to interact with vehicles without diverting attention from the road.

Cognitive overload

Complex menus and the screens might distract the drivers attention.

Limited Accessibility

Traditional interfaces exclude users with mobility or vision issues

Lack of Personalization

Current voice systems struggle with accents and casual language.

Safety Risk

Manual interaction increases the chance of road accidents.

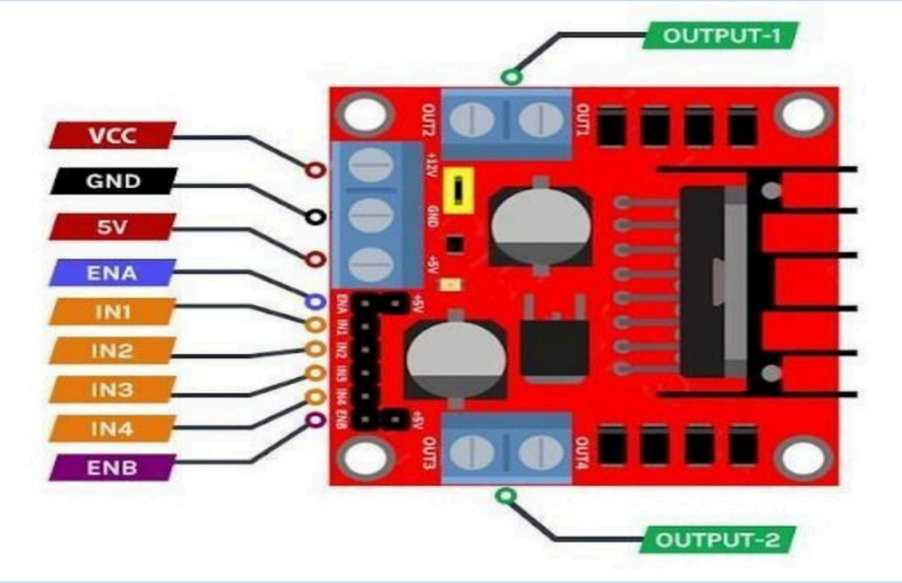
IDEATE

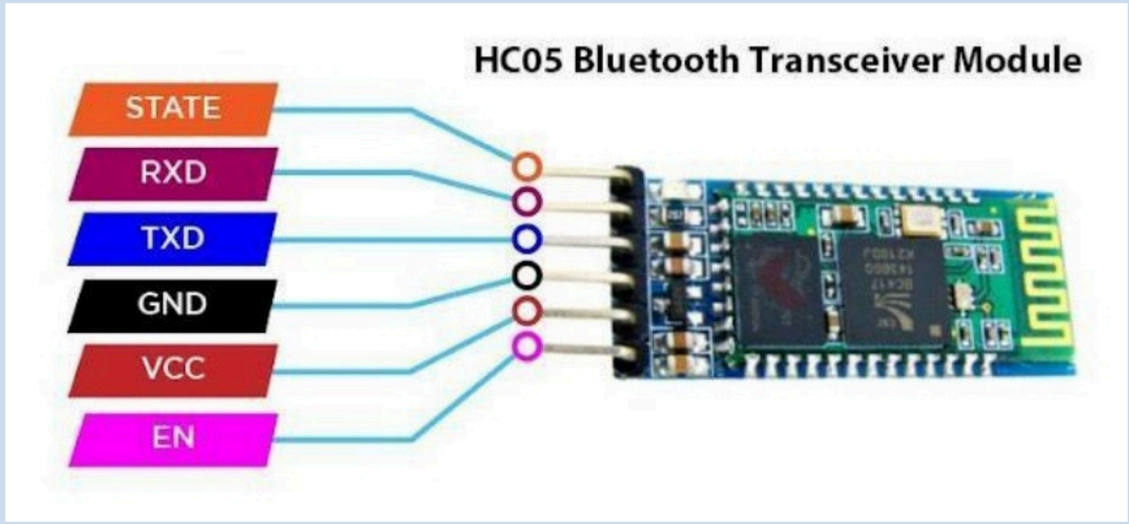
In the Ideate phase, we explored innovative voice-interaction solutions for cars through open-minded brainstorming, focusing on enhancing driving through natural communication. We used techniques like "How Might We" prompts, role-play, rapid sketching, and reverse brainstorming to uncover creative ideas.

1. Natural Language Understanding: Developed voice assistants that interpret full sentences, emotions, and regional accents, moving beyond basic commands.
2. Safety and Efficiency: Enabled hands-free multitasking, voice-based navigation, and emergency protocols triggered by distress phrases.
3. Inclusivity and Accessibility: Designed voice-first interfaces with multimodal feedback and adaptive systems that learn user preferences.
4. Personalization and Local Relevance: Allowed customization of assistant's voice and behavior, recognized routines, responded to emotional cues, and supported multilingual and hybrid speech patterns.

PROTOTYPE

Step 1: Assembling the Hardware
Step 2: Setting up the Bluetooth Module
Step 3: Writing the Code
Step 4: Implementing Voice Commands
Step 5: Connecting to a Voice Assistant





TESTING

1. Functional Testing

• Verifies that commands like “forward,” “stop,” “left,” “right,” etc., are correctly recognized and executed.

• Ensures the car’s movement matches the voice input without errors.

2. Performance Testing

• Checks response time from voice input to action.

• Evaluates performance under various signal strengths (if using wireless modules like Bluetooth).

3. Stress Testing

• Tests system behavior under extreme conditions. e.g., rapid sequence of commands or noise-heavy environments.

• Helps determine the limits of voice recognition reliability.

4. Battery & Endurance Testing

• Assesses how long the system operates on a full charge.

• Observes power drain during prolonged usage or motor strain.

5. Environment Testing

• Checks recognition accuracy in different noise levels (quiet room, outdoors).

• Assesses whether lighting or surface variations affect the sensors (if equipped).

THANK YOU