Team 01

Voice-Activated Autonomous Car
(The BatMobile)

I am Batman!

Brief description:

- Our project, the "Voice-Activated Autonomous Car BatMobile," is an exciting endeavour to create a futuristic, intelligent vehicle that responds to voice commands, offering a taste of the technology that drives autonomous cars. This BatMobile-inspired car will not only be visually striking but also packed with advanced technology to navigate and perform specific actions upon voice commands, making it an impressive and entertaining showcase of modern automation.

Functionality:

- The Voice-Activated Autonomous Car BatMobile will consist of a range of subsystems and hardware components that collectively enable it to respond to voice instructions and carry out various tasks. These tasks include the ability to drive forward, backward, turn, and even activate special effects like LED lights, a voice-responsive "Bat Signal" projector. The car's main objective is to provide an immersive experience of voice-controlled automation, making it an appealing project for both enthusiasts and those interested in exploring the potential of autonomous systems.

Subsystems:

Subsystem 1: Voice Recognition and Processing

•This subsystem will handle voice input from the user.
•Utilises a microphone to capture voice commands.
•Employs voice recognition software to convert spoken words into text.
•Processes and interprets voice commands to trigger specific actions.

Subsystem 2: Motor Control

•Responsible for controlling the movement of the car.
•Utilises two motors for forward and backward movement.
•Another motor for turning.
•Receives commands from the Voice Recognition subsystem and translates them into motor actions.

Subsystem 3: Bat Signal Control

•Activates and controls the Bat Signal projector.
•Coordinates with the Voice Recognition subsystem to respond to specific voice commands for light effects.

Subsystem 4: Communication Protocol
•Ensures that all subsystems can exchange data and commands.
•Utilises I2C protocol for inter-MC communication. (researched on google which protocol to use)

Hardware:

Microcontrollers:

•Arduino RP2040: Main control unit for the BatMobile.
•Raspberry Pi Pico W

Input Devices:

•Microphone: For voice input and commands.
•Analogue Sensor: Ultrasonic sensor for distance measurement.

Output Devices:

•DC Motors (2): For controlling the vehicle's movement.
•Motor (1): turning.
•Projector: To display the Bat Signal.

Communication Protocol:

•I2C Protocol: To enable communication between the Arduino RP2040 and Raspberry Pi Pico.

Minimum requirements:

•At least 2 concurrent tasks (Voice Recognition and Motor Control).
•At least 2 input devices (Microphone and Ultrasonic Sensor).
•Arduino RP2040 and Raspberry Pi Pico W as the main microcontrollers.
•Communication protocol (I2C) applied between microcontrollers.
•3 output devices, including at least 2 different devices (DC Motors,Speaker,Projector).

Once again…….

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