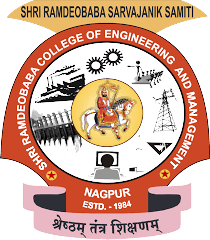
**Shri Ramdeobaba College of Engineering and Management, Nagpur**

**Department of Electronics and Communication**

**Session 2023-24**



**Teacher’s Assessment (Minor Project)**

**Semester: V EC (SECTION B)**

**Course: Microcontroller & Interfacing Lab**

**Course Code: ECP353**

**Minor Project Report**

Title of the Project: **Robot controlled by using Android app**

Group Number:

Date of Submission: /2/2023

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**INTRODUCTION**

1. A robot controlled by an Android app using the IC 8051 microcontroller combines hardware and software to enable remote operation.
2. The IC 8051 serves as the brain of the robot, interpreting signals from the Android app to control various functions.
3. This integration allows users to manoeuvre the robot wirelessly, offering a versatile and user-friendly interface for interacting with the robotic system.
4. The synergy between the microcontroller and the Android app enhances the robot's capabilities and opens up possibilities for applications in areas such as automation, surveillance, and remote exploration.

**Literature Survey**

A literature survey on robots controlled by Android apps using the IC 8051 microcontroller reveals the integration of this microcontroller into robotics. Researchers focus on Android app development for user-friendly control interfaces, utilizing various wireless communication protocols, including Bluetooth. Control algorithms are explored to ensure efficient and reliable interaction. Applications span across education, healthcare, and industrial automation. Challenges, such as latency and security, are addressed through various methods. Comparative studies evaluate different approaches, while emerging trends in this field indicate a promising future. This survey sheds light on the current state and potential advancements in IC 8051-based Android-controlled robots.

**COMPONENTS LIST**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr No.** | **Name of Components** | **Value**  **(Specify Unit)** | **Quantity Used** |
| **1.** | 8051 microcontroller IC |  | 1 |
| **2.** | DC Motor | 200rpm | 2 |
| **3.** | Motor Driver IC | L293D | 1 |
| **4.** | Robot Body | Fiber | 1 |
| **5.** | Bluetooth Device | HC-05 | 1 |
| **6.** | LED | Red | 1 |
| **7.** | Battery | 9Volte | 1 |
| **8.** | Jumper Wires | - | 5 |
| **9.** | Voltage Regulator IC | LM7805 | 1 |
| **10.** | Resistor | 10K, 1K, 470 Ω | 3 |

**BLOCK DIAGRAM**

Serial Bluetooth

(HC-05)

8051 micro controller

8051 micro controller

L293D

Motor Driver

Data Communication

Over Bluetooth

Phone

**WORKING PRINCIPLE**

In this Smart Phone controlled Robot, the user of android app sends the data to 8051microcontroller through HC-05 module. The received data is compared in 8051 microcontroller and the decision is made accordingly. The below table shows the direction of motors and status of robot for different received characters.

|  |  |  |  |
| --- | --- | --- | --- |
| **Received character** | **Motor 1** | **Motor 2** | **Status of robot** |
| f | Forward | Forward | Moves forward |
| b | Backward | Backward | Moves backward |
| r | Forward | Backward | Moves Right |
| l | Backward | Forward | Moves left |
| s | Off | Off | Stopped |

1. The HC-05 Bluetooth module facilitates wireless communication between the Android phone and the 8051 microcontroller. The module is set up as a slave, and it communicates with the microcontroller using serial communication.
2. The L293D motor driver is employed to control the DC motors. This motor driver allows the robot to move in various directions, including forward, backward, right, left, and stop.
3. The logic levels on the input pins (m1f, m1b, m2f, m2b) of the L293D motor driver determine the direction and movement of the motors.
4. The Android app communicates with the robot by sending specific characters representing different commands (e.g., 'f' for forward, 'b' for backward) through Bluetooth.
5. The microcontroller receives these characters, interprets them, and controls the motors accordingly.
6. After receiving a command and executing the corresponding motor movements, the microcontroller sends back the status of the robot to the Android app. This feedback allows the user to know the current state of the robot.

**APPLICATIONS**

1. The technology used in this project can be extended to control home appliances using a mobile application.
2. The robot can be equipped with additional sensors like cameras or infrared sensors to create a simple surveillance robot.
3. Mobile-controlled robots can be utilized in search and rescue missions in areas where human access is difficult or dangerous.
4. The robot can be equipped with a camera and a two-way communication system, allowing users to remotely control the robot and interact with people in a different location.
5. The project can be extended to incorporate Internet of Things (IoT) principles, enabling the robot to be controlled and monitored remotely from anywhere in the world.
6. In environments that are hazardous for humans, such as exploring disaster-stricken areas or outer space, mobile-controlled robots can be deployed for exploration and data collection.

**ADVANTAGES**

1. The use of Bluetooth technology allows for wireless communication between the Android app and the robot. This eliminates the need for physical connections, providing flexibility in controlling the robot from a distance.
2. The Android app provides a user-friendly interface for controlling the robot. Users can easily send commands using the app, making it accessible even for individuals without extensive technical knowledge.
3. The robot sends the status back to the Android app, providing real-time feedback to the user. This feature allows users to monitor the robot's status and make informed decisions while controlling its movements.

**CONCLUSION**

The Android-controlled robot using 8051 microcontroller and the HC-05 Bluetooth module is a successful project that demonstrates the integration of hardware components and software to create a remotely controlled robot. The project includes a feedback mechanism where the robot's status, such as its movement direction, is sent back to the Android app. This enhances user feedback and interaction. The project can be expanded by adding additional features or sensors to the robot, making it a platform for further experimentation and development. It also provides a foundation for learning and expanding into more advanced robotics projects.

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