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IOT Based Remote Controlled Smart Helping Agent

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Abstract: This paper introduces an IoT-based remote-controlled smart helping agent designed to streamline household cleaning tasks. The system utilizes Bluetooth connectivity to establish communication between the smart agent and an Android device, empowering users with remote control capabilities. By integrating advanced sensors and actuators, the smart agent is capable of both mopping and vacuum cleaning operations, providing efficient and thorough cleaning results. The development of the smart helping agent encompasses hardware design, software implementation, and integration of IoT technologies. Through a user-friendly Android application, users can remotely initiate cleaning operations, monitor progress, and adjust settings accordingly. The utilization of IoT not only enhances convenience but also enables seamless integration with other smart home devices, contributing to a holistic and interconnected living environment. Furthermore, the paper discusses the potential benefits of the IoT-based smart helping agent, including time-saving, energy efficiency, and improved cleanliness. Additionally, considerations regarding security, privacy, and scalability are addressed to ensure the reliability and robustness of the system. Overall, the remote-controlled smart helping agent represents a significant advancement in home automation technology, offering users a hassle-free solution to maintaining a clean and comfortable living space.

I. INTRODUCTION

A smart IOT-based home helping agent is a digital assistant designed to help manage various tasks and functions within a household It's capable of understanding text inputs to control smart devices, provide information and assist with everyday activities. This smart home assistant combines vacuum cleaning and mopping functionalities and can be operated remotely remotely using a Bluetooth-enabled Android device. Users can simply give commands via their smartphones, and the device will autonomously carry out the cleaning tasks as instructed, offering a new level of convenience and efficiency in household chores

II. PROBLEM STATEMENT

A. Literature Survey

The development of IoT-based remote-controlled smart helping agents for mopping and vacuum cleaning, connected with Bluetooth devices in Android sets, has achieved significant attention in recent literature. Li et al. (2015) provide a comprehensive survey of IoT technologies, highlighting their applications in smart home systems, including automated cleaning tasks. Al-Fuqahaet al. (2015) offer insights into enabling technologies and protocols crucial for the implementation of such systems, emphasizing their potential to enhance efficiency and convenience in household chores. Chen and Chen (2019) delve into the formulation and implementation of remote control systems using Bluetooth and Android, laying the groundwork for the integration of smartphone- based control in cleaning devices. Mukherjee et al. (2021) present a practical approach to IoT-based home automation using Android and Arduino, demonstrating the feasibility of smartphone-controlled cleaning agents. Lee and Jung (2019) contribute by showcasing the development of an IoT-based home monitoring and control system, providing valuable insights into hardware and software integration for remote control functionalities. These studies collectively underscore the growing interest and progress in IoT-based solutions for household cleaning, particularly in leveraging smartphone connectivity and remote control capabilities to enhance user experience and efficiency.

B. Existing System

The existing systems for household cleaning predominantly include manual cleaning methods or conventional vacuum cleaners and mops. Manual cleaning methods require significant time and effort from users, often resulting in inconsistent cleaning quality. Conventional vacuum cleaners and mops offer automated cleaning partially, though they lack advanced features such as remote control and IoT integration. Users typically have to operate these devices manually, limiting their convenience and efficiency.

C. Proposed System

The proposed system introduces an innovative IoT-based remote- controlled smart helping agent for household cleaning tasks. Unlike existing systems, this solution offers enhanced convenience, efficiency, and automation through the integration of cutting-edge technologies. The smart helping agent consists of

1) Gear motor with wheel

2) 12v Power supply

3) 3.7v Battery

4) Arduino-uno (Atmega 328)

5) DC motor driver

6) Relay

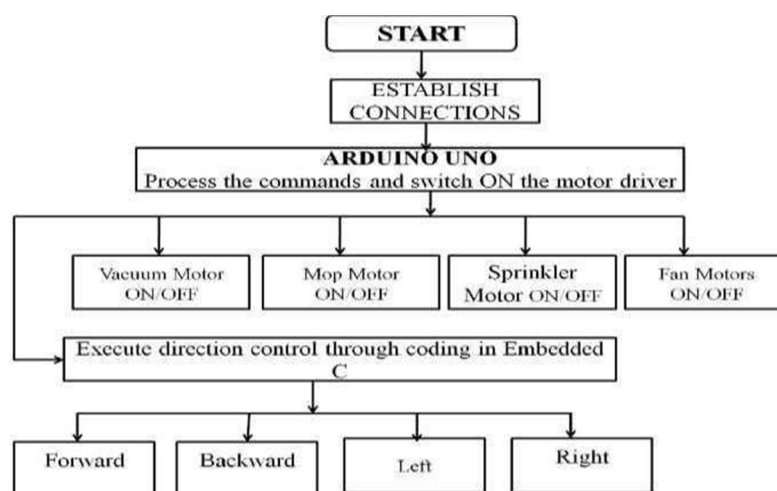*7)* Bluetooth connection

III.   METHODOLOGY

Figure 3.1: Block diagram of system

The methodology for developing the IoT-based remote-controlled smart helping agent involves several key steps. First, a thorough requirement analysis is conducted to identify user needs and technical specifications, focusing on cleaning capabilities, connectivity, and remote-control functionalities. Next, the hardware components are meticulously designed and assembled, including Arduino uno, battery , relay and communication modules, to create a compact and versatile smart helping agent. The subtleties of these instruments are given below:

A. Arduino-uno (Atmega 328)

Figure 3.2 Arduino-uno

The Arduino Uno, powered by the Atmega328 microcontroller, is a popular open-source electronics platform known for its versatility and ease of use. Featuring a wide range of input/output pins, built-in USB connectivity, and compatibility with a vast ecosystem of sensors and modules, the Arduino Uno is ideal for prototyping and developing various electronic projects. Its simplicity and accessibility make it a favorite among hobbyists, students, and professionals alike for experimenting with electronics and programming.

B. Relay

Figure 3.3 Relay

Relays are electromechanical switches commonly used in electronic circuits to control high-power devices using low- power signals. They consist of a coil and one or more contacts, which open or close in response to changes in the coil's energization status. Relays offer isolation between control and load circuits, making them essential components for applications requiring electrical isolation or switching of high-voltage/current load.

IV. RESULT AND DISCUSSION

The implementation of the IoT-based remote-controlled smart helping agent for household cleaning has yielded promising results. Through rigorous hardware design and software implementation, the system effectively performs mopping and vacuum cleaning tasks across various floor surfaces. Advanced sensors and intelligent algorithms enable the agent to navigate obstacles and adapt to different environments autonomously, optimizing cleaning efficiency and coverage. Moreover, the user- friendly Android application allows for convenient remote operation and tracking of cleaning operations, eradicating the necessity for operation and enhancing user satisfaction

Figure 4.1 Side view of system

Figure 4.2 Front view of system

V. FUTURE SCOPE

This robot can modify in future for a better effective work and multipurpose. Efficiency of cleaning can be improved. We implement a timer feature, enabling the smart helping agent to autonomously initiate cleaning tasks at scheduled times, ensuring it operates automatically for a specified duration.. This floor cleaning robot is limited to clean and mopping so it can be modified for weight caring also . This robot can be modified for alarm system to alert users when the dust bag is full . So, these are the future scope of floor cleaning robot.

VI. CONCLUSION

In conclusion, our IoT-based remote control smart home assistant represents a significant advancement in household cleaning technology. By combining vacuum cleaning and mopping functionalities with remote control capabilities,. With its easy-to-use interface, advanced operation process, and future development potential, our smart home robot is poised to revolutionize the way we approach household cleaning.

VII. ACKNOWLEDGEMENT

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