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HOME AUTOMATION USING ARDUINO AND APPLICATION

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Abstract: Now a days people want to complete their work within minimum amount of time. So, use of automated systems is trending. This paper describes the home automation system designed and developed using Arduino with Bluetooth module. This home automation system will be a simple and reliable technology with Android application. Home application such as Fans, Bulbs, Air Conditioners, and automatic door lock will be controlled by home automation system. When people will be out of home, they can monitor and control the application of smart home using Android Application. This will be secure, user friendly, and low cost, solution for smart home.

Index Terms **- Automated System, Arduino, Home Automation, IOT.**

I. INTRODUCTION

In today's fast-moving world, "smart homes" are getting really popular. They give home owners a lot of control and make life more convenient. These smart home systems have become advanced, taking care of things like lights, temperature, security, and saving energy. One cool solution to make your home smart is by using something called the Home Automation with Arduino. It uses Arduino microprocessor, along with sensors and devices, to turn a regular home into a smart, automated place to live. By using home automation systems, we want to make life easier and better by bringing technology into your home. With Arduino-based automation, you can control and check on your home system on your mobile. It gives you more control, makes your home safer, and helps you save energy. This system does not just make life simpler; it also helps to save the environment by using less energy.

II. RESEARCH METHODOLOGY

In our paper we discuss about to create a home automation system using Arduino with Android application, we have started by researching and planning the system, selecting the hardware components, including Arduino boards and various sensors like smoke, temperature, lesser module, ultrasonic sensors, and fingerprint sensors. We have designed a user-friendly mobile application to control the system, and we have integrated voice commands for hands-free control. Additionally, we have implemented an anti-door lock system using a fingerprint sensor for added more security. Throughout this system, we have focused on user customization, data security, and privacy. We have rigorously tested the system to ensure it works as intended, and we have provided user documentation for easy setup and usage. Our project methodology has considered limitations and risks, and we have kept track of the project's timeline and budget. Ultimately, we aim to create an affordable and accessible home automation solution that makes daily life more convenient, energy-efficient, and secure.

III. MODELING AND ANALYSIS

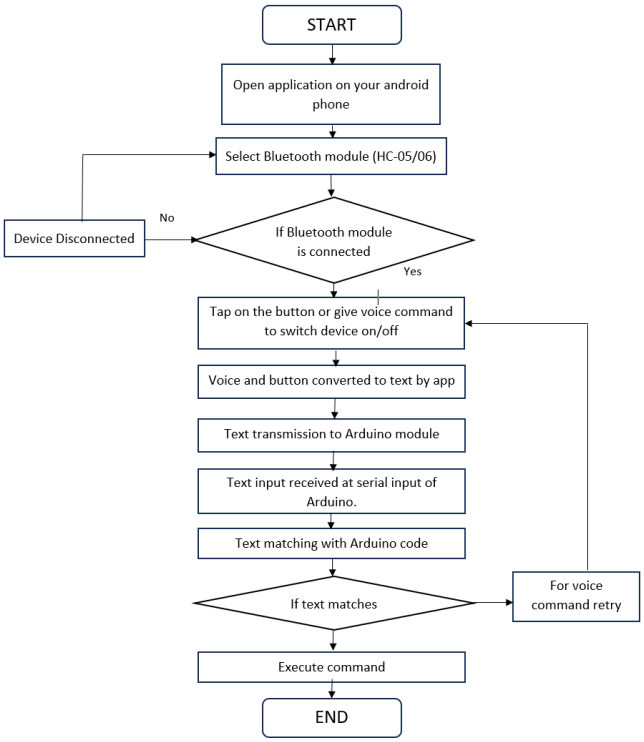

Figure 9: Flowchart

The above model shows the overall flow of the system, home automation using Arduino:

3.1. Open the application on your Android phone:

The first step involves launching the application that will be used to communicate with the Bluetooth module.

3.2. Select Bluetooth module (HC-05/06):

The user then needs to select the specific Bluetooth module they will be using from the application's interface [4]. The diagram specifies that this flowchart application lies to HC-05 and HC-06 modules.

3.3. Device Connected?

The application will then check to see if the Bluetooth module is currently connected to the phone.

- **If Yes:** If the module is connected, the process moves to step 4.
- **If No:** If the module is not connected, the user will likely need to navigate to the phone's Bluetooth settings to establish a connection. This step isn't depicted in the flowchart.

3.4. Tap on the button or give voice command to switch device on/off:

Once connected, the user can interact with the Bluetooth module by application a button on the application's interface or by issuing a voice command.

1. **Voice and button converted to text by application:** The application then interprets the user's button press or voice command and converts it into a text format.
2. **Text transmission to Arduino module:** The text message is then transmitted from the phone application to the Arduino module.

3. **Text input received at serial input of Arduino:** The Arduino receives the text message via its serial input.
4. **Text matching with Arduino code:** The Arduino then compares the received text message with its programmed code.
    - **If text matches:** If there's a match, the Arduino proceeds to execute the corresponding function as instructed by the code.
    - **For voice command retry:** If there's no match, specifically for a voice command, the Arduino may prompt for a retry – this step isn't explicitly shown in the flowchart, but it's implied in the loopback arrow.

3.5. Execute command:
The Arduino executes the function or command that's associated with the received text message.
3.6. END: The process ends here.

IV. RESULT

In the context of a Home Automation System typically refer to distinct functional components that work together to achieve the project's goals. Here are some essential systems in a project:

• Lesser Light Security System:

This System is responsible for continuously monitoring surrounding of home, and when someone try to break the security, it will send the notification to the owner.

• Anti-Door Lock System:

The Anti-Door Lock System manage the security of the home. It includes fingerprint sensor to verify the authorized user and if some unauthorized user tries to access it will send notification to the owner.

• LPG Gas Detection System:

This System is responsible for monitoring the LPG gas and when it detects the gas it will on the exhaust fan and send notification to the owner.

• Temperature System:

This System is responsible for monitoring the temperature of the home. When the temperature become high it will on the fan or open the window.

• Water Level Indication System:

This System is responsible for monitoring the level of water in the water tank. It uses ultrasonic sensor to measure the level of water in water tank and when the water tank is full it will shut down the water flow.

• Alarm and Notification System:

In case of emergency or errors, this System triggers alarms and send notifications to alert users

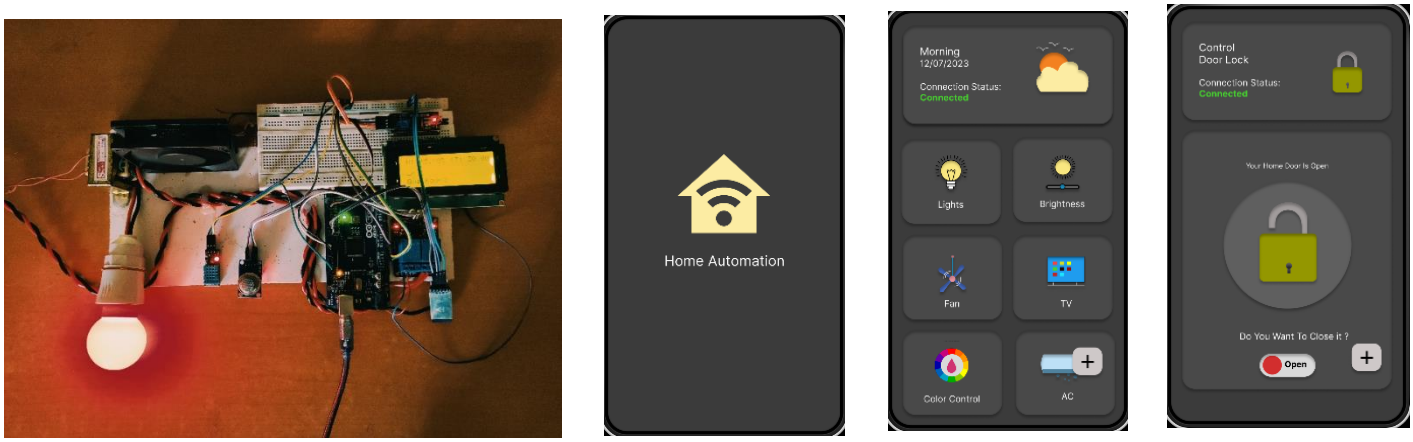

Figure 10: Implementation

V. CONCLUSION

The "Home Automation using Arduino and Android Application" brings affordability, ease of use, and convenience to the forefront. With features like mobile application control, voice commands, environmental sensors, and a fingerprint door lock, it simplifies daily life, enhances security, and helps to save energy. This project showcases how Arduino technology can make homes smarter and more user-friendly, offering a glimpse into the future of home automation.

A. ACKNOWLEDGMENT

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