HOME AUTOMATION SYSTEM

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Abstract – The project presents the development of an advanced home automation system aimed at revolutionizing residential living through smart technologies. Leveraging Internet of Things (IoT) principles, the system integrates various sensors, actuators, and communication protocols to enable remote monitoring and control of home appliances and devices. Through a user-friendly interface accessible via mobile or web platforms, homeowners can effortlessly manage their home environment, ensuring convenience, security, and energy efficiency. The project emphasizes scalability and interoperability, paving the way for future expansion and integration with emerging smart technologies**.**

***Key Words*:** Home Automation System, Internet of Things (IOT), Sensors, Actuators, Remote Monitoring

1.INTRODUCTION

Home automation enables centralized control of household devices, automating tasks like remote device management and leveraging wireless networks for efficient communication. The integration of sensors and control systems in home automation optimizes safety, comfort, and energy efficiency. Diverse user interfaces—from computer systems to smartphone apps—enable convenient control of automation systems, facilitating efficient resource utilization. As the Internet of Things (IoT) evolves, networked appliances offer enhanced connectivity, improving efficiency and economic benefits in home environments.

The Home automation is the technology referred to the automatic and electronic control of household features, activity, and appliances in simple terms, it means you can easily control the utilities and features of all the houses via the internet to make life more convenient and secured and even spend less on household bills. Home automation system typically connects controlled devices to a central Smart home hub (sometimes called a "Gateway"). The user interface for control of the system uses either wall-mounted terminals, tablet or desktop computers, a mobile phone application, or a Web interface that may also be accessible off-site through the Internet.

2. RELATED WORKS

In the study [1], stated the use of cloud based home automation wherein after the successful connection from home applications to the server, the data of sensor are sent to the web server for monitoring of the system. The web server page which will allow to monitor and control the system. By entering the assigned IP address in the web browser this web server page will appear. The web server gives the information about the temperature in different places of the house and the Motion state of the house.

[2]. It also gives the status of the various electrical appliances like light, fan etc which we can control remotely. The main result we could see, by operating devices from anywhere with our hands. The purpose and requirements for the system may be described

as follows: A home automation system is nothing but controlling of the lights in a home remotely by using a web application and the system should have auto and manual modes.

3. METHODOLOGY

There are mainly 6 steps:

- Arduino initially checks in which port the Arduino uno cable is being present by checking its port number (COM3 or COM4).
- is being checked in processing software where the result shows whether if the door is being authorized access or unauthorizedly accessed.
- Apache monitor server is started for starting the Web application.
- Once it is turned on, the localhost address is typed on the browser and start the web application that has created.
- In Home Automation application the current status of the home is being shown, in which manual mode is also used to set the temperature of the fan as per our requirement and we can also turn the Lights as on and off.
- Finally current status is being shown on the screen.

4. PROPOSED SYTEM

The proposed system Consist of Arduino UNO, Sensors and breadboard all are connected to each other. Here we used LDR sensor it Consist three pins one connected to 3.3v power supply and one is Analog input to Arduino and one pin connected to ground. As similar to LDR sensor fire and gas sensors consist of three pins. One pin connected to 3.3v and one connected to analog input and one pin is grounded. Servo Motor is enabled for opening and closing of door. Bread Board pins are connected to respective Arduino UNO board pins in which UNO board pins are connected to LDR sensors, gas and fire sensors respectively. Manually turning on and off of the devices is also enabled through Web application.

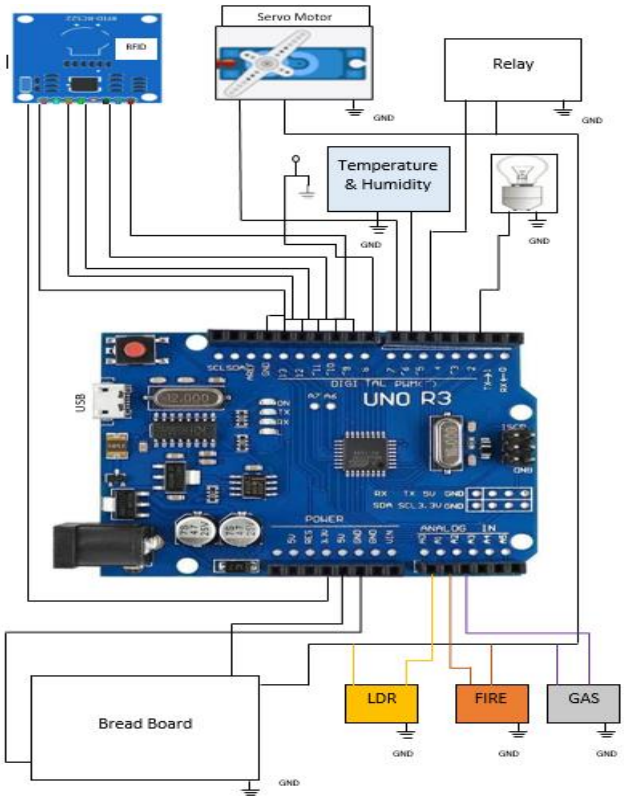

FIG 4.1 SYSTEM ARCHITECTURE

The above figure shows the system architecture for the home automation using Arduino UNO board device.

6. TECHNOLOGY USED

Arduino is open-source Arduino Software(IDE) makes it easier to write code and upload it to the board. It is also used to build low-cost scientific instruments to prove the principles of IOT with programming and it uses the C++ programming language which makes it easy to use for beginners and professionals.

Processing is an open-source software bundle created to be used by testing various IOT related projects. It is a free graphics library and integrated development environment(IDE) built for the electronic arts and new visual design communities with the purpose of teaching the fundamentals of computer programming in a visual context.

Monitor Tomcat is an open-source web server and servlet container used to run Java-based HTTP applications. It implements the Jakarta Servlet, Jakarta Servlet Language and Jakarta Server Pages(JSP) technologies and provides developers with a highly scalable, ready-to-use environment to house and deploy Java applications.

7. OUTPUT

- **Snap Shot of Email:** Email message will be sent to the registered user indicating that an emergency has been occurred. Here we can also change the content of the text message about the type of emergency service that has occurred.

Fig 7.1: Email message will be sent to the registered user

- **Web Dashboard after RFID access:** When the RFID card reader is detected on the tag, it displays the message that either Authorized access has occurred or an unauthorized access been displayed.

Fig 7.2: Initial Web dash board after RFID access

- **Real Time Update:** Changes according to the environment will be reading by the database generating messages according to the corresponding changes occurring in the environment.

Fig 7.3: Real time update of the database corresponding to the changes in environment

- **Manual Mode Operating:** Manual mode operating is also enabled for controlling the house devices manually. Home devices such as light, fan can be operated by manually turning on or off lights and setting the speed of the fan as per the temperature requirement.

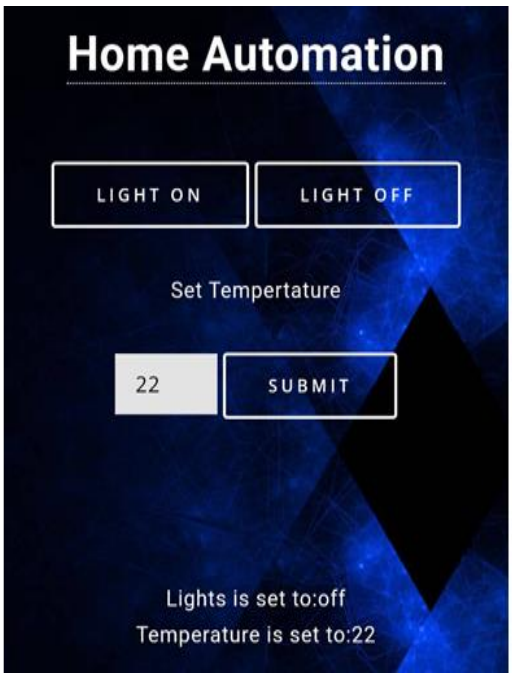

Fig 7.4: Manual mode operating

8. CONCLUSION

This project will reduce the burden of humans by using simple sensors and connecting it to Arduino. The designed system controls and integrates variety of sensors which checks surrounding temperature and humidity levels, detects the motion of object, and check the smoke levels in air. This is done with the help of Arduino which communicates and control respective sensor operations. The data of the sensor can be provided to the users through Wi-Fi module. The notifications can be sent to the users through mail.

9. FUTURE SCOPE

- The system can be expanded to include various other options which could include home security features like capturing the photo of a person moving around the house and storing it onto the cloud.
- This will reduce the data storage that using the CCTV camera which will record all the time and stores it. The system can be expanded for energy monitoring or weather stations.
- This kind of a system with respective changes can be implemented in the hospitals for disabled people or in industries where human invasion is impossible or dangerous and it can also be implemented for environmental monitoring.
- The home automation market is primarily driven by growing need for effective solutions in various domestic applications such as lighting, safety and security, energy management, entertainment, heating, ventilation, and air conditioning.

10. REFRENCES

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