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IOT Based Home Automation and Alerting Using Raspberry Pi

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ABSTRACT: Availability of wireless broadband networks such as 3G, 4G, and long-term development paired with less expensive and accessible smartphones, the mobile industry has grown enormously in terms of providing different services and applications at people's fingertips. This project presents IOT based home automation and alerting system implemented using raspberry pi. The remote monitoring component of this project explains the capacity to know what is going on with multiple devices at home, which can be used for control and safety. For example, we can track the temperature, the status of some sensors to identify intruders, and various home gadgets such as fans and lights. This type of "connected" home can make living more convenient as well as safer. This system consists of a smartphone and the Blynk application, which has information about home appliances, including their ON and OFF states. Through Wi-Fi, a smartphone connects to a Raspberry Pi using the IP address. The user-friendly wireless application boosts productivity and lifestyle. This project has a broad scope and can be integrated with a variety of other systems, such as smart home electronic products.

KEYWORDS: Raspberry Pi, sensors,home automation, Wi-Fi, Internet of things, Blynk application.

I. INTRODUCTION

Homes of the 21st century will turn out to be increasingly more self-controlled and robotized because of the comfort it gives, particularly when utilized in a private home. Life is becoming simpler and easier in every way as automation technology advances. Automation is now used in almost every aspect of life, from the workplace to the home. Microcontrollers or computers are used to carry out the techniques. Since microcontrollers can't run different programs at once [1] thus controlling two or more appliances at once is challenging. So, we're using the Raspberry Pi [2] module to solve this problem. The Raspberry Pi is a credit-card-sized computer that runs the Linux operating system and can perform nearly all of the functions of a PC.[3] Many people have made the internet a part of their daily lives in today's globe. In addition, the Internet of Things (IoT) [4] is a new and growing internet technology that allows you to exchange information and execute tasks while you are engaged in other activities. The system becomes more efficient and live data monitoring is possible [5] by using an IoT system. The Internet of Things is a concept in which each gadget is assigned an IP address and communicates with other devices via that IP address. The Internet of Things can alter people's lifestyles. People seem to prefer automatic systems over manual systems in today's world. The two features of this concept are wireless home security and home automation.

II.LITERATURE SURVEY

The work on a Bluetooth-based home automation system was proposed by **Piyare&Tazil et al**[6]. In this system, home appliances are connected to the Arduino board at input and output ports via relay. The Arduino board's program was written in the high-level interactive C language and the connection is established via Bluetooth. Only authorized users

are permitted access to the appliances, which is protected by a password. The main disadvantage is that this system is not applicable for longer distances.

The SMS-based Wireless Home Appliance Control System was proposed by **M.S.H Khiyal et al** [7]. In this system, the homeowner can send an SMS using pre-registered mobile number to control home appliances. If the SMS received is not from the pre-registered mobile number, the system discards the SMS. In this way, the system does not allow intruders to control home appliances.

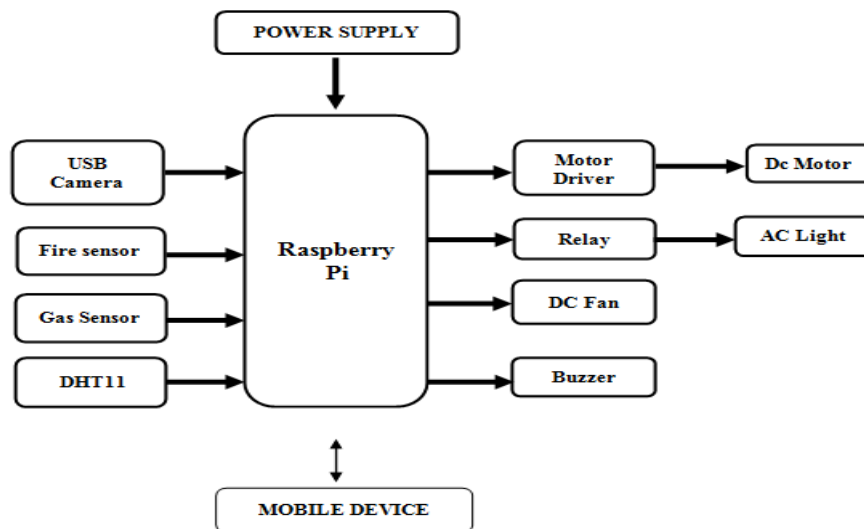
A. Alheraish[8] proposed work on a GSM-based home automation system using cell phones. The home sensors and devices communicate with the home network via GSM and SIM cards. The system makes use of a transducer, which converts machine functions into electrical signals that are then sent to the microcontroller. The system's sensors translate physical properties such as sound, temperature, and humidity into a different quantity, such as voltage. All signals are analyzed by the microcontroller and converted into commands that the GSM module can interpret. Based on the command received by the GSM module, choose a suitable communication method from SMS, GPRS, or DTFC.

B. Pandya et al. [9] suggested an Android-based home automation system that incorporates Bluetooth and voice commands. It is employed with an Arduino microcontroller to link the appliances, a Bluetooth module to send the signal, and an Android application to operate on the smartphone. The usage of a microcontroller to convert the byte signal to string format means that there must be a delay in the system, which is a drawback of this work.

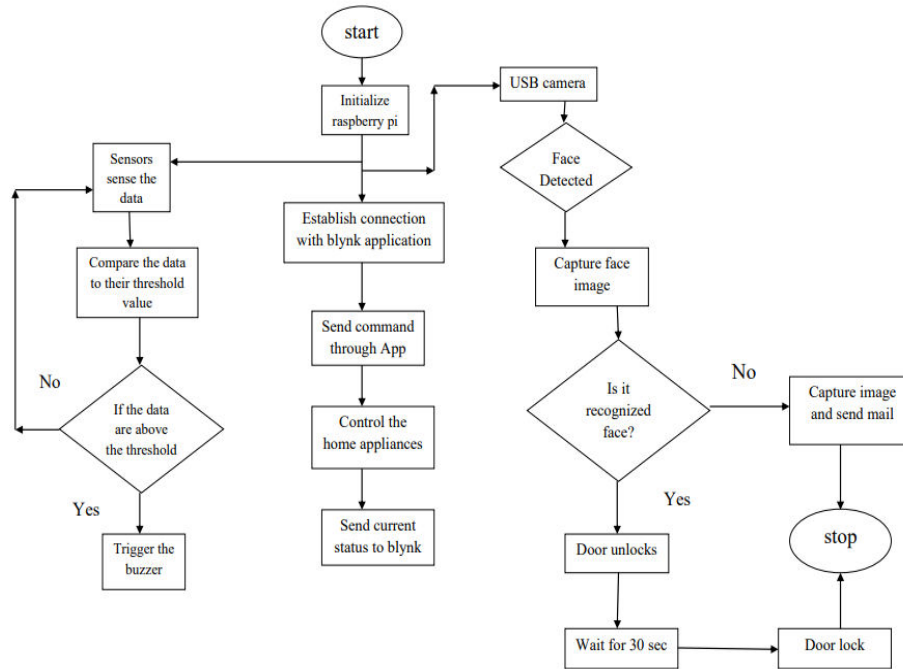
III. PROPOSED SYSTEM

The block diagram of IoT-based home automation and alerting using Raspberry pi is shown below figure. The power supply block converts 220V AC to 5V DC which gives power to the Raspberry Pi. All the home appliances are connected with Raspberry Pi. Mobile phones and Raspberry Pi are connected through Wi-Fi using the Blynk Application. Raspberry Pi is used as the board controller to connect the appliances through input and output ports. We can operate household appliances from overseas by using a cloud server. Python coding is used for controlling home appliances. Camera interfaced with Raspberry Pi will detect any suspicious moments near home and send those pictures to the owner via mail. If the value of the sensor goes up above the threshold value, an alert message is sent to the owner through the Blynk application.

BLOCK DIAGRAM



FLOW CHART



IV.CONCLUSION

These types of Home Automation Systems are essential since humans sometimes make mistakes and forget to turn off appliances when they are not in use; in this situation, they are useful to use power efficiently and safely. Home Automation is a significant step forward in the growth of technology in the appliance business, as well as another strategy for avoiding human errors and lowering energy usage. This IoT-based solution provides real-time weather monitoring. It keeps track of temperature and humidity, as well as detecting gas leakage and smoke in the event of a disaster. Information can be accessed from any location on the globe. Raspberry Pi is an intelligent platform that allows many appliances to be connected and controlled across a larger distance through the internet connection. Thus, compared to commercially available home automation systems, the proposed system is better in terms of scalability, adaptability, and security.

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