CONNECTED SMART HOME USING RASPBERRY PI

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Abstract

The web has been interfacing individuals and making life less difficult by furnishing a wide range of data with the snap of a catch. The expression "smart home" is utilized to portray a home that utilizations innovation to enable the home's frameworks and hardware to speak with each other, be controlled by a period plan, and even be remotely initiated from a cell phone or other web empowered gadget.

A couple of the system that can be controlled by brilliant home innovation incorporate lighting, temperature, and security frameworks. The TV, espresso pot, hot tub, PC and stereo are cases of machines and gadgets that you can oversee remotely with brilliant home innovation.

From inside your home or around the globe, a smart home gives you comfort and accommodation while improving security and vitality proficiency.

Keywords: **Indoor air quality, Internet of Things (IoT), Intelligent Sensors, Microsoft Azure, Raspberry PI 3 Module, Rasbian OS, Security Camera, Smart Home System, Smart Phone, Wi-Fi.**

I. INTRODUCTION

Indoor air quality (IAQ) comprehensively alludes to the ecological attributes inside structures that may influence human wellbeing, comfort, or work execution. We screen IAQ in light of the fact that we invest roughly 90% of our energy breathing "indoor air". IAQ attributes incorporate the centralizations of poisons in indoor air, and additionally air temperature and humidity. In a few nations indoor air quality can be more awful than open air quality, particularly when we consider the measure of time individuals spend inside versus outside.

These days security frames the most essential piece of our lives. As it assumes exceptionally essential part to satisfy our security angles as robbery and burglary which was dependably an issue, as recently expanded dangers and robbery. Home can profit by the security gave by smart security. It settle the question discovery following issue on the video security observation framework.

The fabricated model of the framework sends cautions to the proprietor over message alert utilizing the Internet for Raspberry Pi 3 if any kind of human development is detected close to the passageway of his home and raises an alert alternatively upon the client's carefulness. The arrangement for sending ready messages to concerned security work force if there should arise an occurrence of basic circumstance is additionally incorporated with the framework. The alerts and the status of the Iot system can be gotten to by the client from anyplace even where Internet network may not be promptly accessible (since it isn't vital for the cell phone to be associated with web just board is required to have an entrance to Wi-Fi).

This also includes indoor air quality monitoring which detects different gases present indoor and alert the user by sending message to their mobile phone.

The difficulty faced by current home security/surveillance systems in providing information pertaining to the situation to users while being away from home is tried to overcome in this project

This idea overcomes the common fault in many existing home security systems which causes unnecessary embarrassment by triggering security alarm due to the systems inability to judge a special situation in which it should not have triggered the alarm.

This paper describes about the overview of the smart home and its functionalities. There are different home automation technologies accessible in market but guidelines about these technology is very low. This paper highlight advantage and rest of this research paper is organized as follow. In section II, literature survey about home automation systems are discussed. Section III highlights the advantages of smart home. Finally, the future work and conclusion is discussed.

II. LITERATURE SURVEY

This paper provides a simple introduction to the IoT, its application and potential benefits to the society. IoT has received much attention from scientists, industry and government all over the world for its potential in changing modern day living. IoT is envisioned as billions of sensors connected to the internet through wireless and other communication technologies. The sensors would generate large amount of data which needs to be analyzed, interpreted and utilized. Home Automation System uses the technology of Internet of Things for monitoring and controlling of the electrical and electronic appliances at home from any remote location by simply using a Smartphone. Implementation of a low cost, flexible home automation system is presented. It enhances the use of wireless communication which provides the user with remote control of various electronic and electrical appliances.

A. *Advantages*
- This low cost system with minimum requirements takes care of both home security as indoor air quality.
- This system use smart-phone application which is helpful because where most of the people have smart phones and hence can be accessed from a wide range of phones with different operating systems.
- This system does not require the user to manually trigger an alarm.
- PIR sensor is not used to detect the motion.

III. PROBLEM DEFINITION

The air quality within our homes can be up to eight times worse than outdoors, and on specific occasions. Indoor air quality can deteriorate due to activities like cooking, which introduces smoke and other particulate matter.

When it comes to security cameras, it enable users to record footage for later viewing, and to help nab criminals. They cannot, however, stop a crime when it is in progress. They do not alert owners or neighbors. This means that you will incur losses which may no longer make you feel absolutely safe. In surveillance system there should be a person at hand always to monitor the area. When it comes to connected home environment, the user of this system will be notified about intrusion activity or air quality level so that immediate actions can be taken in a case of emergency

IV. COMPONENTS USED IN PROPOSED MODEL
- Raspberry Pi 3
- Buzzer
- Temperature and humidity sensor
- Gas sensors
- Analog to Digital converter
- USB Camera
- LED lights
- Power Supply

V. PROPOSED FRAMEWORK OVERVIEW

Raspberry Pi 3 is powered up using the power supply with sensors connected to Raspberry Pi 3.Anolog to digital converter is used to get the digital output from the sensor. USB Camera is connected to Raspberry Pi using anyone of the 4 available USB ports. Buzzer is used to trigger an alarm whenever unusual situation occurs which will help you to take safety measures. And at the same time LED lights will be blinked to understand the status of the indoor air detected. Indoor air quality and security camera details is sent to Microsoft Azure.

Indoor air quality and security camera details can be viewed remotely using smart phone remotely as well as it alerts the user in case of any danger.
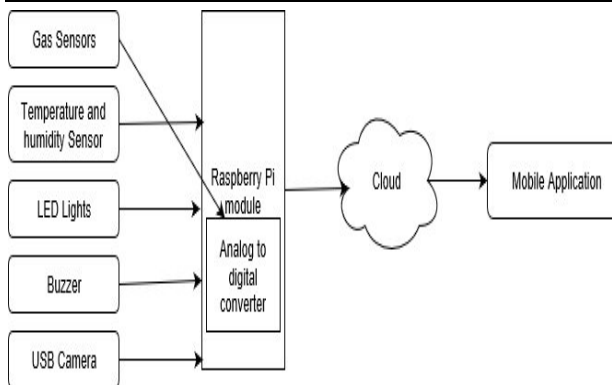
Fig. 1 Block Diagram on connectivity

The Fig. 1 shows the connectivity between the components. Where different components are integrated with the Raspberry Pi module. And the gas sensors are connected to analog to digital converter to produce digital output. Sensor data as well captured picture picture will be stored in Microsoft Azure. Which is viewed remotely using application.
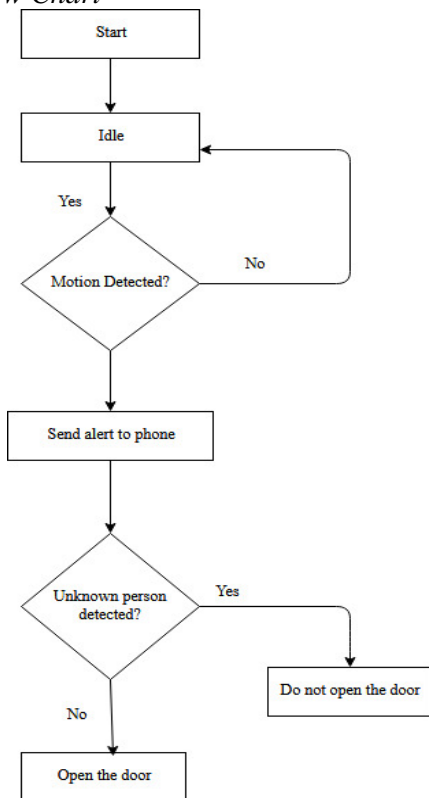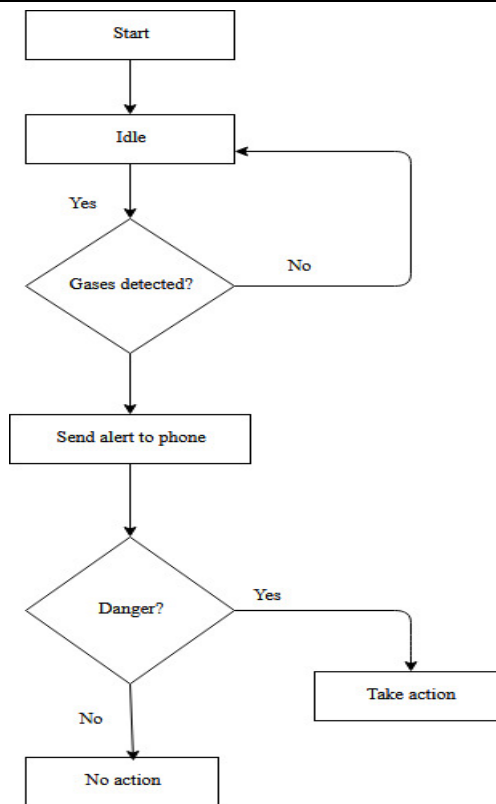
A. Flow Chart

Fig. 2 Security Camera

Fig. 3 Indoor air quality

VI. FURTHER SCOPE

As the system is dependent on the user's discretion and judgeability of the situation whether it is a guest or an intruder entering his house the use of a camera connected to the micro- controller might help the user in taking decisions whether to welcome the guest or not. The captured picture of the guest or intruder after face detection, can be mailed to the user. The user can further forward the same photograph to the police station if he wishes. Further the system may be made more synchronized by integrating the voice call feature within the same smart phone application through which the user can even control his home appliances without any voice call being triggered to his phone. Further automatic unlocking the door depending upon the person detected is known or unknown.

VII. CONCLUSION

Indoor air pollution is among the top five environmental health risks. The best way to address this risk is to control or eliminate the sources of pollutants, and to ventilate a home with clean outdoor air. The ventilation method may, however, be limited by weather conditions or undesirable levels of contaminants in outdoor

air. If these measures are insufficient, an air cleaning device may be useful.

While air cleaning devices may help to control the levels of airborne allergens, particles, or, in some cases, gaseous pollutants in a home, they may not decrease adverse health effects from indoor air pollutants

The proposed work has developed a Home Automation using Wi-Fi, Android and Raspberry Pi. This is a cost-effective, low maintenance and user friendly automation system to help the elderly and differently abled people. The idea proposed in this article can also be extended for the automation of industries, hotels, laboratories and hospitals.

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