DEVISING AN INTEGRATED HOME AUTOMATION SYSTEM BASED ON THE SPECIFIC USAGE OF THE INTERNET OF THINGS (IOT) ALGORITHM AND TECHNIQUES

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ABSTRACT

IOT-based Home Automation Systems contribute greatly to the present day-to-day routine, making it friendly and rich by working on personal satisfaction. We are in the time of the Internet of things, where there will never be a complete development of web applications in home automation, which is getting more famous because of its endless benefits. The proposed research represents the 'Full Home Control', the point of the Home Automation Systems not long from now. Because of the minimal expense and straightforwardness of correspondence through cell phones and tablets over the Internet, the Popularity of Home mechanization is acquiring development. This paper proposes a Low-cost Home Automation System involving Raspberry Pi3 as a processor and Arduino UNO to remotely control and screen home machines utilizing a cell phone or tablet. Raspberry Pi3 screens and controls security frameworks, water, fire and LPG system and Arduino UNO is used for controlling and checking lights, fans, temperature and moistness. GSM is utilized to impart home devices, for example, lights, fans, gas checking, water observing, fire ready framework and security framework using Short Message Service (SMS) instant messages. The proposed work uses GSM and Wi-Fi parallel convention, permitting the owner to control the Home Automation System from the home/local location utilizing the separate recurrence data transmissions. The proposed framework shows the utilization of basic advances that can apply in smart homes with a modest and adaptable observing and controlling system. Raspberry Pi 3 is utilized to distinguish hackers by email sent to the authorized individual, comprising a picture of the interloper. The entrance can be acknowledged or denied by utilizing the IoT idea.

INTRODUCTION

The Internet of Things has reformed our existence with numerous imaginative innovations that are utilized to plan a system that can be controlled and observed effectively by handy gadgets in any event when the client is away from home. The smart home is an insightful high-level climate comprising of advancements that cause the electronic gadgets to expect and answer as indicated by the prerequisites of the home occupants. While planning a smart home, one should think about numerous viewpoints. Can order these perspectives into three classes; these are as per the following: first and foremost, to give solace in the zone of senior consideration, childcare and medical services; furthermore, improvement as far as security by empowering a ready framework to safeguard the occupants when a dubious action has been seen and thirdly, to lessen the energy utilization lastly arrangement to media diversion. Remembering these perspectives, an adaptable remote controlling framework will be intended for systems administration smart home machines open by multi-section focuses like PCs, tablets, cell

phones and so on, as shown in Fig.1. The proposed project represents a minimal expense and effective execution of an IoT application that screens and controls home machines using GSM and the World Wide Web. In this proposed project, the Home Automation framework involves convenient handy gadgets like UI. The correspondence with the organization of smart home machines is completed utilizing a web portal, which uses low power utilization conventions like Wi-Fi, Zigbee and so on. The proposed has been carried out in two sections; the initial segment portrays Arduino UNO as the processor and Raspberry Pi 3 as the main handling unit in the next part. This venture carries out GSM and Wi-Fi for controlling home apparatuses using the cell phone as correspondence conventions. Arduino UNO screens lights and fans and sends an alarm message on the off chance that lights are on and fire is distinguished. Raspberry Pi3 is executed as a server that screens and controls security frameworks, water frameworks, and LPG gas and fire health.
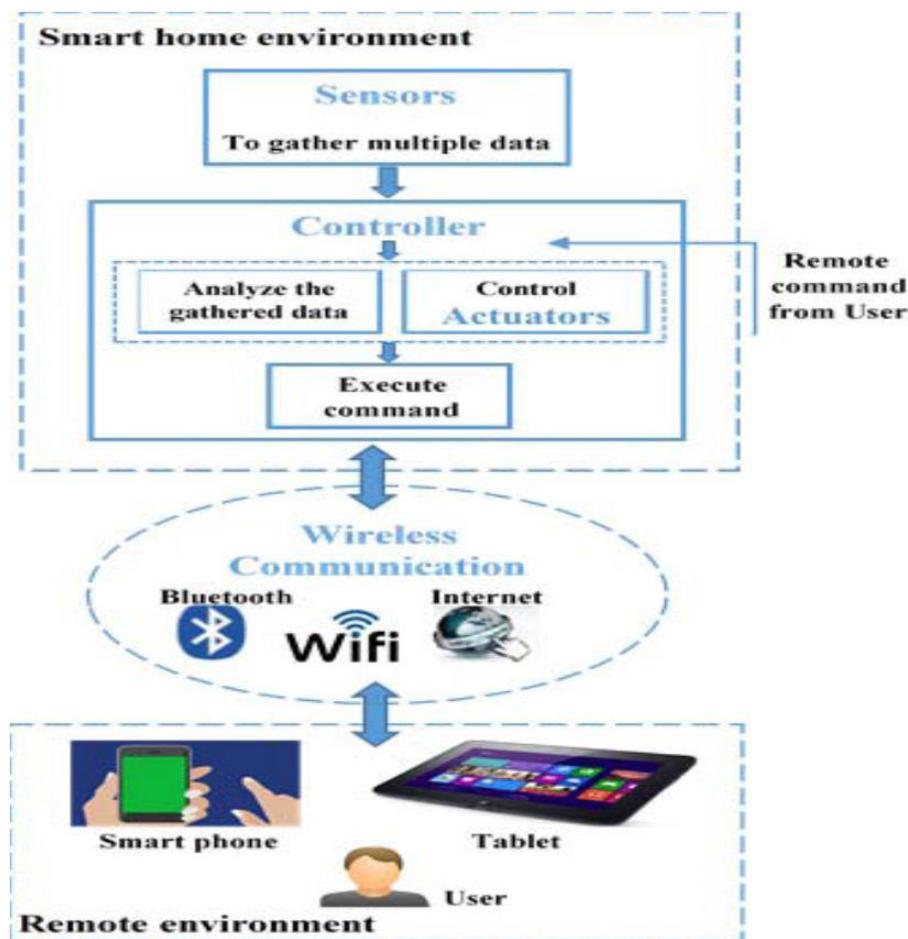

Fig 1: Example of Home Automation system

PROPOSED METHODOLOGY

The proposed work in this paper executes the accompanying equipment parts: Raspberry Pi3, Arduino UNO, Node MCU, GSM, PIR sensor, LDR Sensor, DHT 11 sensor, smoke sensor,

fire sensor, level sensor, pH meter, DC engine, AC siphon, transfers. Here the proposed framework can be classified into two sections. The initial segment comprises ARDUINO UNO as its regulator, as portrayed in Fig 2. Where lights and fans are turned on/off by sending an SMS, the temperature and mugginess will persistently be refreshing alongside the contribution from the fire sensor. The data is refreshed on the page through Node MCU. Also, assuming there is fire, exhaust fans and sprinklers are turned on. The proposed project improves the insurance from mishaps that can happen because of fire and upgrades the capacity of sleuthing the smoke to forestall a more major misfortune. An alarming instant message is shipped off the proprietor. Here GSM and Wi-Fi are utilized as correspondence conventions.
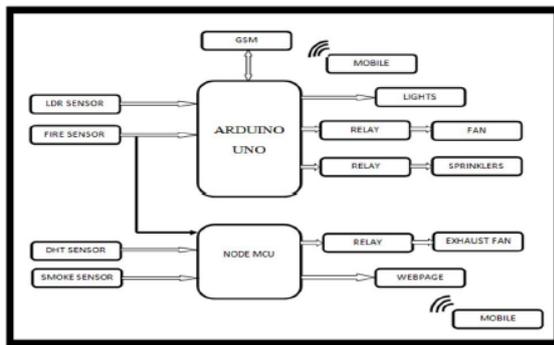

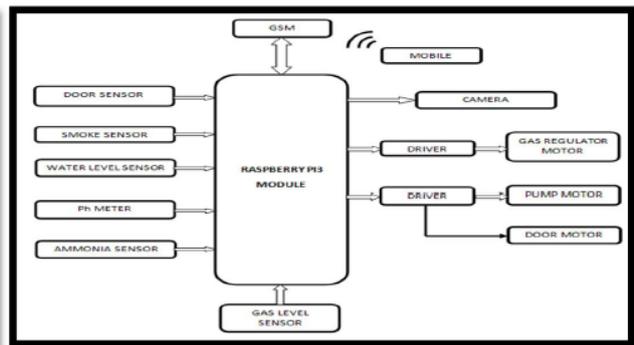*Fig 2: Proposed System block diagram with arduino*

Fig 3: Proposed System block diagram with Raspberry pi

This paper proposes a structure that screens and controls the security framework, water observing and gas checking. The second piece of the proposed framework comprises Raspberry Pi3 as the processor, as portrayed in Fig 3. In this proposed framework, on the off chance that an Intruder or unapproved people enter our zone, the PIR Sensor identifies the movement. The camera catches a picture joined to the Raspberry Pi and shipped off the house's proprietor through g-mail alongside an ongoing SMS. After the regular SMS is ready, the security framework turns on the signal. Will send off the captured picture to the authorized user utilizing the implicit Wi-Fi module in the Raspberry Pi board. Again, the proprietor can concede or deny the interloper's entrance through g-mail. This paper portrays a framework where the booking of LPG chambers is made simpler with no human intervention. The heaviness of the chamber is continually checked, and when the chamber is vacant, a constant message is shipped off to the gas specialist.

Alongside the robotized booking, we have acted to guarantee the client's security and prosperity by continually checking LPG spillage. If gas spillage happens, the gas controller naturally switches off, and an ongoing message is shipped off to the proprietor using the Arduino unit. Another added element of this proposed framework is water quality and charging given water utilization. Here, will communicate the server with transfer equipment circuits which control the apparatuses running at home. The server speaks with the comparing transfers. Speaking with the waiter permits the client to pick the OK gadget.

HARDWARE IMPLEMENTATION

1) Power Supply: The proposed work requires AC and DC power supply as the DC supply is used for Arduino and raspberry pi whereas AC supply is used for submersible pump. Here 12V are required but AC is 230V hence, a step-down transformer, bridge rectifier and filter are used to convert AC to DC to obtain the required power.

2) Arduino UNO: The Arduino Uno R3 is a microcontroller board based on ATmega328. It consists of 14 digital I/O pins, 6 analogue pins, a 16 MHz crystal oscillator, a USB connection, a power jack and a reset button.

3) Raspberry Pi 3: The raspberry pi board comprises a program memory (RAM), processor and graphics chip, CPU, GPU, Ethernet port, GPIO pins, Xbee socket, UART, power source connector. And various interfaces for other external devices. It also requires mass storage, for that we use an SD flash memory card.

4) GSM: Global system for mobile communication is one of the most popular standards for mobile technology system. It is one of the wireless networks which have low power & low cost communication devices.

5) LCD (Liquid crystal display): In our proposed system 16*2 LCD is a display unit. The material used in LCD combines the properties of both liquids & crystal. It has two registers namely command register & data register.

6) Node MCU (Wi-Fi Module): It is used to provide the internet connection. It consists of ESP-8266 Wi-Fi networking solution & also capable of running self-constrained applications.

7) Buzzer: The buzzer is an output device when an unauthorized user wants to access the RFID cards buzzer beeps the sound.

8) AC Motor: It is a submersible motor pump can lift water up to 0.7meters & it is easy to install & handle. It consumes low electricity & it is compact in size.

9) IR sensor: Infrared Obstacle Sensor Module has built in IR transmitter and IR receiver that sends out IR energy and looks for reflected IR energy to detect presence of any obstacle in front of the sensor module. The module has on board potentiometer that lets user adjust detection range. The sensor has very good and stable response even in ambient light or in complete darkness.

10) MQ2 Sensor: The MQ-2 is a flammable gas and smoke sensor detects the concentrations of combustible gas in the air and outputs its reading as an analogue voltage. The sensor can measure concentrations of flammable gas of 300 to 10,000 ppm. The MQ-2 gas sensor is sensitive to LPG, i-butane, propane, methane, alcohol, Hydrogen and smoke.

11) DHT 11 Sensor: The DHT11 is a commonly used Temperature and humidity sensor. The sensor comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data.

RESULTS

From the proposed framework, we can take the outcomes that this framework diminishes energy utilization, forestalls incidents and goes to preventive lengths immediately. The proposed framework utilizes GSM and Wi-Fi to communicate with different electronic apparatuses. Here the light, fan and fire wellbeing is given through the Arduino UNO, Whereas security, LPG observing and charging and water quality and charging are done by a raspberry pi. The proprietor is cautioned through SMS in the security framework, and the picture is caught and shipped off to the client. In light of the consent, either the hacker is allowed admittance or denied. Home is LPG checking where programmed the top off is documented, and assuming there is any spillage of LPG, the controller switches off, and a ready message is sent. Likewise, water checking sends an alarm message when water is sullied. Here we are utilizing various sensors that alert the clients to any mishaps.

CONCLUSION

Using IoT, different applications can be executed by checking and controlling different family gadgets and can likewise be applied in the field of Industrial administration and medical clinics and so on. By utilizing two processors here, we are isolating the responsibility. Observing and controlling lights, fans and temperature help in less energy utilization. Then again, by carrying out raspberry p, we beat a few issues. We have an answer for LPG booking and spillage, water quality and amount checking, hence saving water and cautioning clients from dangerous water conditions, expanding security, and alarming the proprietor if there is an intruder.

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