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Smart Anti-Theft for Home Using IOT

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ABSTRACT

The Internet of Things (IOT) is a network of interconnected computing devices, digital machines, or people that may exchange data over a network without needing to interact with other people or computers. Smart cities, smart grids, traffic management, and other uses of the internet of things. This study aids in identifying the issue with modern day life where automation employing the technique. The Internet of Things assumes responsibility for protecting our houses by offering various factors, such as passwords and one-time passcodes that convey messages to the user. Home security is more important today than ever before because robberies are more likely to occur. Solutions for smart home technologies are being offered through wireless sensor networks and the internet of things. Moreover, this system offers a reducing method of intruder detection using closed-circuit television in the absent of any form of eyesight, even in the middle of the night. This study provides a spontaneous notification of an ongoing incursion, assisting the user of a novel technique to prevent smart home theft.

KEYWORDS: wireless sensors networks, smart home, camera, sort of vision, technologies, spontaneous notification

1. Introduction

The "Internet of Things" is the networking of physical objects with electronics built into their structures to communicate and detect interactions with one another or the environment. As a result of the internet of things-based technologies' enhanced levels of services, people's daily lives will change significantly. Modern society faces significant challenges with security and monitoring. Recent burglaries and terrorist attacks have highlighted the urgent need for reliable video surveillance and the prompt notification of property owners and other household members of ongoing thefts. Closed-circuit television cameras and digital video recorders are just a couple of the surveillance options available today. While they can record trespasser activity, they cannot distinguish between human and non-human objects. Due to a lack of awareness and a dearth of smart devices, the theft rate has significantly increased in recent years. The range of smart home concepts, solutions, and applications is expanding thanks to the use of wireless sensor networks, the Internet of Things, and the Cognitive Internet of Things. According to the current research, the suggested smart home anti-theft system can detect an intruder even if their face is partially or entirely hidden by clothing, leather, fibre, or plastic. Systems for home automation use wireless sensor networks to track and control variables like voltage, current, and temperature. Reduced excessive energy use in smart homes is the main objective. It contributes to improving the performance of the control network.

2. Literature Survey

In paper [1] Garg, S., Yadav, A., Jamloki, S., Sadana, A., & Tharani, He asserts that not all systems will always operate as intended. It's possible that some components won't be adequately supported or controlled, which could result in high energy use and an increase in electricity prices. He claimed that in 2015, 40% of people thought that having internet of things was a significant security measure for homes. The majority of people in today's society believe that having internet of things is a significant increase in home security because of the implementation of features like face recognition and alarm messages reaching mobile devices.Because it can link the entire network system to a single database at a significantly faster communication rate than Bluetooth technology, Wi-fi technology is the most widely used in the internet of things.

In paper [2Y. -C. Lee and C. -M. Lee. He claims that remote monitoring and control are done using personal computers. These computers cost a lot to maintain, have a limited monitoring range, and are challenging to use at higher settings.He believes that the Raspberry Pi is the best choice because it is inexpensive and consumes little power. A raspberry pi can be used to remotely control a computer, tablet, and phone from your home using the internet. The virtual networking system server should be accessed from a computer or mobile device to connect to the raspberry pi.In this study, he used NODE-RED, a programming tool that provides a browser-based editor for wiring hardware devices like APIs and web services.

In paper [3] jabbar ,W. A.,Kian, T. K., Ramli, R. M., Zubir, S. N., Zamrizaman, N. S.M., Balfaqih, M.., …Alharbi, S. A smart house, in his opinion, is an automated system made up of sensors, actuators, and controllers that enhances comfort, automation, safety, and security for a higher standard of living for its residents. Several sensors and actuators were connected to the Node MCU controller, which updated the data to the IoT server. The MQTT Dash mobile app and Adafruit IO Web on desktops and PCs can be used to monitor data from temperature, humidity, motion, gas, and RFID sensor.

In paper [4] Srikanth, S., saddamhussain, S., & prasad, P. S. Alexa, Google Assistant, and Home Assistant are a few well-known cloud-based digital assistants. Our daily lives will be more efficient and productive the more we can automate them.Alexa will record user voice input, convert it to text, and upload it to the cloud for analysis. The necessary instructions will be sent to the IOT device once spoken text is found on the AWS cloud.The Node MCU collects data from sensors from his vantage point and sends it over Wi-Fi to the Raspberry Pi, which then sends the data to the cloud.

In paper [5]] Lulla, G., Kumar, A., Pole, G., & Deshmukh, G. He claims that a webcam can be used to view the incursion's movements, but this system is seriously flawed because it only provides one alarm method, which is useless if the user doesn't have access to their mail.Face ID is used to map an individual's information and create their ID in the database. This Facial ID is then utilised throughout the face recognition process of a recently acquired photograph in order to authenticate the user.The features offered by the suggested system include zone barriers, facial recognition, remote camera surveillance, and power failure detection, to name a few. Additionally, it has an intrusion logging feature that enables the owner of a secured property to access data about intrusions from any location and ata any time.

3. METHODOLOGY

The proposed system's architecture consists of four components: a Raspberry Pi board, voice control, home safety (related to IoT), and remote control. Using Raspberry Pi successfully combines the capabilities of the other three components.
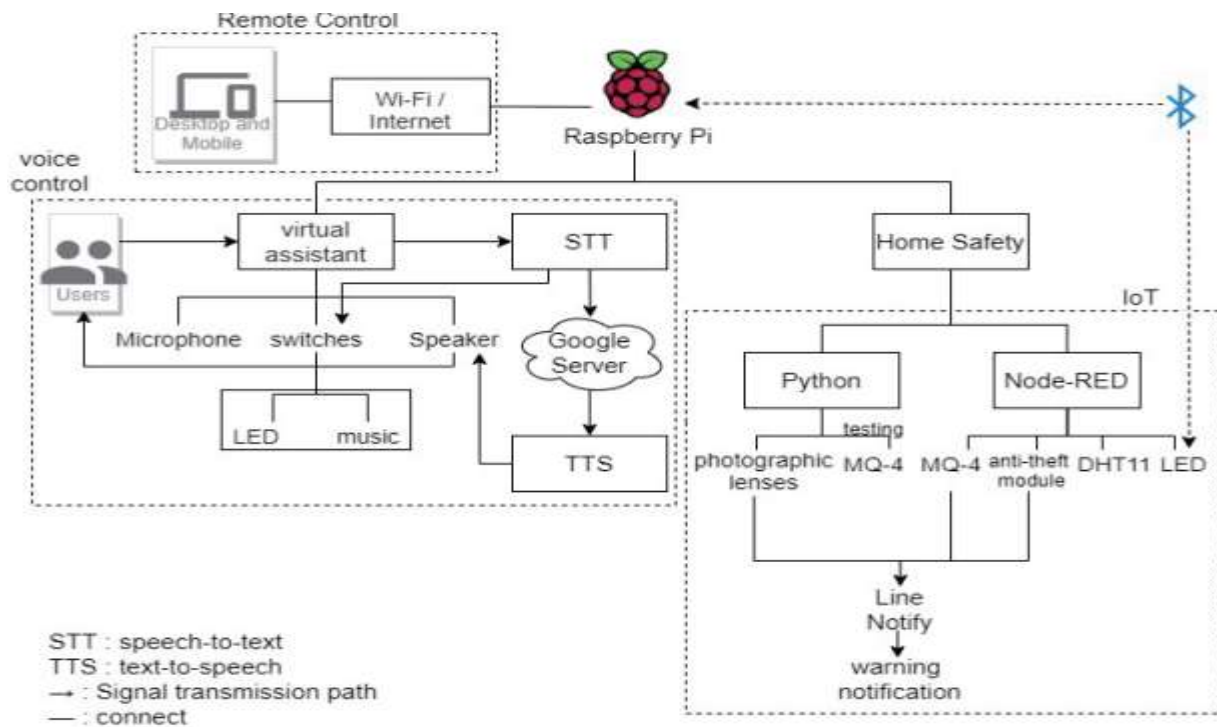
System architecture

Remote control: With the Raspberry Pi board, devices at home could be remotely controlled by a computer (PC, Tablet) or smartphone over Wi-Fi or the Internet. Virtual network computing (VNC) server and viewer must be installed on the computer or smartphone and used to establish a remote
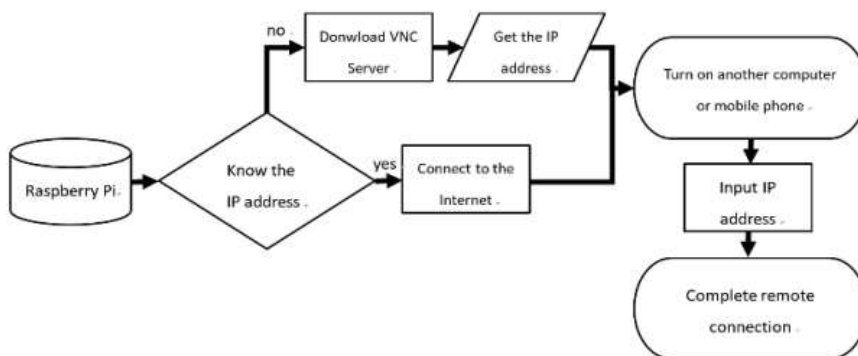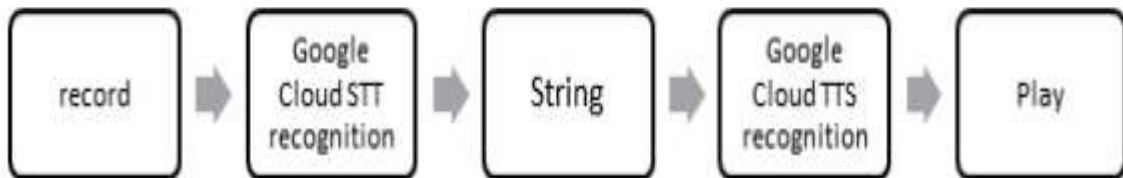

Flowchart of a remote connection

connection to the Raspberry Pi board how to connect a computer, a mobile device, and a Raspberry Pi remote control.The proposed real-time home surveillance system has two main monitoring components: environmental sensors for temperature and humidity as well as anti-theft and gas alarms.

```python
import RPi.GPIO as GPIO
import time
CHANNEL=7
GPIO.setmode(GPIO.BCM)
GPIO.setup(16,GPIO.IN)
def action(pin):
    print ("Sensor detected action!")
GPIO.add_event_detect(16, GPIO.RISING)
GPIO.add_event_callback(16, action)
try:
    while True:
        print ("No abnormality")
        time.sleep(5)
except KeyboardInterrupt:
    GPIO.cleanup()
```

The codes for the MQ-4 sensor.

A programming tool called Node-RED offers a browser-based editor for connecting hardware components like APIs and online services. Designers can easily integrate all devices or modules to realise the IoT using the Node-RED. using Node-RED as a sensor for humidity and temperature (DHT11 sensor). In this study, Node-RED programming for other objects like LEDs, gas sensors (MQ-4 sensor), magnetic Micro Bits sensors, and camera lenses is comparable to that for DHT11 sensors.

Flow chart of the conversion between STT and TTS.

For gas monitoring and anti-theft mechanisms, video monitoring is taken into consideration for home safety. The MQ-4 gas sensor can function normally after being connected to the Raspberry Pi board and can be programmed in Python to detect dangerous gases.
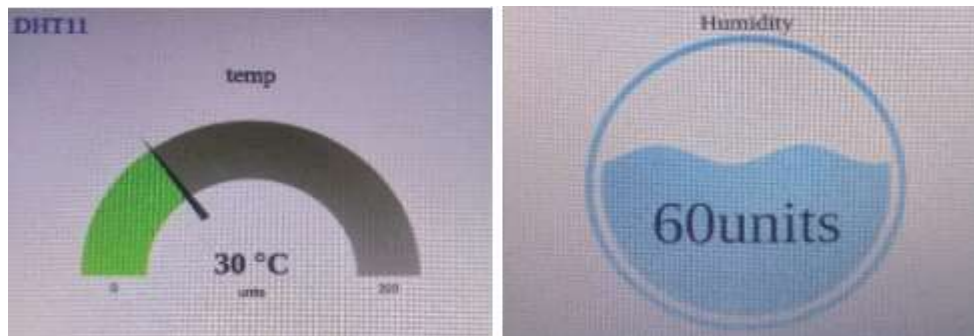
An interface designed via Node-RED for detecting temperature

his depicts a section of the MQ-4 sensor's coding. Alarms send out LINE notifications to people if the density of harmful gas exceeds a threshold. A Micro Bit magnetic sensor that connects to the Raspberry Pi via Bluetooth and a camera is used to realise the anti-theft function that is designed to detect the opening of a door or window. The system determines if the door or window is open and sounds the alarm in addition to turning on a square LED array and lighting up when the detecting magnetic strength is lower than the threshold. Users are simultaneously alerted by the system with LINE to view screens.

The Raspberry Pi is equipped with a DHT11 sensor module that measures the humidity and temperature. NODE-RED displays a temperature and humidity sensing interface that was created using Node-RED.Gas monitoring and an anti-theft system with video surveillance are taken into consideration for home security. The MQ-4 sensor is used for gas monitoring and can find different dangerous gases. The proposed system emits an alarm once the dangerous gas appears and depicts a gas safety alert.

4. Results and Discussion

This displays the various door statuses and the corresponding alarm messages for anti-theft functions. As seen in Fig. 9, when the door is closed, neither the square LED array nor the alarm sound. When the door is opened, the square LED array illuminates and the Raspberry connected speaker emits an alarm.

A LINE warning message is sent to the user at the same time to remind them to view the video screen. Door-open alarms activate when a door is opened by an intruder and held open for a certain period of time. The door-held-open time is programmable and used to monitor if a door isopened by an authorized access requestor. The door alarm warns the owner by emitting a chime, a loud siren sound or a flashing light, or both.

Door-open alarms are also called door-left-open alarms or door-held-open alarms. Door alarms of this type are made of two components: a magnetic stripe fixed on the door panel and an input sensor fixed at the door frame. When the contact between the magnet and the sensor is interrupted, the door alarm generates the warning signal.

5. Conclusion

The goal of this project is to create a home surveillance system that satisfies both the needs of a safe home and a smart home. It uses a Raspberry Pi, a variety of sensing modules, and small devices.

The suggested system takes into account remote control and basic voice control features. Mobile phones can also be used as the control terminal to remotely control the suggested system in addition to computers (PCs or Tablets). The system can be easily operated by elderly or people with limited mobility by using voice control features. The development of advanced functions is still required. Examples of operations that are further developed to use cloud services include warning operations, camera policy (photographic lenses), and voice control response delay.

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