Review on the Smart Home in Internet of Things

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ABSTRACT:

Since IoT technologies are being introduced into smart home systems, the revolutionary potential of IoT-driven smart home applications is currently hampered by limitations and fragmentation. In order to meaningfully contribute to technological landscapes and support research endeavours, it is imperative to understand existing possibilities and identify deficiencies in this field of study. To that end, we have devised a methodology that entails a targeted exploration across three primary databases: IEEE Xplore, ScienceDirect, and Web of Science, for articles pertaining to (1) smart homes, (2) applications, and (3) IoT. As a result, this paper offers a method for integrating strong security measures into IoT implementation for smart home systems while simultaneously emphasizing user convenience during system operation.

INTRODUCTION:

The term "Internet of Things," or " IOT " for short, refers to individually identifiable items (things) and their virtual counterparts inside a framework akin to the Internet . IOT frequently thought to require radio frequency identity , or RFID.

Due to the development of IPv6, which allows for the connection of nearly an infinite number of embedded devices , and its widespread adoption in many CE products , wifi is now a viable alternative to the ZigBee or Bluetooth used by many home automation systems that are now in use .We came to the following conc -lusions: 79% of those with special needs,91% of the elderly , and 88% of the general public are interested in remotely operating their home appliances .The first task it covers is automatic locking/unlocking of door after authenticating user via face recognition algorithm, only after which electric lock will work . The second category of the Internet of Things, the Consumer Internet of Things, and more especially smart home applications, are the primary subjects of this article. A wide variety of wireless sensors that are put in residential buildings are used to collect this data. In a similar vein, big data technologies may be used to gather and examine vast volumes of data. A smart home is made up of many distinct components. We break these components down into a few essential core components that make up the system's basic architecture. The Wi-Fi works on radio waves technology, as the data to be passed through Wi-Fi is converted into the electromagnetic signal which is then sent using the antenna. Transforming a physical quantity into numerical data is the responsibility of a sensor. To gather data from a single location, often known as a sensor node, one or more distinct types of sensors may be combined into a single device. Additionally, there are wireless models that provide remote data transfer, sensing, and control of various degrees of intelligence in the house through the use of radio, infrared, Wi-fi, RFID, Bluetooth, or cellular networks. Through the installation of our instrumented gateways in over 200 houses and the in-person collection of network traffic records from smart home IoT devices, we are able to capture this variety and scale.

LITERATURE:

The user has a wifi-enabled mobile device (such as a smartphone) that can communicate with the gateway, but at first the system just consists of the gateway on the home network; IoT gadgets have not yet been linked. We came to the conclusion that 79% of those with special needs, 91% of the elderly, and 88% of the general public are interested in remotely operating their household equipment. The first task it covers is automatic locking/unlocking of door after authenticating user via face recognition algorithm, only after which electric lock will work The end-device sends out a broadcast message titled "Hello IoT

server" after connecting to a wireless network and receiving an IP address. During this time, it searches the network for the default gateway. home owner's mobile device. To operate the household appliances, switch mode makes use of the radio buttons. Switch status is sent by pressing the radio button. The video stream of the room is displayed in video mode. The Android application streams the recorded video.

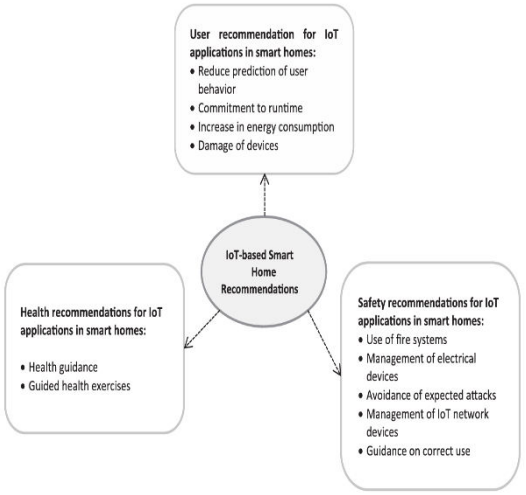

Fig 1: IoT application categories suggested for smart home use.

The middleware module, client application module, and data gathering module on the edge device are the three main building blocks of modern software architecture. A smart home is made up of many distinct components. We break these components down into a few essential core components that make up the system's basic architecture. The principal objective of the project is to design a system that will offer remote control of household equipment in addition to security against accidents when the home host is away. Switch status is provided via the radio button. Video Mode provides the room's live video feed. At the Android application, the recorded video is streamed. A single network is shared by all of the devices . There is a shared network connection between the webcam, raspberry pi, and smartphone. A shared network is established via a router. In the meanwhile, if someone enters while security is gathering data and doing out tasks. After creating a magnetic field, this controller may be linked to relays on various switches to pass current. In the future, routers such as those used in Smart City initiatives will be able to provide wide-area access. The flexibility to add new appliances to the system at any moment ensures its dependability. © 2017, When the IRJET mode is on, an SMS indicating that someone is inside the house will be sent to the

A data connection on the user's phone is not required in order to run a home security system. When the launchpad is linked to wifi at home or at the workplace, the system functions as intended. The server/API layer, which sits between the front end and the back end, makes it easier to analyze and store sensor data in databases. In order to operate the actuators, it also gets commands from the web application client, which it saves in a database. Through the serer, the actuators submit requests to consume the commands stored in the database. Not to mention the wireless variety that makes use of radio, infrared, Wi-fi, RFID, Bluetooth, or cellular networks to provide distant data transmission, intelligence sensing, and control within the house. All household appliances and systems in a smart home are controlled and monitored by the HEMS in accordance with the grid The fundamental architecture of a smart house with linked HEMS and ESI is depicted . In spite of its seeming fragmentation on the front end, the back end of the smart home IoT ecosystem is becoming more and more consolidated. A few main cloud providers, including Google Cloud and Amazon AWS, are usually used to host the back-ends of smart home IoT devices. When it comes to smart TVs, smart speakers, smart assistants, and home automation equipment, these two drive between 60 and 90 percent of the traffic. Bluetooth, an Arduino board, and smartphones are used in inexpensive, safe home automation systems. R. Piyare and M.

Tazil [2] suggested a Bluetooth-based home automation system. A smartphone or PC serves as the reception device for the Bluetooth system. The data provided by the smart home can either be processed to initiate actions (e.g., turning on the air conditioning if the temperature rises beyond a certain threshold) or it can be locally ingested and shown to the home owner on the control panel's screen. Real-time event receiving in a web context is one of the trickiest issues. The conventional methods—using web sockets, polling APIs, WS-events, and so forth—are insufficiently reliable. A lightweight event protocol was designed. This framework carries out model driven analysis.

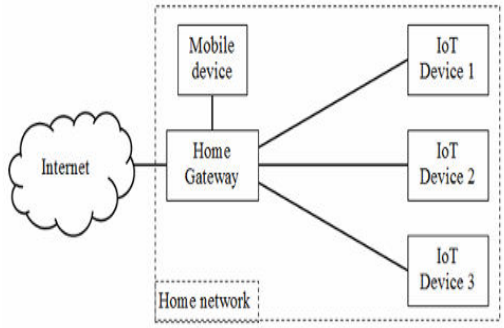

Fig 2 : Configuring the System

To create our system, all of these parts must be installed and linked together, hence they must be as little as feasible. The home automation system presented in this study is freestanding, adaptable, and inexpensive. We can manage or operate household appliances both indoors and outdoors by utilizing the approach described . By giving orders to the agents that are associated with them, one may manipulate resources. Depending on the context and ontologies, these agents can interact with one another to accomplish a variety of activities. The user must utilize the mobile device to load the identification and pre-shared secret key of the Internet of Things device to the home gateway in order to get ready for the second round of authentication. The reason the relays will be linked normally is so in the event that the IoT SHS has a malfunction, the traditional switches will regulate the loads and the plugs will be supplied with electricity. Instead of using local Wi-Fi to allow connectivity anywhere at any time, the local server is moved online to provide access to the device from outside the house. The user will be able to check the status of the household appliances and turn them on or off as needed thanks to this. The gateway is designed to handle unknown sensor kinds and incorporates additional sensors into the home network. It has the capacity to communicate both downlink and uplink with hundreds of sensors that are connected to the home network. The microcontroller receives periodic reports from these sensors on the status of the gadget. Each home gadget has an RFID tag and a reader that are part of the RFID module. The homeowner uses the reader to swipe the tag through to operate the device locally. Attacks at the ESI/HEMS during energy import or export: In a smart home, the user acts as both a producer and a consumer of energy. By installing RES on his property, the user may create his own energy and sell it to the utility as needed to meet demand. The count of people entering the house is increased each time someone enters, and appliances in home automation mode turn on together with the alarm, while security lights come on in tandem with the alert. The Raspberry Pi's GPIO pins are linked to the relay.

Using the infrastructure of Google Cloud, this use case provides the cloud service for assessing house conditions. With the measurement service, the user may visualize and save data related to their home conditions, making them accessible from any location at any time. We measured the temperature, humidity, ambient light, and proximity in this use case using the following sensor modules. Figure 4 displays the measurement service's user interface. With IaaS (or utility computing), users pay for IoT in Home Automation based on a traditional utilities paradigm that provides servers and storage upon request. PaaS, like Google App Engine, considers how applications could evolve inside a provider's architecture. A framework

for safe communication between internal and external organizations, the need for standardized key management to maintain secrecy, the ability to temper or reverse a smart meter, and a robust and lawful framework protecting user privacy are all open challenges in the context of smart homes. Because they don't encrypt traffic and are vulnerable to tracking user behavior, smart home IoT devices pose significant privacy risks. Some Internet of Things (IoT) smart home gadgets continue to communicate over (plain) HTTP, making network attackers' ability to intercept and manipulate their traffic extremely easy. When utilized at normal temperature, the MQ series of gas sensors, which have an electrochemical sensor and a tiny internal heater, are sensitive to a variety of gases. The Sno2 alcohol sensor MQ135 has a lower clean air conductivity. When the target explosive gas is present, the conductivity of the sensor rises in tandem with the levels of escalating gas concentration. The use of wireless technology opens up new possibilities for flexibility. But the house is usually a multipath environment with a lot of interference, which can lead to a lot of packet errors and losses. Thus, in the event that the application requires dependability, strong transmission systems have to be developed. Due to its continual delivery at short intervals, the stream data is collected in time units that can be specified, such as one minute, one hour, or more. Real data is kept in databases, whereas the resource core layer controls the metadata of the content resource.

Conclusion:

IOT technology integration with smart home systems is the aim of this article. The idea of an architecture that incorporates IOT into smart home systems is what makes a difference. IOT and smart home systems are two quickly growing disciplines, and this article aims to raise awareness of them both and hopefully contribute to them. Two essential elements for an IoT deployment to be effective in a smart home setting are security and ease. An Internet of Things Smart house System (IoTSHS) is made to act as a remote control for a smart house via a PC or laptop, an IR remote, or a mobile device. The WiFi-based microcontroller was the controller utilized in the design of the IoTSHS. While we have succeeded in creating a home automation system that makes users' lives more comfortable, easy, and compliant with cutting-edge technological standards, there is still opportunity for enhancements and new services. As of right now, the system is a successful and reliable working model of cozy that is smart automation. All Android smartphones running version 4.0.3 or above that have Internet connection can download the mobile application. The planned study is expected to pave the way for smart energy management on Big Data and IoT platforms. This issue may arise frequently in smart homes in the future.In this work, we identify security risks through a number of scenarios and assess how these risks affect a smart home setting. By enabling monitoring and management of equipment from any distant place within Wi-Fi range, the suggested Home Automation System improves mobility. Demonstrating services for assessing house conditions, monitoring home appliances, and managing home access was done effectively using this technique. Our research indicates that the functionality of devices has a discernible impact on the volume of Internet of Things (IoT) traffic in smart homes. Specifically, devices that access media via the Web display high volumes of traffic during the day, which corresponds to patterns of human activity, while devices that offer automation features display low volumes of traffic with sub-hour intervals. Sensors give more advantages to the scope of the project. It features the most unique design with low cost implementation.

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