A CRITICAL REVIEW OF IOT APPLICATIONS IN SMART HOMES: SECURITY RISK ANALYSIS

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ABSTRACT

The new and problematic age of shrewd residential bundles (from this point forward called applications) in light of Internet of Things (IoT) is essentially controlled and dispersed. To give significant bits of knowledge into mechanical situations and bolster analysts, we should perceive the to be had choices and holes in this line of exploration. Along these lines, on this glance at, an outline is done to delineate examinations scene directly into a sound scientific classification. In this paper, I have a pattern to audit a few deals with savvy homes utilizing web o things (IOT) as of late. We have pattern to examine numerous ways use for steps of brilliant homes like keen home security, savvy home condition, shrewd home gadgets and association. Web of Things (IoT) is a rising development that is making our world increasingly savvy. Associated world can't be imagined without IoT. An IoT based Smart Home is one such model. In IoT engaged Smart Home condition various things, for instance, lighting, home contraptions, PCs, observation camera, etc all are related with the Internet and empowering customer to screen and control things offering little appreciation to time and region necessity. This paper delineates Frugal Labs IoT Platform (FLIP) for building IoT enabled Smart Home. This paper looks at components of Smart Home and its applications and presents FLIP plan with execution of Smart Home organizations using FLIP through a proposed structure. The proposed system showed in this paper is used for checking and controlling Smart Home condition. Web of Things (IoT) conceptualizes the chance of remotely partner and watching genuine (things) through the Internet. Concerning our home, this thought can be suitably combined to make it progressively astute, increasingly secure and robotized. This IoT adventure bases on broke down for better fundamental leadership, monitoring our agencies and looking at our homes building a sharp remote home security structure which sends alerts to the owner by using Internet if there ought to emerge an event of any trespass and raises an alarm on the other hand.

Keywords— Internet of things (IOT), smart home, Security, device, controller, Machine to Machine Communication, Security Threats, Security Countermeasures.

1INTRODUCTION

Internet has changed human's lifestyles by way of presenting anytime, anywhere connectivity with all and sundry. As many advancements in generation has been come the sensors, processors, transmitters, receivers, and so on. Are now available in very cheap price. Hence these all matters can be utilized in our daily lifestyles. If absolutely everyone desires to expand the services of net, then Internet of Things can be stated as the expansion of internet offerings. Today's net is now increasing towards Internet of Things (IoT). The idea of Internet of things(IoT) became presented with the aid of the improvement of the widely used international system known as the web along the company of ubiquitous computing and mobiles in eager articles which brings new open doorways for the creation of innovative answers for distinctive parts of existence. The idea of Internet of factors(IoT)creates a system of items which could convey, associate and collaborate collectively to reach a shared goal. IoT gadgets can improve our ordinary lives, as each device stops performing as a solitary system and turn out to be a few part of an entire complete associated framework. This gives us with the following statistics to

whilst we are far far from them Internet-of-Things: The internet wherein the existing network of internet

to the pc structures will connect with the real global items or things. Things may include any items, domestic home equipment, gadgets, vehicles, and so forth. And while these things connect with the internet in particular infrastructure via general protocols then the whole machine is said to be Internet of Things (IoT). The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, gadgets, animals or humans that are furnished with precise identifiers (UIDs) and the capacity to transfer records over a network with out requiring human-to-human or human-to-pc interaction. The definition of the Internet of Things has evolved because of the convergence of a couple of technology, actual-time analytics, system reading, and commodity sensors, and embedded structures. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (inclusive of domestic and building automation), and others all contribute to allowing the Internet of Things.

2.STUDY OF DIFFERENT APPROCHES OF SMART HOME AUTOMATION SYSTEM IN IOT

IoT contraptions are a bit of the greater thought of home robotization, which can fuse lighting, warming and cooling, media and security systems. Long stretch preferences could join essentialness

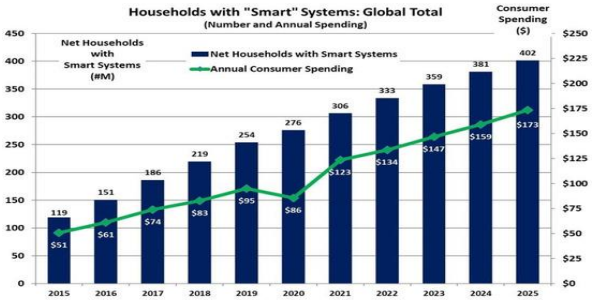


Fig :1 Graphical Representation of uses the smarter home automation & it's analysis

venture reserves by means of thusly ensuring lights and equipment are murdered. Endeavors are pondering and recognizing a huge proportion of IoT-related applications, which can be isolated into two classes. In first

grouping the devices are related, molding an establishment that is mechanized with M2M correspondence and significance to improve people's lives. In this grouping IoT can be seen expecting the activity of TCC&R (track, request and control). In nuclear families for example the room temperature, windows, lights and electrical contraptions, etc would all have the option to be controlled remotely from PC and robotized to discard manual techniques people face step by step in their lives. The Internet of Things is acknowledged to have suffering effects in both advancement and present day societyIn spite of the way that the term IoT has started to incline out in the open during the latest five years, partner things to the Internet is definitely not another wonder. Possibly the key application was the Trojan room coffee pot that was envisioned not long after web was considered in 1989. A keen home or robotized home could be established on a phase or focus focuses that control clever devices and mechanical assemblies. For instance, using Apple's Home Kit, producers can have their home things and decoration obliged by an application in iOS devices, for instance, the iPhone and the Apple Watch. This could be a dedicated application or iOS neighbour hood applications, for instance, Siri. In this section, discussed different Home Automation System with their technology with features, benefit and limitations they have. "The Figure 3" shows Basic Architecture of Remote Home Automation.

The Home automation system that uses Wi-Fi technology System consists of three main components; web server, which presents system core that controls, and monitors users' home and hardware interface module(Arduino PCB (ready-made), Wi-Fi shield PCB, 3 input alarms PCB, and 3 output actuators PCB.), which provides appropriate interface to sensors and actuator of home automation system. The System is better from the scalability and flexibility point of view than the commercially available home automation systems. The User may use the same technology to login to the server web based application. .If server is connected to the internet, so remote users can access server web based application

through the internet using compatible web browser. The application has
system.An interface card has been developed to assure communication between the remote user, server, raspberry pi card and the home Appliances. The application has been installed on an android Smartphone, a web server, and a raspberry pi card to control the shutter of windows. Android application on a smartphone issue

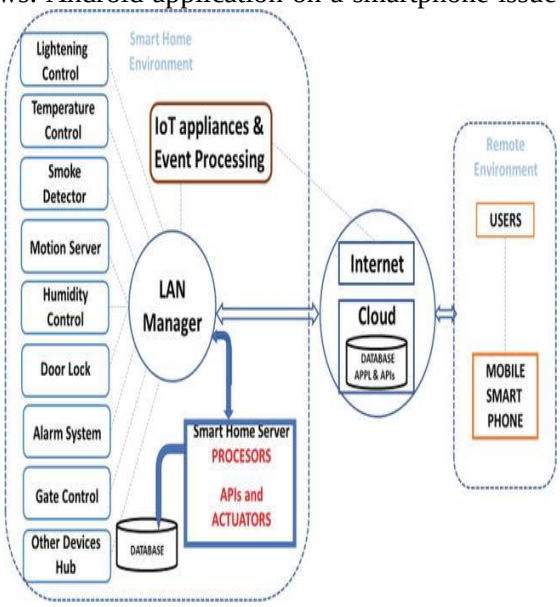


Fig :2 IoT Application

command to raspberry pi card. An interface card has been realized to update signals between the actuator sensors and the raspberry pi card. Cloud-based home appliance monitoring and controlling System. Design and implement a home gateway to collect metadata from home appliances and send to the cloud-based data server to store on HDFS (Hadoop Distributed File System), process them using MapReduce and use to provide a monitoring function to Remote user. It has been implemented with Raspberry Pi through reading the subject of E-mail and the algorithm. Also, in Web server based home automation, the design of web server and the memory space required is ejected by this method, because it simply uses the already existing web server service provided by G-mail.

2.1 Implementation of Cost-Effective Smart Home Controller with Android Application using Node MCU and Internet of Things (IOT)

The proposed system discusses about how smart home is controlled and implemented using android application and IoT. The application was designed using android studio software and the Node MCU was connected to in home Wi-Fi and relay board. General Purpose Input Output (GPIO) pin state considers the relay operation, that is if the output of GPIO pin is low then relay will be in open circuit condition and if it is high then relay closes the circuit and turn ON the device. Arduino software is used for coding and also for the working of Node MCU.The paper presents low-cost controller which controls home appliances through web application.

2.2 IoT based Monitoring and Control System for Home Automation: The system presents an efficient implementation w ith the help of IoT (Internet of Things) for monitoring and controlling the home appliances through web. The system consists of IR sensors and Passive Infrared (PIR) sensors which are used to detect infrared light and human presence or an animal arrives in their proximity respectively, it helps to turn ON/OFF of lights. The fire detection module consists of a Light Dependent Resistor (LDR) and flame sensor which gets sensed when fire is detected and LDR helps for detecting fire by using light intensity. A camera is installed in system and it takes picture of the fire and accident and then sends it to mobile, the Raspberry Pi is used in the system. The overall connection of the system is shown in the figure.

2.3 Smart Home Energy Management System

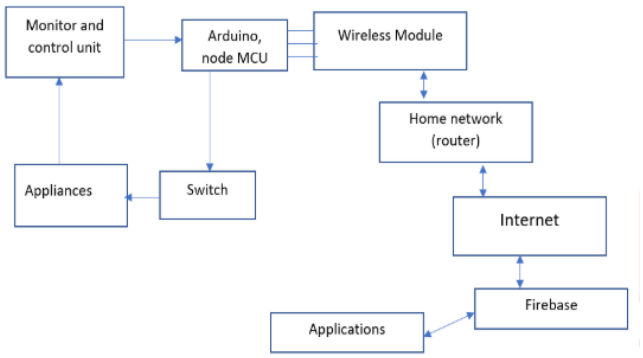


Fig : 3 Energy management system

proposed methodology, every electric outlet contains the current sensors. The sensor data is sent to the microcontroller which then analyses the data and sends it to the web server. In the server, the data is stored in the JSON format energy management system The mobile application gathers the data from the web server and displays it to the user. The user can send the control commands to the web server. The microcontroller continuously monitors the elements that can be controlled. When any changes are observed in the elements, the microcontroller can take

appropriate actions. It is also possible to get the readings of total energy consumed by an electrical outlet in the present month. This is shown in . This methodology can be used for controlling the appliances in the house with the help of mobile applications remotely.

2.4 Brainy Streets - An automatic lighting system

The proposed model deals with the automatic switching ON/OFF of street lights based on the intensity of sunlight, using the Arduino UNO micro-controller, LED- Street Lights, LDR and PIR Sensors. The Light Dependent Resistor offers high resistance during the daytime when the intensity of sunlight is high and low resistance during night time when there is absence of light. Based on the value of LDR resistance, PIR motion sensor is used. During night time, when movement of any object is detected within the user defined limit, PIR sensor detects the movement and with the signal to the microcontroller, the LED lights which are treated as street lights in this model are turned on. This is shown in figure . When there is absence of movement, the lights are turned off. This method can be used in houses to automatically control the lighting system.

2.5 IoT Based Smart Emergency Response System for Fire Hazards

The proposed system consists of ESP32, flame sensor, MQ gas sensors, GPS module and MQTT protocol for message transmission. Smoke, flammable gases and fire can be detected using this system. It is also capable of providing the location of the hazard to the fire department . MQ2 is used to detect the smoke, the Flame sensor is used to sense the flame, MQ-5 is used to detect the gases like LPG/LNG, methane, CO, H2 and the GPS module is used to obtain device location. These sensors are connected to a MQTT broker. With the help of the internet, the fire hazard alerts are sent to the nearest fire organization. This is shown in fig.9. This methodology can be used in the houses to detect the leakage of LPG gas or fire in the kitchen and alert the concerned people instantaneously.

2.6 IoT-mobile enabled smart water level controlling system to regulate water wastage

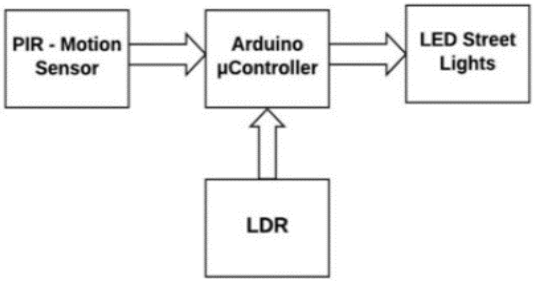
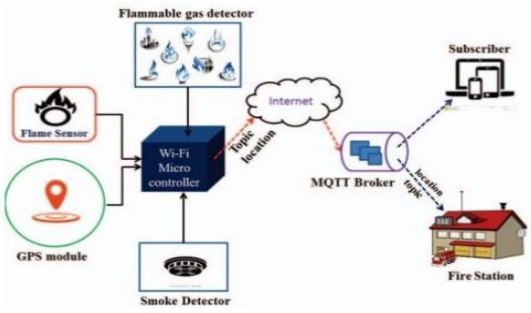


Fig :4 Smart Water Management

The proposed model deals with monitoring and controlling of water wastage. The water level sensor provides the information with the Arduino about the level of water in the water tank. Arduino updates database in the server about the level of water through HTTP (Hypertext transport protocol) and the information is stored in the server and that information is displayed on the registered phone number [10]. If the level of water in the water tank is below minimum level, then the server sends notification to the registered mobile phone indicating the user to turn ON the motor, then the water is filled in the tank. If the level of water above maximum level, then the server sends another notification to the user to turn OFF the motor..

2.7 Home Based Fire Monitoring and Warning

Fig :5 Home Monitoring



The proposed system is used for monitoring of fire. It is implemented using Arduino Uno. This system consists of Buzzer, GSM and Arduino board. LM35 temperature sensor is used to detect fire based on temperature. To detect fire, lighter is used as a fire source. Once lighter is lighted it will be sensed by the sensor and then it will generate signals which are sent to microcontroller (Arduino_uno) and trigger the incident. The fire detection module is used to send results to the registered mobile phone using GSM

module. LM-35 flame sensor is used to detect the flame and it is taken as physical input [11]. The flame sensor converts physical input to the digital signal. This digital signal is received by the Arduino and sensor detects the flame based on temperature. When flame is detected, the buzzer produces alarming sound and notification is sent to the registered user through mobile phone immediately to avoid huge loss of properties.

2.8 IoT Based Home Appliances Control

The proposed model deals with the automatic switching ON/OFF of lights. This system uses Arduino board and android mobile phone. ESP8266 WI-FI module is connected with mobile phone then the module is connected with hotspot. The automation board consist of eight leds it will be configured when user touch relay ON then automation board one led is starts blinking. If user touch OFF then it will not blink. In the same way all the leds are controlled by android application. Relay is used to control all the devices and microcontroller is used to control whole system. If the automation board configured with devices, then we can easily turn ON or OFF device. People can login to smart home monitoring system

3 CONCLUSION

In this Review Paper we gain the knowledges about different approaches of smart home automation system in IoT .Web of Things has various applications in different zones. IoT has been starting at now planned for mechanical WSN. It has been made for Smart Homes System. There are a couple of issues found in IoT and Smart Homes. New advances could help with constraining some of them. This paper presents the issues and challenges that could come. The theory targets were to present the subject of Internet of Things (IoT) and its application to make sharp homes to give getting, comfort and to improve the individual satisfaction. Bringing IoT advancement to our home outcomes in new security challenges, in this manner IoT-based awe inspiring homes require extreme security basics. These moved improvements offer the two prospects and dangers, an IoT-based Smart Home is especially powerless against various security dangers both from inside and outside the home, if security in a shrewd home or astonishing gadget was undercut, and the client's security, solitary data and regardless, success of the occupants will be at risk. Along these lines, sensible assessments must be taken to make the watchful home dynamically secure and appropriate to live in. In any case, we should know precisely what we are trying to ensure about and why before picking unequivocal blueprints. Home Automation is one of the critical usages of IoT. It gives less complex and entertainment living to every person. In this endeavor, a system for working up an IoT programming based canny home computerization structure was completed and attempted through the made model. It bases on prosperity and security perspective of home computerization through using a bit of the progressing open advances.

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