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Survey paper on Worry-Free 2.0- IoT based solution for smart home

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ABSTRACT

We are living in the age where there is an innovation every day, but still, we live in the same conventional houses. We should aim to induce some technology to our houses too. So, by considering this scenario we have developed a module that will transform our traditional houses into modern day home. Thus, we provided a solution for improving our lifestyle and include some of the technological advancements in our day-to-day life. Our technology was helpful to those who are especially abled as well as those who need constant supervision. It is environment friendly as it helps in saving electricity. Our product will fulfil the basic requirements of daily life and ensure the safety of thatfamily. Our product portfolio consists of products which can ensure security of home and bring convenience to our lifestyle. One of our products is smart switch which can operate any appliance from any remote location. Our second product isintruder alert, if any intruder tries to break in our house, then an alert will be sent to owner of the house. Unnecessary electricity wastage is one of the biggest concerns of today's time,to solve this we have developed a module which will automatically turn on and off light during day and night. Our fourth product is gas leakage alert, if there is LPG gas leak our product will detect it and will take measures accordingly.

Keywords: *Smart Home, ESP8266, Internet of Things, Safety, Security, Convenience, LPG Gas Leak.*

1. INTRODUCTION

As we live in the modern era and are more used to technology. Today we want everything to be smart. Today we have smart phones, smart tv's, smart watches and even cars have become driverless. But what we need more than that is to make the place we live in smart i.e., we need smart Homes. And for the sake of development in smart home technology we are creating a project named Worry Free 2.0. The objective of this project is to provide safety and security needs. It also provides a comfort zone to the people with less effort and cost. It also provides user friendly applications to users, and it also provides facility to specially-abled people so they can easily control their appliances from their comfort zone. The 1st product will be a device which will allow us

to control our day-to-day appliances with our smart phone as well as we will implement a Bluetooth remote form monitoring. The 2nd product is regarding wastage of electricity many times when we light gate lights we keep them on before going to bed till the next morning so when we wake up too late the electricity is wasted because daylight comes by the time of dawn so we will automate the lights so that it will react according to surrounding lights and automatically turn on and off the lights. The 3rd device based on robbery issue under this we will develop a device that will alert the user when someone tries to break into their house. Then 4th product is regarding the gas leakage the currently available products send alert to the user but what is the use of alert when theuser is away from home so our product will give the alert as well as on the kitchen exhaust fan and open windows so that most of the gas is provided the passage to vent out of the house and reducing immediate damage.

A. Goals or Objectives:

- To provide comfort to the people for using modern devices withless effort and cost.
- To accommodate life safety and security needs.
- To provide user friendly application to user to accessthe smart devices.
- To develop such an environment so that especially abled personcan also control their appliance.

2. LITERATURE SURVEY

According to the Digital Market Outlook, the revenue of the Smart Home segment Smart Appliances in India is expected to be 4.22 million U.S. dollars in 2025.[1]

According to a post in India Spend website in September 2015 around 1,16,946 gas leaks happened from 2010 to 2014 and around 19,491 deaths were reported around that time span.[2]

Market Research Future predicts that the home security market will be valued at more than $44,806.5 million by 2023.[3]

Applying and using the electrical gadgets without smart technology is consumes time and make life inconvenient. Hence the advancement of Automation technology is being preferred over manual system by Vinay Sagar K N1 and Kusuma S M2 in (2015).This paper designed to present a Home Automation system(HAS) using wireless communication, to provide the user with remote control of various lights, fans, and appliances within theirhome and storing the data in the database. The system will automatically change based on sensors' data. This system is designed to be low cost and expandable allowing a variety of devices to be controlled.[4]

M L Sharma1 et al. (2017) has developed a home automation system that interfaces with Android mobile devices. That mobile device and system can communicate with each other via Wi-Fi. The proposed Home Automation System enhances mobility and supports monitoring and control of devices from any remote location within Wi-Fi range. Being a simple and user-friendly application, it serves as an application of great help to the old aged or physically disabled people. User can select the option, which switch he/she wants to switch ON/OFF or set timer from their Android smart phone Application.[5]

Srinath N. S, Dhole P. S, Mohire N. P, Naik S. C & Ratnaparkhi IS This paper proposes a Home Automation system that employs the integration of multi-touch mobile devices, wireless communication, and sensors communication to provide the user with remote control of various lights and appliances within their home. This system uses a consolidation of a mobile phone application, handheld wireless remote, and PC base program provide means of user interface to the consumer. [6]

Basil Hamed the main objective of this Paper is to design and implement a control and monitor system for smart house. Smart house system consists of many systems that controlled by LabVIEW software as the main controlling system in this paper. Also, the smart house system was supported by application as a sub controlling system. The system also is connected to the internet to monitor and control the house equipment's from anywhere in the world using LabVIEW.[7]
Deepali Javale, Mohd. Mohsin, Shreerang Nandanwar the prime objective of this paper is to assist handicapped/old, aged people. Itgives basic idea of how to control various home appliances and provide a security using Android phone/tab. The design consists of Android phone with home automation application, Arduino Mega ADK. User can interact with the android phone and send control signal to the Arduino ADK which in turn will control other embedded devices/sensors.[8]

The recent years the work which are related to our topic has been survey by us, to give more efficient and better work then each wesurveyed. To make our system success we required this kind of study to gather the information of the existing one to give the newly and innovated work from us. N. Sriskanthan and Tan Karand they have presented an application of Bluetooth Technology for home automation. (things IoT), which are all act as an internet based working systems. This system he proposed will a cost efficient one which can be easier to handle it.[9]

Shahriyar, E. Hoque, M. M. Akbar, S. Sohan, I. Naim and M. K. Khan they have proposed a system based on the GSM based communication control for home appliance. Different AT commands were used to control different type of things. [10]

As per National Crime Record Bureau (NCRB), 2,44,119 cases of robbery, theft, burglary, dacoity took place in residential premisesin 2017. Ravi Kishore Kodali et al. (2016) [5] has built a smart wireless home security system which sends alerts to the owner byusing Internet in case of any trespass and raises an alarm optionally. The difficulty faced by current home security/surveillance systems in providing information pertainingto the situation to users while being away from home is tried to overcome in this project. PIR motion sensors are installed at the entrances of a building. These sensors as explained earlier detect the motion of human beings. This signal which detects theirpresence becomes the input trigger for the micro-controller. The owner, who may or may not be present in that building, will be receiving a voice call on his mobile phone.[11]

According to a post in India Spend website in September 2015 around 1,16,946 gas leaks happened from 2010 to 2014 and around 19,491 deaths were reported around that time span. HenceThe objective of the project is to build a Gas leakage detector using LPG gas sensor and also connect it with IoT using ESP module forsafety and security. Arduino is used as the main controller. The output of the project is used to detect leakage of gas from cylinders and notify the user. Mr. Mahesh Podar and [11] Sharmad Pasha,

V. NAren and Deepthi did Sensing and Monitoring and controllingSystem of gas.[12]

3. PROPOSED WORK

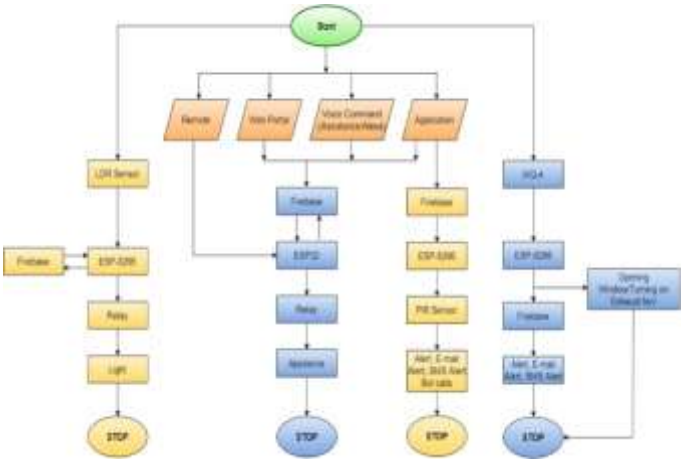

Figure 1: Flowchart of the System

A. The flow of the System

The user will start the devices through mobile application or by awebsite or other input options such as voice commands. These inputs will then be stored in a real-time database which will be connected to different ESPs. These ESPs will retrieve the values stored as inputs and take actions accordingly

B. Functional modules

The whole System is divided into 5 modules namely Web-Application, Smart Switch, Automated Lights, Home Security &

Home safety modules. All these modules are independent of eachother.

1) Web-Application

This module is used mainly for providing the GUI for the whole system and providing inputs to the Firebase Database. It will also be used for displaying alerts.

2) Smart Switch

This module is implemented for Home Automation purposes. This module will read and detect the value change which will represent the state of appliance and as these values will be changed by Web-Application these values will be detected by ESP and will give directions to Relay and Relay will control the appliances.

3) Automated Light

This module will detect the presence and absence of natural light and will then after reaching certain threshold value it will change corresponding value of the Light to either 0 or 1. This change will be detected by the ESP on the other end and based on this value it will give command to relay whether to on the lights or off them.

4) Home Security

This module will work in integration with the web- application module. In the web-application there would be a button which will toggle the state from "I am In" to "I am Out" and vice versa. Based on this the ESP will decide whether to ON the Sensor or not. If it is turned ON and any motion is detected, theuser will get an email or SMS on registered ID.

5) Home Safety

This module will be detecting the leakage of gas in a particular household and if any gas is detected the user will get an alert through the web-application and the ESP will also start taking preventive measures accordingly such as turning on Kitchen Exhaust Fan or starting the window opening mechanism so that the gas will get a path to vent out and thus reducing immediate danger.

4. CONCLUSION

This survey helps in developing an approach for making the devices more relevant and convenient. It contains many modules as we developed a website, application, smart switch, automated light home security and home safet**y.**

In website module we have developed a website which will act asa portal for giving inputs as well as showing alerts.

In application module we will be developing an application for giving inputs as well as for showing notification.

In smart switch module we are going to develop an application/web-portal through which we can switch on the appliances of our home.

For automated light module, we will be developing such a device which will automatically switch on and off the light according to the presence of natural light.

In our Home Security module, we are going to develop a device which will alert us if someone tries to enter our house in our absence.

For our Home Safety module, we will be developing a device which will not just alert but will take preventive measures in case of gas leakage.

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