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Implementation of Sensors in IOT Application

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Abstract:- In the past few decades, the importance of the Internet of things (IOT) has emerged in various fields. It is a technology that connects the Internet to all devices that are incapable to connect to the Internet. Therefore, this paper aims to provide convenient realization of sensors in the IOT system. The idea based on the start of the IOT, as it is a modern idea that combines ease of work and development, in the company of itself and benefitting of limited communications such as short message service (SMS) and broad communications such as wireless fidelity (WIFI), toward ensure robust and applicable sensors that can be serve the community in several aspects, predominantly people with special needs. The system uses Arduino, event stream processing (ESP), sensors and global system for mobile (GSM) to control devices. The system is simulated by using an electronic circuit via Google assistant and messages application.

Keywords:- *Internet of Things; Short Message Service; Google Command.*

I. INTRODUCTION

The main concept of a network of smart devices discuss in the early as 1982, with a customized Coca-Cola transaction machine at Carnegie Mellon University becoming the first ARPANET-connected appliance, capable to statement its stock and whether newly loaded drinks were freezing or not.[1] Mark Weiser's presents the ubiquitous computing, the computer of the 21st century, in addition to academic venues such as UbiComp and PerCom created the modern visualization of the Internet of things (IOT).[2]In 1994, Reza Raji illustrated the conception in IEEE Spectrum as "[moving] small packets of data to a large set of nodes, so as to integrate and automate the whole thing from home appliances to entire factories". Between 1993 and 1997, a number of groups projected explanation akin to Microsoft's at Work , Novell's or national employment investments trust(NEST). The field has been grow greatly when Bill Joy envisioned device-to-device communication as a division of his "Six Webs" framework, obtainable at the World Economic Forum at Davos in 1999.[3]

The idea of the "Internet of things" and the term itself, initially become visible in a speech by Peter T. Lewis. According, to Lewis the IOT, is the combination of nation, procedures and technology with connectable instruments and sensors to allow remote checking, status, treatment and assessment of trends of such instruments.

Therefore, IOT invent separately by Kevin and hence the phrase IOT has been appeared. Subsequently, the analysis of radio-frequency identification (RFID) is addressed, which would permit computers to handle all individual things.[4] The major topic of the IOT is to insert short-range mobile transceivers in a variety of devices and daily requirements to permit new forms of communication between citizens and things, and among things themselves. Furthermore, defining the IOT as basically the point in time when more 'things or objects' were connected to the Internet than people, Cisco Systems expected that the, with the things/citizens ratio rising from 0.08 in 2003 to 1.84 in 2010[5].

II. RELATED WORK

Due to recent developments in IOT and their applications many researchers have been interested on this matter , thus Morais et al. [6] presented building up understanding of dynamic IOT to data with particular explanation of its variables, quantifier and sensors organization, and hence a recognition of nineteen data kinds has been achieved. Authors in. [7] discover the process to navigate transport unit in smart cities by means of achievement of vision based sensor and advanced normalized phase correlation. As a consequence, evades organizes global positioning system (GPS) with calibrated sensors. Such mapping of vehicles needs image registration. The researchers effectively obtain precise result in comparison to calculated data from GPS corresponding to predictable position accuracy. Gao chong et al. [8] studied the participant and comeback of smart home system based on browse/ server (B/S) module. The structural design of purposed smart home system along with its hardware design and its implementation criteria has been elucidated. The user can remotely control the house hold objects.

The outline performance of the aforementioned methods is flexible and valuable. However, more effort needs to be carried out; therefore, Soumya Basak et al. [9] introduced remote monitoring station (RMS). It is worth noticed that, RMS attained good performances when interconnection of internet with wireless network, Message Queuing Telemetry Tracking (MQTT) are established. The application of RMS lies in providing climatic alerts to farmer serving them in growth and preservation of crop production. A.R. Ali et al. [10] presented the design of wireless smart sensors, its associated standards, protocols, network topologies and information regarding its realization. The mobility setup in network of wireless smart sensors by means of diversity of protocols as well institute of electrical and electronics

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engineers (IEEE) 1451. B. Soh et al. [11] investigated the element responsible for setting up smart city that is 'network sensors'. The researchers addressed selection of solutions and principled implications to deal with challenges faced throughout growth of novel techniques. For that reason, it contains delivery of service & optimization, security & safety management, traffic control & parking, smart building, public transport. Thus, Yaw-Wen kuo et al. [12] focused on the principle of IOT presented to daily routine of users applied in the automation system through environment sensor.

Owing to need of accessibility in transmission of electricity, low transmission and long range of power is essential therefore sensor node depict less amount of current in transmission. The function of media access control (MAC) and RF radio technologies has been discussed. The author designed commercial module based sensor node which implemented IEEE 802.15.4e (TaSCH) time slotted channel hopping. Alcaya et al. [13] explored the comprehensive structural design for angle of attack sensors and declared short explanation of its drawing. Then, Himadri Nath Saha et al. [14] reviewed literature on disaster management on risk identified during disaster and its preparedness.

The phenomena of disaster management includes emergency response, allocation of resources, reaction planning and ends up at recovery of disaster by means of early warning, sensors and IOT standard. The authors in. [15] considered three chief factor of sensor nodes as energy with connected location and superiority of link when kept in or outer the network by arranged many base station performing simulations in Matlab and estimated life span of node by applying one of the routing practices. Xuxun Liu et al. [16] implemented (ACO) ant colony optimization. Researcher developed method of global optimal distance acquirement by adopting the progression of network lifetime judgment and accomplished with the objective of high energy consumed throughput network and low energy dissipation from sensor nodes. Wenzhengxu et al. [17] reconnoitered whilst nodes are moderately charged during convey of energy wirelessly by realizing magnetic resonant coupling. Canvasser compared state of art benchmark with the result of total space travelled by mobile charger 1 to 15% extended and highest total sensors lifetime is 9% with respect to average energy ending period per sensor using two types of algorithms.

More results found by Loizos Kanaris et al. [18] to verify and compare the remarks of simulation performed throughout designing of IOT networks. In this experimentation, connection of two simulators as completed amid the network layer and 3D polymeric radio propagation. Next, Tao Liu et al. [19] explored the arrangement of IOT technologies and implementation of its functionalities. The purpose of IOT helping in clinical care and real time electrocardiography (ECG) monitoring by means of telemedicine technology has been demonstrated. Henrich C. Pohls et al. [20] accomplishment of software based elliptic-curve cryptography (ECC) on constrained devices for secure digital signature. The plan is to reconstruct the previous signed bit representation. Soumya Kanti Datta et al. [21] concluded the possibility of integrated semantics computing on android powered mobile devices.

Discussion for embedding M3 framework by means of its light weight version in mobile purpose has been completed. Accordingly, structural design of machine to machine and its associated prototype has been realized. Prahlada Rao B. B et al. [22] explored the scheme on operational of cloud computing and IOT for addressing big data issues. The different applications such as irrigation, environmental monitoring and augmented reality are recognized on cloud by means of sensor as service. Qian Zhu et al. [23] implemented IOT gateway working as bridge between network of network and wireless sensor network.

The gateway based on Zig bee- GPRS protocols investigated the application in smart city, industrial and environmental monitoring. Uday Shankar Shanthamallu et al. [24] presented brief review on conceptual machine learning and applicability of its algorithms. A variety of modals including supervised, unsupervised methods and deep learning processes has been focused upon.

The applications of algorithm are exploited for irregularity detection, sensor networking, and pattern recognition and at different layers of IOT structural design. S.S.Navghane et al. [18] considered sketch for implementing IOT based smart dustbins jointly with Wi-Fi module, weight and IR sensors for contributing hygiene in the society. The current status of garbage could be retrieved on mobile web browser using Wi-Fi with html page. Interfacing of microcontroller possessing IR sensor with central system is finished by means of Wi-Fi module. Khirod Chandra Sahoo et al. [25] investigated intruder detection in order to preserve security.

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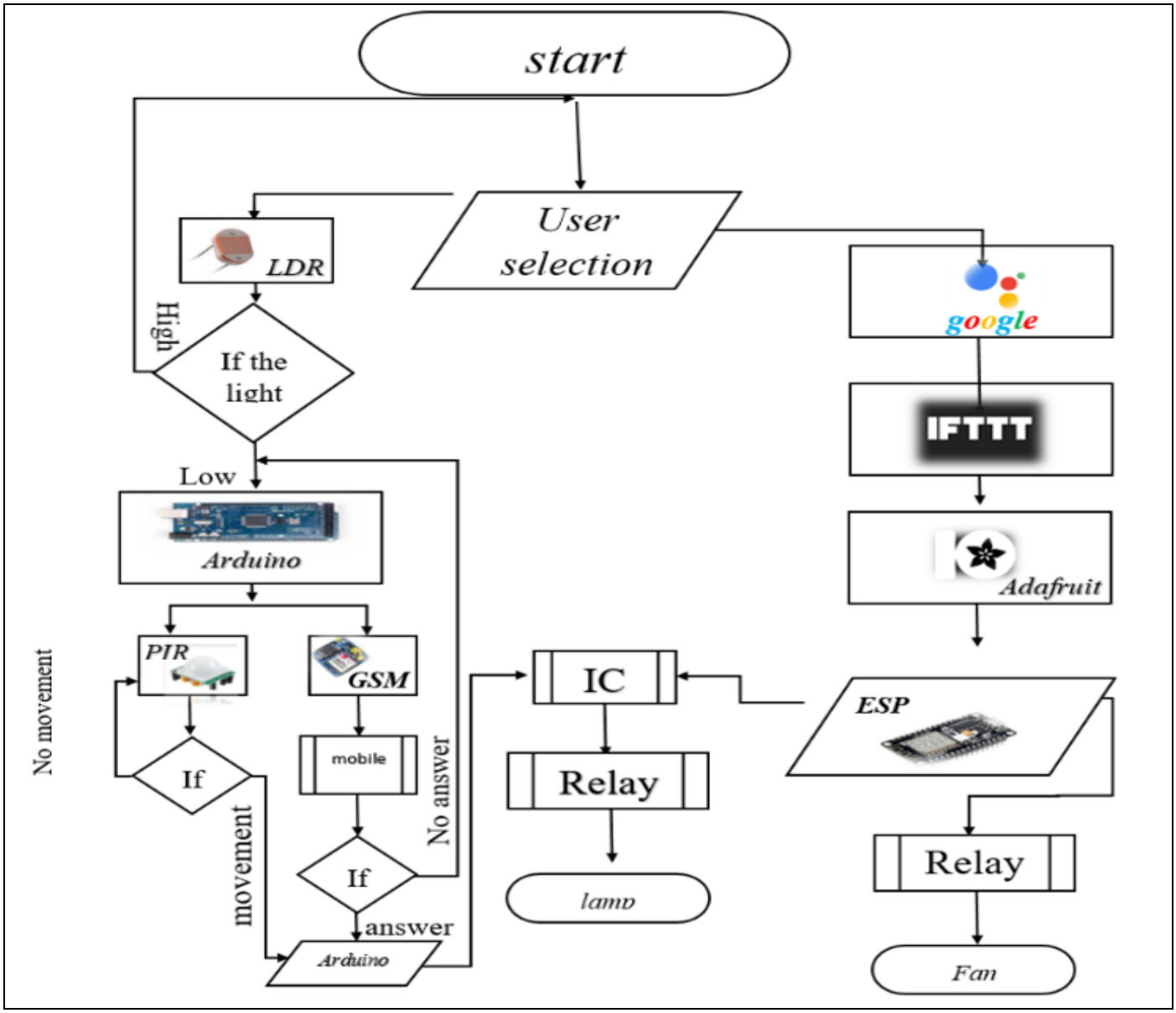

Fig 1 Project Flow Char.

It is significance to show that, the application and characteristics of passive infrared sensor (PIR) able of detecting the anomalous motion even in dark surroundings has been carried out by Zig bee. The main idea used for creating wireless sensor network and ESP 8266 module to transmit data to a remote server. The global system for mobile communication (GSM) sends text alerts to respective authorities regarding detection of intruder. All sensor nodes connected to center node utilize Zig bee for transmitting and receiving data wirelessly.

III. PROPOSED SCHEME

The project started in two ways as show in fig [1], The first way when the orders came from google assistant in mobile phone it sends to adafruit via if this then this application (IFTTT) online by using email and user name account. Then, Adafruit through the internet send the orders, by adafruit key the event stream processing (ESP) received the order and send it to relay to fan if it fans order but if it lamp order it send to the or gate then to lamp. all these steps must be done in many seconds. Note that in this way the project needs the internet connection. The second way if the light dependent resistor (LDR) sensor detect value Measure the light intensity in the room in normal and dark conditions; its measure using Arduino application code, as show as fig [2] Where the x-axis represents time and the y-axis is the intensity of illumination.As we can see, the natural illumination is at400. first GSM send notification to mobile phone and if the SIM received orders it send to Arduino to or gate using coding to relay to the lamp, also if the move sensor detect movement Measure the move intensity in the room around the sensors; its measure using Arduino application code, as show as fig [3] Where the x-axis represents time and the y-axis is the intensity of movement when the light goes down the order send to Arduino open lamp by coding then send to or gate to the lamp. Note that to GSM need balance to send the notification and mobile phone also need balance to send orders.

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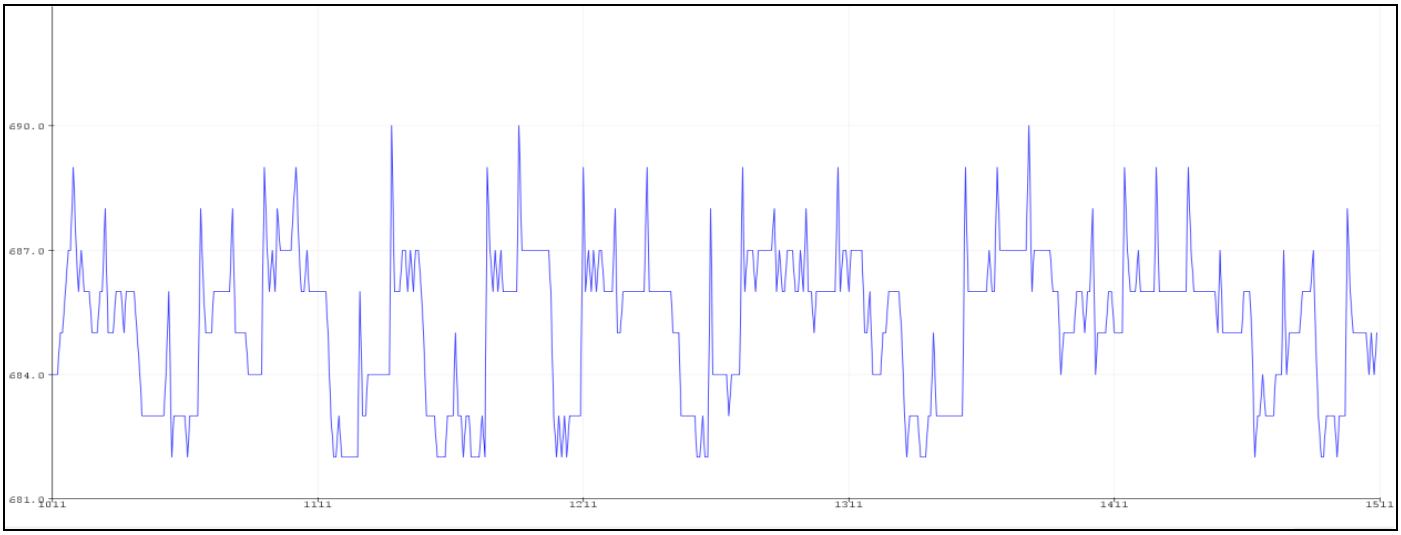

Fig 2 Measuring the Light Intensity

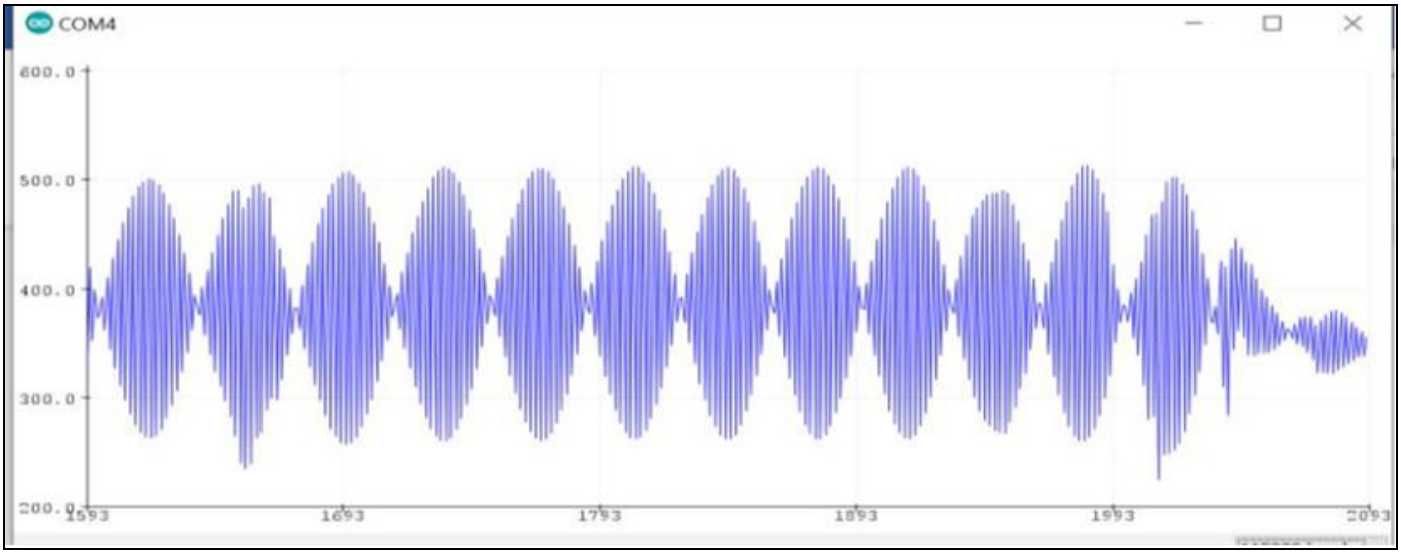

Fig 3 Measuring the Intensity of Movement

There are two ways to start the project but the two ways will be using to gather the first way to control using google command in google home press the microphone to speak and say the command or order or open the keyboard to write the command or order “Activate lamp on” to open lamp fig [4].

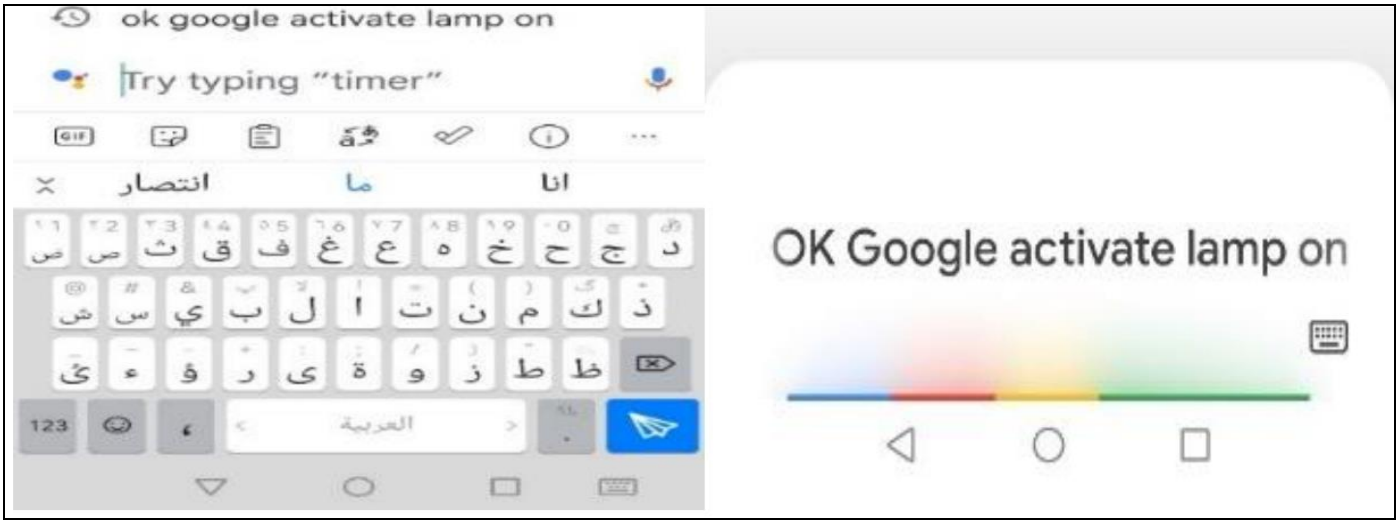

Fig 4 Orderusing Speaks or Type

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When send that IFTTT replay to the command by notification and set the order to the adafruit fig[5,6].

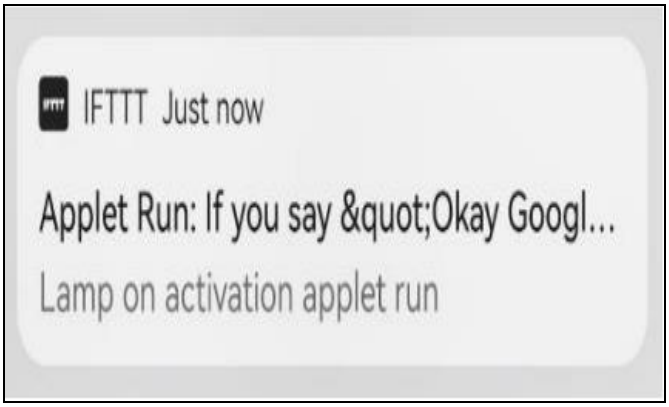

Fig 5 Replay to the Order

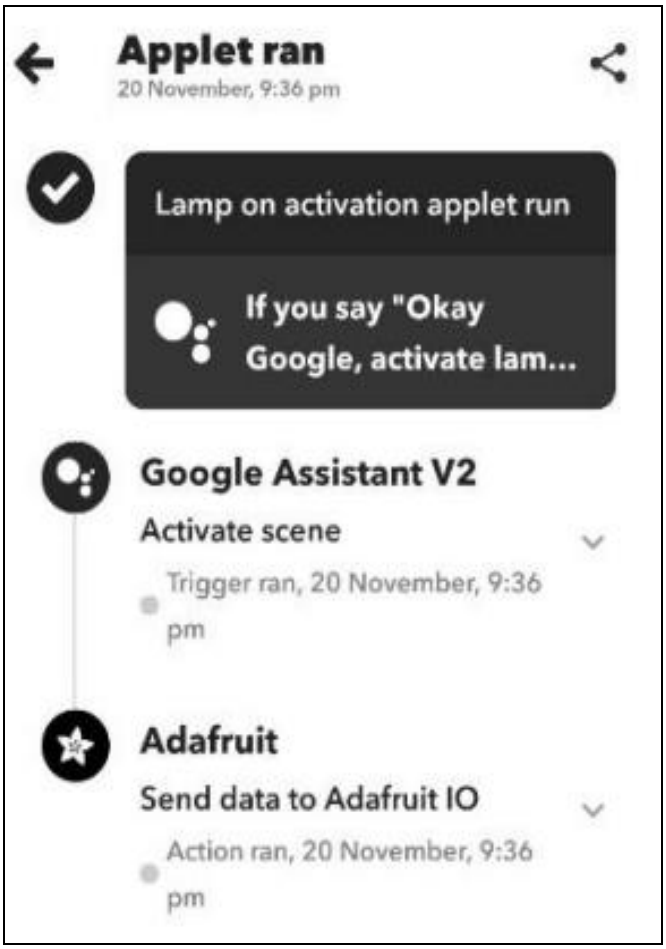

Fig 6 Replay to the Order

From adafruit link to ESP by the code with the adafruit key and username; adafruit link to ESP used message queuing telemetry transport (MQTT) library in ESP code, in code the comment controls the signal transmission to pin and integrated circuit (IC) or relay to the device. The second way to control using sensors this way in depended to light industry if light was high or normal lamp doesn't open any way but if the light was goes down GSM will send SMS "Low light open lamp?" the order will send using SMS replay to the question see the figure below fig [7].

Fig 7 GSM Sends Notification and we Send Order by Replay the Question

When we send the order GSM send the Signal to the arduinoand it send signal to or gate to the relay finally lamp is openalso we can send the order without received message by say"ON" to send high signal to open lamp and send "OFF" to sendlow signal to close lamp as can be seenin fig [8]. The hardware implementation is presented in fig [9].

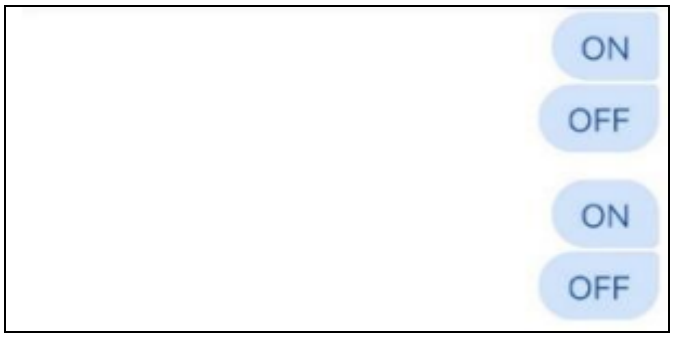

Fig 8 Sending Order without Replay the Question

Fig 9 The Hardware Prototype

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IV. CONCLUSION

In to the recent development of Internet of Things, this research is designed to build a system that implements sensors in the Internet of Things, by linked the devices with sensors and internet or as it called a scientific name internet of thing using google assistant and messages application.

The system uses Arduino, ESP, sensors and GSM to control devices. The system is simulated using an electronic circuit using Google assistant and messages application. The code was Written and verified via the circuit. It is a convenient system which is more suitable for the elderly and people with special needs. It does send a notification when the light goes down in LDR, notification will be a message in a mobile phone says “low light open lamp?” the order also via message by send “ON” to turn on lamp and “OFF” to turn off lamps this order can be sent by any mobile phone or any number to GSM number to make it easy but the notification was send in one mobile number , system also turn on lamp when there are movement detection by PIR sensors, note that system was turn off lamps when LDR read a high light, all this order can be send to Arduino to send it to the lamp, also system is control lamp and fan with google assistant via ESP when the person send order by google assistant (“activate lamp on” to turn lamp on, “activate lamp off” to turn off lamp, “activate fan on” to turn on fan, “activate fan off” to turn off fan) IFTTT was send signal to adafruit using user name and email to send it to ESP by the key and the code to send it to lamp to carry out the order. We used OR gate to organize the order between ESP and Arduino. All signal was sent to OR gate was sent to relay and from ESP also it sends to the relay so, all output from system 220 volt, all this system can be run around the world that is mean you don’t want be around or near it to use order and received notification.

RECOMMENDATIONS

- *The Project can be used in Smart Home Applications with the following Suggestions:*

- Used the temperature and humidity sensor (DHT-11) to control the fan and the air conditioner when the temperature and humidity increase by making it an appropriate environment that is neither too cold or too hot.
- For more security of the system, the GSM can be made to send notifications with the lamp on when there is movement.
- Other suitable sensors can be used to control more application for more sophistication.
- Adding a dust sensor to the system to make the ports close automatically in case of bad weather.
- Add a timer to close all lamps and ports in special time and send notification for that.

Two ways to start the project but the two ways will be using to gather the first way to control using google command in google home press the microphone to speak and say the command or order or open the keyboard to write the command or order “Activate lamp on” to open lamp fig [4].

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