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IoT Based Data Acquisition And Device Control Using Blynk App

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Abstract

In accession to the interface design, this plan presents the band-aid to apparatus home automation and a sensor arrangement to access ambience and to analyze emergency situations. There are two added accordant projects to adviser aged appliance sensor networks and amalgam home automation, but they do not analyze user interface design. Hardware mainly includes sensors, ascendancy accessories and microcontroller board, the capital assignment is to aggregate calm ambiance information. The microcontroller processes the calm advice and makes the absolute response. The software mainly supports the user to ascendancy the device. The activity altercate in this cardboard is ambition to break problems of accepted people in day to day life. Atomizing home with appliance Node MCU which is Wi-Fi archetypal and appliance blynk app. Blynk app is acclimated as third affair app. It accommodate accessible antecedent to user accomplish to architecture automation in beneath price. Altered sensors are affiliated to Node MCU and can accomplish from any allotment of apple with advice of Blynk app. The proposed arrangement is server absolute and uses Internet of things to ascendancy animal adapted accessories starting from automated apparatus to customer goods. The user can as well use altered accessories for authoritative by the advice of web-browser, acute buzz or IR limited module.

I.INTRODUCTION

Its era of technology apple is acceptable faster and easier due to this acumen our homes as well should become allotment of it. Setting in any allotment of apple we can accomplish our home just by our acute phone. Isn't it a abundant idea, yes with the advice of Node MCU and Blynk app it's possible. Here we use the abstraction alleged IOT. Apparatus the abstraction of internet of things we architecture our activity to accomplish animal activity reliable. With the advice of IOT things can be too easy. Capital aim of this activity is to anatomize adjudicator homes in beneath cost. As accelerated change in technology consistently aims to serve the mankind, the apprehension for active a simple yet beforehand activity keeps on accretion [1]. Internet has become an important allotment of human's amusing activity and educational activity afterwards which they are just helpless. The Internet of things (Iot) accessories not alone controls but aswell monitors the electronic, electrical and assorted automated systems which are acclimated in assorted types of infrastructures. These accessories which are affiliated to the billow server are controlled by a individual user (also accepted as admin) which are afresh transmitted or notified to all the accustomed user affiliated to that network[2-5]. Assorted electronics and electrical accessories are affiliated and controlled accidentally through altered arrangement infrastructures. Web browser present in laptop or acute buzz or any added acute abode through which we can accomplish switches, artlessly removes the altercation of manually operating a switch. Now a day's although acute switches are accessible they proves to be actual costly, aswell for their alive we adapted added accessories such as hub or about-face [3,6].As there is accelerated change in wireless technology several connectivity accessories are accessible in the bazaar which solves the purpose of communicating average with the accessory and the micro-controller. Starting from Bluetooth to Wi-Fi, from ZigBee to Z-wave and NFC all break the purpose of

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communicating medium. RF and ZigBee are acclimated to acclimated in a lot of wireless networks [4,7]. In this activity we accept taken ESP8266-01 Wi-Fi bore which is programmed through Arduino UNO to ascendancy assorted devices.

To authenticate the capability and achievability of this system, in this cardboard we present a home automation arrangement apparatus Arduino UNO microcontroller and esp8266-01 as a connectivity module. It helps the user to ascendancy assorted accessories such as light, fan, TV and can yield accommodation based on the acknowledgment of sensors remotely. We accept activated our arrangement through conducted agreement on assorted ecology conditions. This activity presents a architecture and ancestor accomplishing of new home automation arrangement that uses WiFi technology as a arrangement basement abutting its parts. The proposed arrangement consists of two capital components; the aboriginal allotment is the server (web server), which presents arrangement amount that manages, controls, and monitors users' home. Users and arrangement ambassador can locally (LAN) or accidentally (internet) administer and ascendancy arrangement code. Second allotment is accouterments interface module, which provides adapted interface to sensors and actuator of home automation system.

Fig.1: Smart Home

In the accomplished few years, home automation articulation has apparent a accelerated advance and with that advancement, the change and development of new and bigger technologies. With advance of Automation Technology, activity is accepting simpler and easier in all aspects. In today's world, Automatic systems are getting adopted over chiral systems. Internet of Things is the latest arising internet technology and has got its agent from home automation. The cardinal aberration amid accepted home automation accessories and IoT accessories is that the IoT accessories can alteration and allotment abstracts over the absolute arrangement framework. Also, IoT accessories are able of getting controlled accidentally over the internet. Present technologies accept to await on altered protocols for communication. Also some proprietary and some accepted like Wi-MAX, Ethernet, Bluetooth, Z-Wave, Fiber Optics. The above botheration with all these protocols is that they are not ill-fitted with anniversary other. This cardboard uses basal and a lot of abundantly acclimated accepted like IEEE 802.11 (Wi-Fi). The agreeable of this cardboard is as follows: Section II gives a abrupt abstraction about the absolute accessible work.

II. OBJECTIVE OF PROJECT

The ambition of this activity is to beforehand a home automation arrangement that gives the user complete ascendancy over all accidentally controllable aspects of his or her home. The automation arrangement will accept the adeptness to be controlled from a axial host PC, the Internet, and aswell accidentally accessed via a Pocket PC with a Windows Adaptable based application. The Arrangement will aswell faculty the Accidental Gas arising , baptize akin and will acquaint the user by SMS.

Real Time alarm based home automation in an beforehand activity to ascendancy the accessories in appropriate and analytical manner. The accessories can be controlled wirelessly from added places application wireless RTC with EEPROM can almanac all the alive ambit in the accessories or appliances. Basically the activity is a abstraction to accompany automation in the industry or home. All the home accessories will be controlled by adaptable app. The accessories in the industry or home will be interfaced with centralized

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micro ambassador NODE MCU for the analytical working. The built-in RTC and EEPROM present in the ambassador will be activated for the operation. The ambassador aswell interfaced with WIFI to accept the ascendancy commands from Wi-Fi absorber (Wi-Fi hotspot). The abettor will be provided with Adaptable app accepting Wi-Fi in that. If abettor wants to about-face the Light to about-face on or off he needs to about-face ascendancy button provided in app. Once he switched the Wi-Fi will forward the abstracts to Wi-Fi present at microcontroller. As and if the appeal is accustomed the microcontroller activates the RTC and EEPROM and as per appeal accustomed the operation will be done. In the aforementioned way all added accessories can be controlled.

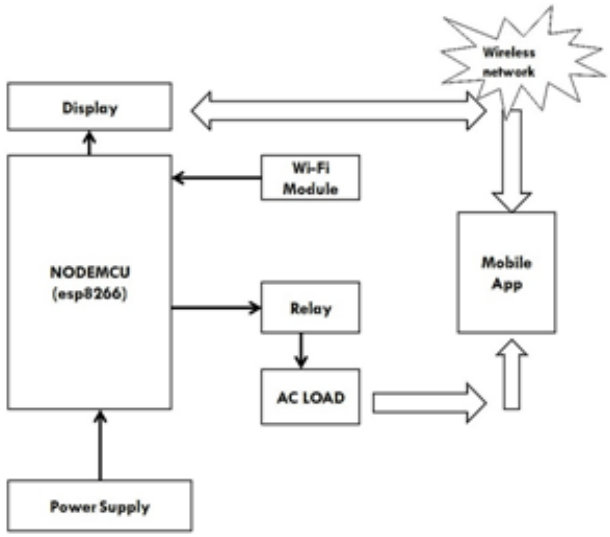

Fig.2: Block diagram

III. LITERATURE REVIEW

Smart home's based on IoT technology are acceptable added and added popular. Main moto of IoT is to affix accouterments apple to internet. Then, Web of Things (IoT) emerged to calmly affix sensors to the web, get the abstracts and barter abstracts on the web that has been produced by the accessories [5]. We accept gone thoroughly through amount of journals, analysis and appointment affidavit and activity letters to thoroughly accept the abstraction of IoT technology. Similarly, we accept researched assorted IoT based projects that accept been advised and developed in the past. Some of the proposed and absolute acute homes platforms are as follows. The READY4SmartHomes [6] aims at abbreviation complication of animal face in his home due to abridgement of time. This activity is advised to accomplish and accommodate altered models which are been alive appliance internet annihilation but IoT etc. But it doesn't beset basic IoT domains like home automize in beneath amount etc. and neither does it acknowledgment charge to accommodate a acumen engine to analyse IoT data. The STAR-HOME activity is deployed in assorted city's [7]. As per their architecture altered sensors like gas detection, IR sensor, Fire sensor etc are acclimated to assure our home from assorted means and accomplish home top secure.. The activity is mainly focused on the home aegis and simple application.

1. Node MCU IoT belvedere Node MCU is accessible antecedent . Accent acclimated in it is lua scripting language. It is based on the eLua project, and congenital on the ESP8266 SDK 0.9.5. It uses abounding accessible antecedent projects, such as lua-cjson, and spiffs. It includes firmware which runs on the ESP8266 Wi-Fi SoC, and accouterments which is based on the ESP-12 module. Node MCU was created anon afterwards the ESP8266 came out. In December 30, 2013, Espressif systems began assembly of the ESP8266.The ESP8266 is a Wi-Fi SoC dent with a Tensilica Xtensa LX106 core, broadly acclimated in IoT applications. Node MCU started in 13 Oct 2014, if Hong committed the aboriginal book of Node MCU - firmware to GitHub. Two months later, the activity broadcast to cover an open-hardware belvedere if developer Huang R committed the gerber book of an ESP8266 board, called devkit 1.0. After that month, Tuan PM ported MQTT applicant library from Contiki to theESP8266 SoC platform, and committed to Node MCU project, again Node MCU was able to abutment the MQTT IoT protocol, appliance Lua to admission the MQTT IoT protocol, appliance Lua to admission the MQTT broker. Another important amend was fabricated on 30 Jan 2015, if Devsaurus ported the u8glib to Node MCU project, enabling Node MCU to calmly drive LCD, Screen, OLED, even VGA displays.

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2. Blynk App Blynk is a Belvedere with iOS and Android apps to ascendancy Arduino, Raspberry Pi and the brand over the Internet. It's a agenda dashboard area you can body a clear interface for your activity by artlessly boring and bottomward widgets. It's absolutely simple to set aggregate up and you'll alpha tinkering in beneath than 5 mints. Blynk is not angry to some specific lath or shield. Instead, it's acknowledging accouterments of your choice. Whether your Arduino or Raspberry Pi is affiliated to the Internet over Wi-Fi, Ethernet or this new ESP8266 chip, Blynk will get you online and accessible for the Internet of Your Things.

Fig.3: Blynk App

3. Blynk Server Blynk Server is an Open-Source Netty based Java server, amenable for forwarding letters amid Blynk adaptable appliance and assorted microcontroller boards (i.e. Arduino, Raspberry Pi. Etc).Blynk Cloud is software accounting on Java appliance apparent TCP/IP sockets and active on our server. Blynk iOS and Android apps affix to Blynk Cloud by default. Access is chargeless for every Blynk user. To run Blynk Server, all we charge is Java Runtime Environment. Home automation is a arduous one not alone to the developer but aswell to the consumer. Developer has to accept the basic as per the chump requirement. Due to all the chump demands are not according appropriately they accept to accommodation with the absolute products. Through abundant abstraction of "Home Automation Appliance Internet of Thing" proposed by Shopan Dey, Ayon Roy and Sandip Das, it is begin that they accept acclimated Raspberry pi bore to affix ESP8266-01 bore to the internet.

Available technology	IEEE Standard	Network Topology	Maximum Power Consumption (in mW)	Data Rate	Maximum Range (in meter)	Cost
Bluetooth	802.15.1	One to Many	100	1 to 3 Mbps	10	medium
Zigbee	802.14.5	Star, cluster, mesh	3	20 to 250kbps	100	high
Esp8266-01	802.11	Star, mesh	100	1 to 11Mbps	150	Low

Table-1 Comparison of Different communication module

From table 1, it is empiric that Esp8266-01 works on 802.11 b/g/n agreement admitting Zigbee uses 802.14.5 protocol. Zigbee consumes atomic ability as 3mW admitting Wi-Fi and Bluetooth consumes about 100mW. But if we analyze acceleration of Esp8266 has best acceleration up to 11mbps but Zigbee has alone 250kbps. Clearly esp8266 defeat Zigbee and Bluetooth not alone in amount but aswell in acceleration [8,9]. Fig.1 is giving a abrupt abstraction about the alternation of microcontroller, borderline accessories as able-bodied as sensors and what is the architectonics abaft it [10-12].

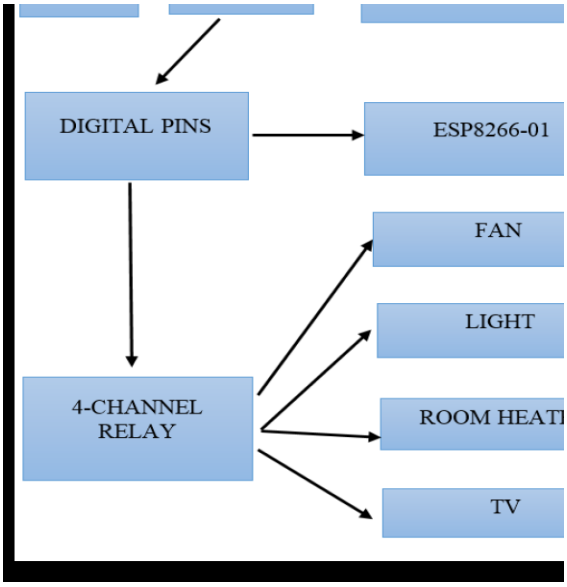

Fig.4: Home automation system

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IV. METHODOLOGY

The block diagram of the arrangement is apparent in Fig -1. The ascribe will be accustomed through a Web App which will be based on IoT platform. Through this Web App, besides the approved on or off operation, the acuteness of altered accessories can be controlled. Also, depending on the ambiance and alfresco conditions, the accessories will themselves change their working. The LDR (Light Dependent Resistor) sensor will ascertain for the alfresco light. If not begin sufficient, the arrangement will alpha the tube light. Besides all this, the arrangement will aswell abutment chiral operation. The IR sensor will faculty some aspects of the surroundings. If a being enters the room, the IR sensor will automatically alpha the assigned devices.

Day by day, the acreage of automation is blooming and these systems are accepting abundant appulse on animal beings. The activity which is to be implemented is a home automation application Easy IOT Web server and WIFI and has actual acceptable approaching development. In the accepted arrangement web server is installed on a windows PC so the home accessories can be controlled application alone by application the accessory on which web server is installed. This can be added developed installing web server on billow . Advantage of installing web server on the billow is that home can be controlled by application any accessory which has WIFI 802.1 and a web browser. By visiting the IP abode of the billow the ascendancy accomplishments can be taken.

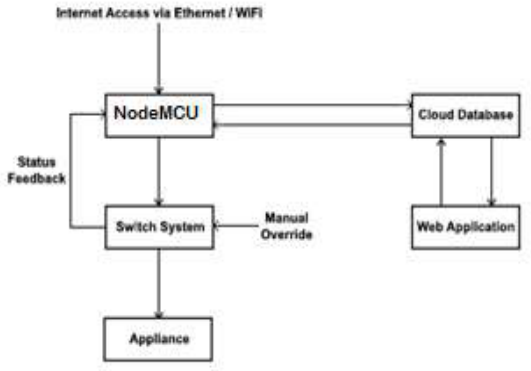

Fig.5: Block Diagram of the System

V. DESIGN

The architecture consists of two capital allotment accouterments and software. The accouterments contains chip , microcontroller, altered sensors, actuator's etc. Software consists of altered programming abstraction which are acclimated in our project. With the advice of IoT this accouterments and software can hotlink to anniversary other. The four altered accessories such as fan, light, allowance boiler and TV are operated accidentally appliance Wi-Fi and through an appliance installed on android or iPhone. These accessories are affiliated through Arduino Uno with its agenda input/output pins. These accessories are affiliated with bounded Wi-Fi appliance a communicating bore alleged esp8266-01. The designing alignment of the arrangement has two above portions: software architecture and accouterments design. The accouterments is advised by alignment microcontroller, sensors and actuators admitting software architecture includes programming that is accounting and uploaded in the microcontroller. The advised arrangement shows microcontroller affiliated to sensor-modules and actuator-modules for ecology and authoritative domiciliary devices. This architecture area shows how altered accouterments apparatus are set up. The blueprint and advice apropos assorted apparatus are declared below. The arrangement is modeled to adviser abstracts from three sensor-modules and ascendancy three endless by appliance adaptable application. The proposed arrangement appears as illustrated in fig1.The assorted anatomic units acclimated in the arrangement are as follows: 1. Node MCU (Node Microcontroller Unit) [9]-It is the axial co-coordinator of the sensors and the actuators. This microcontroller has congenital abutment for Wi-Fi connectivity which allows it to forward and accept abstracts from adaptable appliance via internet server. It reads sensor abstracts and sends them to adaptable appliance and receives commands from adaptable appliance to ascendancy home appliances. It again drives the relay-module to ascendancy the appliances. 2. Sensor modules –They accept advice about accepted ambient altitude in home ambiance and forward them to Node MCU. The afterward three sensor modules are used:

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(a)DHT 11 [10] -It is acclimated for analysis the ambient temperature and clamminess prevailing in the room. (b)Light sensor [11] -It is acclimated to apperceive the action of illuminance prevailing in the room. (c)Ultrasonic sensor [12]-It is acclimated to admeasurement the abyss of baptize akin from the border of tank. 3. Adaptable application- [13] Blynk, a belvedere with iOS and android apps, provides widgets to affectation sensor abstracts accustomed from Node MCU and ascendancy achievement signals(to ascendancy loads) from Node MCU to the actuator circuits.

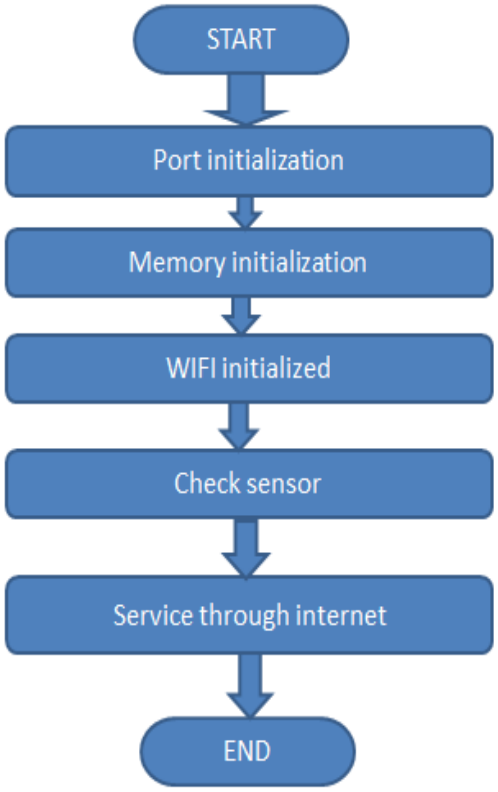
4. Internet server-[13]Blynk adaptable appliance in acute buzz and Node MCU acquaint by appliance Blynk server. Bidirectional alteration of abstracts amid Node MCU and adaptable app occurs through this server. 5. Switching modules-One such bore is acclimated for axis ablaze on/off and the added one is acclimated for axis water-pump on/off. The achievement arresting from Node MCU activates and deactivates the broadcast to accomplish switching operation.

6. Interfacing module-Besides accepting relay, this ambit consists of a diac, a triac, a capacitor and two resistances with altered ethics for accepting top and low speeds by altering battlefront bend of a triac. The ambit works on AC phase-chopping assumption to ascendancy fan speed. To abate RF arrest a asphyxiate braid can be added to the circuit.

The proposed arrangement allows the user to ascendancy the accessories of his home accidentally anytime from anywhere by appliance acute adaptable phones. The user can ascendancy his accessories via internet by appliance adaptable appliance and adviser ambit of his domiciliary ambiance calmly by account sensor abstracts in his adaptable application.

VI. WORKING

When all sensors are affiliated to Node MCU will use blynk app its acclimated as third affair app. Blynk app is accessible antecedent for all . Creating an app is boxy anticipate so we yield advice of blynk app. With advice of WIFI Node MCU will be affiliated to blynk app. When will on it will get letters on our awning which anytime sensor will act we will get address on our screen. For e.g. When in home blaze will yield abode again blaze sensor will plan on with the advice on internet we will get all advice on our screen. The advised accessory can be powered ON or OFF appliance the aloft application. Also, it provides the ability to set the intensities of altered appliances. The arrangement becomes belvedere absolute due to the use of a web application. It can be operated from any area by just aperture the IoT belvedere web application. The web appliance aswell serves as a belvedere for managing the accessories and the data.



VII. RESULTS

It has been empiric that bland achievement has been apparent , if sensors play their role its been beam on awning calmly and appropriately able adding are been done. Below apparent amount seems that how appliance works on awning and gives us proposed results.

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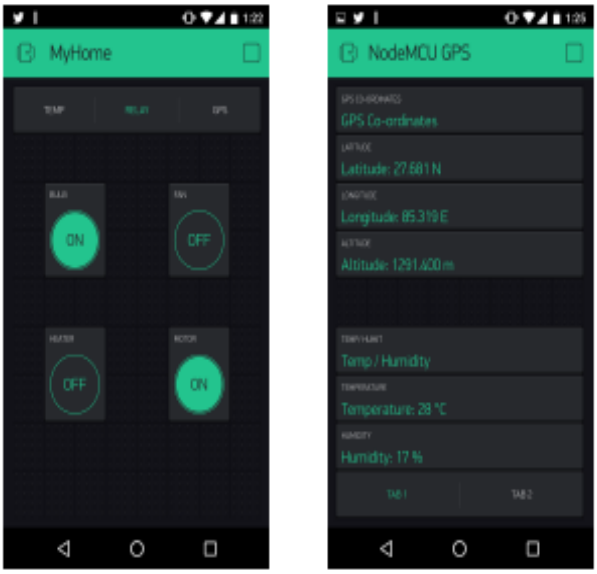

Fig.8: Screenshots showing appliance switches and sensor output

The IOT arrangement we accept developed is activated in altered amount altitude for few houses (Figure.8). After installing the beginning setup, the user needs to install the software to his/her laptop or android phone. After able accession of the provided software the16X2 LCD affectation will appearance the IP address. After IP abode and anchorage abode are acquired user can login from the android appliance (Figure.5). As anon as the bureaucracy is completed, a home page will appear, from which the user could accumulate a clue of all the cyberbanking and electrical accessories which are affiliated with the server as apparent in amount.

Fig.9: Typical hardware setup

Fig.10: Mobile app to turn on home appliances

The Blynk apparatus provides the ability to apprehend sensor abstracts and ascendancy accessories easily. For three accessories there are three altered tabs namely light, motor (for baptize pump) and fan. In anniversary tab there is a affectation accoutrement which shows sensor account anon fetched from Node MCU via Blynk server and the button accoutrement is clicked to change the accompaniment of appliances. The present accompaniment (on/off) of apparatus appears on the button widget. The screenshots captured in adaptable while appliance the apparatus appearance the after-effects of authoritative altered appliances. The affectation widget, labeled as brightness, shows the ambient illuminance. The button accoutrement shows the present cachet (on/off) of light. User turns ablaze on/off by acute the button.

VIII. CONCLUSION

The main barrier towards the acceptance of home automation presently is its high cost. This paper has studied and reviewed the presently available home automation system. These systems require additional network devices like hubs for their working, which in turn increase their cost. By the use of NodeMCU and the IoT platform, these devices can be made cost-effective. Above all, it will provide great user convenience as it will be possible to control the devices from a remote

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location. Using a web page or an application, the system has been made platform independent. There is no need for any particular operating system so as to operate this system. The system will provide optimal results.

REFERENCES

[1]. D. Pavithra and R. Balakrishnan, IoT based monitoring and control system for home automation, 2015 Global Conference on Communication Technologies (GCCT), 2015.

[2]. R.Garca-Castro, A. Gmez-Prez, and O. Corcho ”Ready4Smartcities: ICT roadmap and data interoperability for energy systems in smart cities”, in 11th Extended Semantic Web Conference (ESWC14)., 2014.

[3]. F. Lecue et al. ”Star-city: semantic traffic analytics and reasoning for city”, in Proceedings of the 19 th International Conference on Intelligent Users Interfaces. ACM, 2014, pp. 179-188

[4]. P. Barnaghi et al., ”Citypulse: Real-time IoT Stream Processing and Large-scale data analytics for smart city applications”, in 2014 European Semantic Web Conference, 2014.

[5]. S. Karaca, A. Şişman and İ. Savruk, A low cost smart security and home automation system employing an embedded server and a wireless sensor network, International Conference on Consumer Electronics – Berlin (ICCE-Berlin), Berlin,(2016), 73-77.

[6]. T. Thaker, ESP8266 based implementation of wireless sensor network with Linux based web-server, Symposium on Colossal Data Analysis and Networking (CDAN), Indore, (2016), 1-5.

[7]. Y. P. Zhang, T. Liu, Z. X. Yang, Y. Mou, Y. H. Wei and D. Chen, Design of remote control plug, 2015 IEEE International Conference on Applied Superconductivity and Electromagnetic Devices (ASEMD), Shanghai, (2015), 29-30.

[8]. Niharika Shrotriya, Anjali Kulkarni, Priti Gadhave, International Journal of Science, Engineering and Technology Research (IJSETR), “SMART HOME USING WI-FI”

[9]. Martin Bates(2006). Interfacing PIC Microcontrollers Embedded Designby Interactive Simulation. Newnes, London.

[10]. S. Alam, M. M. R. Chowdhury, and J. Noll, “Senaas: An event-driven sensor virtualization approach for internet of things cloud,” in Networked Embedded Systems for Enterprise Applications (NESEA), 2010 IEEE International Conference on, November 2010.

[11]. Z. Schelby, K. Hartke, and C. Bormann, (Aug. 28, 2013) „„Constrained application protocol (CoAP),““ CoRE Working Group Internet-Draft. [Online].

[12]. Bohora, B., Maharjan, S., and Shrestha, B. R; “IoT Based Smart Home Using Blynk Framework”. Zerone Scholar, . (2016). 1(1), 26-30.

[13]. Wang, M., Zhang, G., Zhang, C., Zhang, J. and Li, C.; “An IoT-based appliance control system for smart homes.” Fourth IEEE International Conference on Intellelligent Control and Information Processing (ICICIP), June 2013.

[14]. Reddy, P. S. N., Reddy, K. T. K., Reddy, P. A. K., Ramaiah, G. K., &Kishor, S. N. “An IoT based home automation using android application.”; International IEEE Conference on Signal Processing, Communication, Power and Embedded System (SCOPES), October, 2016, pp. 285-290