



**IJIRCCCE**

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

**Volume 9, Issue 7, July 2021**

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 7.542**



9940 572 462



6381 907 438



ijircce@gmail.com



www.ijircce.com

# Home Automation Using Google Assistant & Node MCU

Sonali P Dash, Amit Kumar, Vishal, Shiv Narayan

Assistant Professor, Dept. of ENTC., Bharati Vidyapeeth University, College of Engineering Pune, India

UG Students, Dept. of ENTC., Bharati Vidyapeeth University, College of Engineering Pune, India

**ABSTRACT:** Comfort is becoming a major priority in the 21st century. So the revolutions of computing and keenly intellectual environment came into existence. Some technologies like Ubiquitous/pervasive and ambient astuteness gratify the maximum desideratum of perspicacious world but these technologies are not tightly coupled with the cyber world, so the people need another technology extension. Internet of Things (IoT) is an ideal buzzing technology to influence the cyber world and communication technologies. IoT sanctions people and things to be connected anytime, anyplace, with anything and anyone, by utilizing ideally in any path/network and any accommodation. The conception behind Google assistant-controlled Home automation is to control home devices with voice. On the market there are many contrivances available to do that, but making our own is awe-inspiring.

**KEYWORDS:** Energy efficient algorithm; Manets; total transmission energy; maximum number of hops; network lifetime

## I. INTRODUCTION

In this project, the Google assistant requires voice commands. IoT allows people and things to be connected anytime, anyplace, with anything and anyone, by using ideally in any path/network and any service. Home automation system achieved great popularity in the last decades and it increases the quality of life. In this paper, an overview of home automation systems is discussed. This paper presents a design and prototype of the Home Automation system. The main part is NodeMCU, which has inbuilt Wi-Fi module, which will help in controlling devices over the Internet.

With Adafruit account which is a cloud based free IoT web server used to create virtual switches, is linking to IFTTT website abbreviated as "If This Than That" which is used to create if else conditional statements. The voice commands for Google assistant have been added through IFTTT website. In this home automation, as the user gives commands to the Google assistant, Home appliances like Bulb, Fan and Motor etc., can be controlled accordingly. The commands given through the Google assistant are decoded and then sent to the microcontroller, the microcontroller in turn control the relays connected to it. The device connected to the respective relay can be turned On or OFF as per the users request to the Google Assistant. The microcontroller used is NodeMCU (ESP8266) and the communication between the microcontroller and the application is established via Wi-Fi (Internet).

## II. LITERATURE SURVEY

Tan, Lee and Soh (2002) proposed the development of an Internet-predicated system to sanction monitoring of paramount process variables from a distributed control system (DCS). It proposes hardware and software design considerations which enable the utilizer to access the process variables on the DCS, remotely and efficaciously rent designations. Potamitis, Georgila, Fakotakis, and Kokkinoss, G. (2003) suggested the utilization of verbalization to interact remotely with the habitation appliances to perform a particular action on behalf of the utilizer. The approach is inclined for people with incapacitation to perform authentic-life operations at home by directing appliances through verbalization. Voice disunion strategy is culled to take congruous decision by verbalization apperception. In the year 2006, S. M. AnamulHaque, S. M. Kamruzzaman and Md. Ashraf Islam proposed a system entitled "A System for Keenly intellectual - Home Control of Appliances Predicated on Time and Verbalization Interaction" that controls the abode appliances utilizing the personal computer. This system is developed by utilizing the Visual Fundamental 6.0 as programming language and Microsoft voice engine implements for verbalization apperception purport. Appliances can be either controlled by timer or by the voice command. Jawarkar, Ahmed, Ladhake, and Thakare (2008) propose remote monitoring through mobile phone involving the utilization of verbalized commands. The verbalized commands are engendered and sent in the form of text SMS to the control system and then the microcontroller on the substructure. The comprehensive Home monitoring solution was first presented at Consumer Electronics Show in 2014.

Withings Abode is one of the most comprehensive home monitoring solutions on the market, sanctioning users to stay connected to their domicile and family from anywhere. The camera can be utilized with the IFTTT app to engender a number of recipes between connected accommodations and the camera, such as turning it on when user's phone is utilizing geolocation or when the door is locked, or making it turn on the air purifier when deplorable quality is detected. Parents can take comfort in having superior features such as Baby Monitor Mode, which has perpetual monitoring, alerts and interactive push-to-verbalize..One of the topics which is gaining popularity of Home Automation System is because of its innumerable advantages. Home automation refers to the

### III. METHODOLOGY

The methodology (Project work Plan) of this project design includes implementation of the proposed method.

There are some basic steps involving in the Methodology of the project.

1. The first major step is setting up the Adafruit IO. Adafruit IO is a website used to create virtual switches which will be turned ON or OFF depending on the commands given to the Google assistant, and
2. The second step is connecting the ESP8266, and
3. the last step is connecting to Google assistant through IFTTT. (IFTTT is also a website used to create simple chain of conditional statements for like if else statements.)

By following these three steps, the implementation of the proposed system is going to be done.

### IV. SYSTEM DESIGN AND ARCHITECTURE

Hardware mainly deals with Control Unit which comprises of microcontroller NodeMCU, Relays, Driver IC (used for devices like motors), Bulb, Fans, etc.

But for our project, we will have following hardware: -

- A. NodeMCU–32-bit ESP8266 development board with Wi-Fi SoC (Model – ESP12F).
- B. Relay module
- C. One 15W Bulb
- D. One 9V DC Fan

### HARDWARE REQUIREMENTS

#### A. NODE MCU

Node Microcontroller Unit is named as NodeMCU which is open source software and firmware and is built around Node Microcontroller Unit is named as NodeMCU which is open source software and firmware and is built around System-on-Chip (SoC) called the ESP8266. It is designed and manufactured by Express. It contains the crucial elements like CPU, RAM, networking (Wi-Fi), modern operating system and SDK. The NodeMCU aims to simplify ESP8266 development. It has an operating voltage of 3.3v. It has an operating temperature range of :- 40°c ~ 125c



**Figure 1:** NodeMCU Development Board



**FEATURES OF NODE MCU (ESP8266):**

1. Open-source
2. Interactive
3. Programmable
4. Low cost
5. WI-FI enabled
6. USB-TTL included
7. Plug & Play

**SPECIFICATIONS OF NODE MCU (ESP8266):**

1.	<b>Developer</b>	ESP8266 [Opensource Community]
2.	<b>Type</b>	Single-boardmicrocontroller
3.	<b>Operating system</b>	XTOS
4.	<b>CPU</b>	ESP8266
5.	<b>Memory</b>	128 KBytes
6.	<b>Storage</b>	4 MBytes
7.	<b>Power By</b>	USB
8.	<b>Power Voltage</b>	3v ,5v (used with 3.3v Regulator inbuilt on Board usingPin VIN)
9.	<b>Code</b>	Arduino Cpp
10.	<b>IDE Used</b>	Arduino IDE
11.	<b>GPIO</b>	10

**PROGRAMMING NODE MCU:**

Install the current upstream Arduino IDE at the 1.8 level or later. The current version is at the Arduino website. Start Arduino and open Preferences window under file. Enter

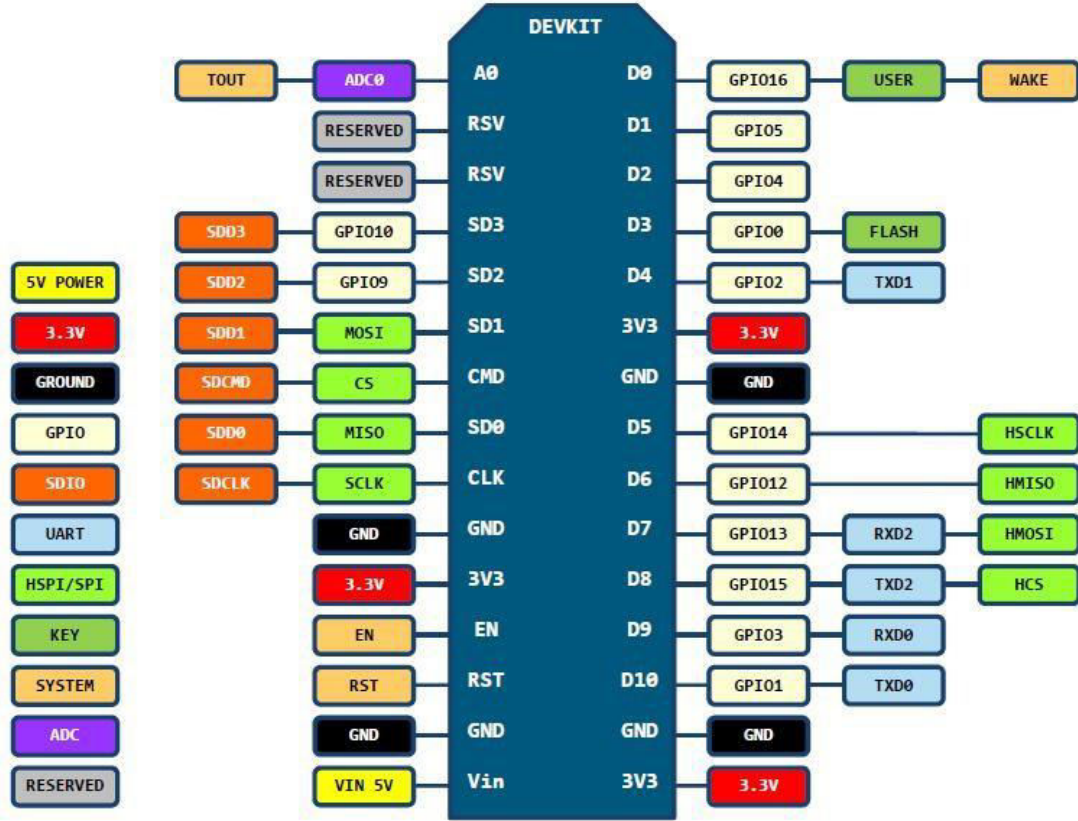
[https://arduino.esp8266.com/stable/package\\_esp8266com\\_index.json](https://arduino.esp8266.com/stable/package_esp8266com_index.json)

into Additional Board Manager URLs field. You can add multiple URLs, separating them with commas.

After Completion,

1. Connect Data Cable to ESP8266 MCU NODE with PC.
2. After Install Drivers if Needed.
3. Check Which Number Is Assigned to our Board.
4. Open Arduino IDE.
5. Open Boards Manager from Tools > esp8266 Modules platform And Select NodeMCU 1.0(ESP-12E Module) board from Tools.
  - Upload Using: Serial
  - CPU Frequency: 80Mhz lash Size: 4M
  - Upload Speed: 115200
  - PORT: Select Assign Port Only.
6. Upload Code.

**PIN DIAGRAM OF NODE MCU:**



**Figure 2:** PIN diagram of NodeMCU

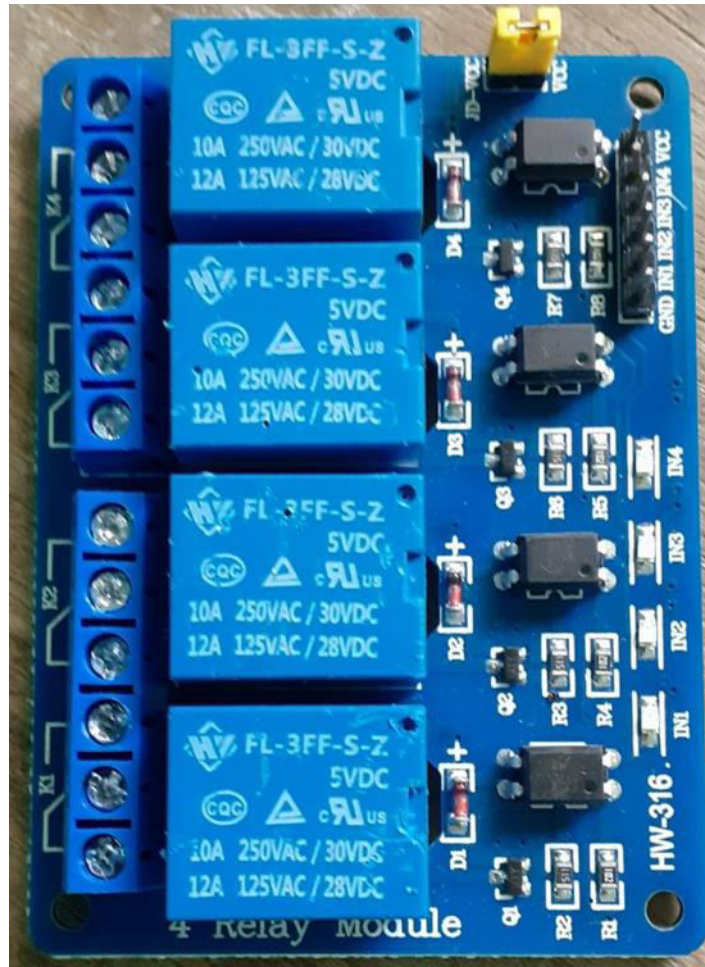
**B. Relay Module**

A relay is a switch that opens and closes electronically and electromechanically. It consists of mainly 5 pins. They are 2 coil pins, 1 connection pin, 1 no connection pin, 1 common pin. Initially, at the off state, it is connected to no connection pin. But when we give the input from the microcontroller then magnetic field between the coil pins produces current so it shifts to connection pin and the current will pass through the load. Figure 5 shows the 4 channel relay board.

A 4-Channel Relay interface board allows us to control various equipment's with large current. It can be controlled directly by Micro-controller (Arduino, Node MCU, Raspberry Pi, 8051, AVR, PIC, DSP, ARM, ARM, MSP430, TTL logic).

**SPECIFICATIONS OF RELAY MODULE:**

1. 4-Channel Relay interface board, and each one needs 15-20mA Driver Current
2. Both controlled by 12V and 5V input Voltage
3. Equipped with high-current relay, AC-250V 10A; DC-30V 10A
4. Standard interface that can be controlled directly by microcontroller.
5. Opto-isolated inputs
6. Indication LED's for Relay output status



**Figure 3:** Relay Board

In this system, the relay is utilized to turn ON/OFF the appliances. The signal is supplied from the NodeMCU microcontroller may be high/low. Whenever a low voltage signal is given to the relay which is connected to a contrivance it is turned off and whenever a high voltage signal is given it is turned on.

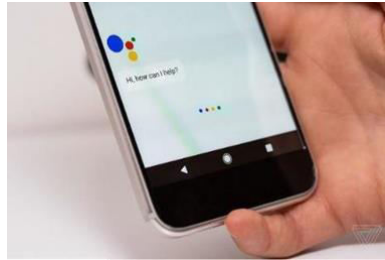
### SYSTEM SOFTWARE REQUIREMENTS

The software part mainly consists of :-

- A. Google assistant application
- B. Adafruit IO
- C. IFTTT Service
- D. Arduino IDE.

#### A. GOOGLE ASSISTANT

The Google Assistant is an Artificial Astuteness predicated Virtual assistant software which sanctions its users to control all the apps in their contrivance. It sanctions the users to control and command most of the apps in their contrivances utilizing voice commands. This provides more accomodation to the people as they only have to command the google assistant exhaustive voice command. Fig 4 shows Google assistant.



**Figure 4:** Google Assistance

**B. ADAFRUIT IO**

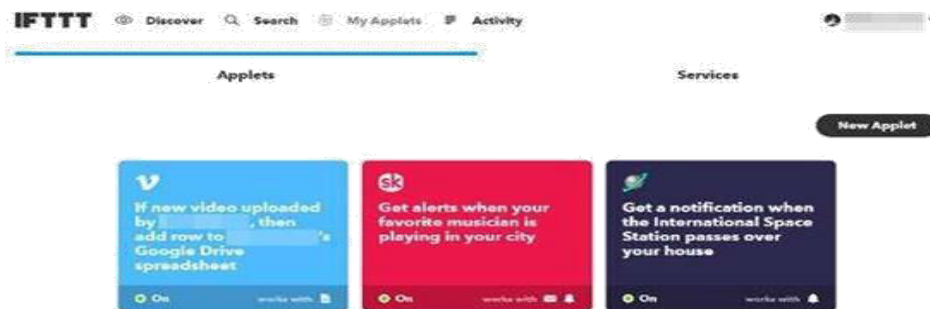
Adafruit IO is utilized to connect projects to Internet. It can handle and visualize multiple victual of data. Dashboards are a feature integrated into Adafruit IO which sanction users to chart, graph, gauge, log, and exhibit our data. Users can view their dashboards from anywhere in the world. Adafruit IO is utilized to control and react to the user’s data. It is a platform designed to exhibit, respond, command, and interact with project's data. It withal keeps our data private and secure for us. It's the cyber world of things - for everyone. Adafruit IO additionally sanctions to establish dashboards that let users directly manipulate or view the current value of each topic. Since it can be accessed from a web browser, it makes it the ideal hub for monitoring and controlling all of sundry IOT projects.



**Figure 5:** ADAFRUIT IO

**C. IFTTT Application**

IFTTT stands for “IF THIS THEN THAT”. IFTTT is a website and a mobile app that was launched in 2010. The conception of IFTTT is to automate everything from your favourite apps and websites to app-enabled and keenly intellectual contrivances. The company provides a software platform that connects apps, contrivances, and accommodations from different developers in order to trigger one or more automation involving those apps, contrivances, and accommodations. It is a free web-predicated accommodation to engender chains of simple conditional verbalizations, called applets. An applet is triggered by changes that occur within other web accommodations such as Gmail, Facebook, Telegram, Instagram, or Pinterest. For example, an applet may send an electronic-mail message if the utilizer tweets utilizing a hashtag, or copy a photo on Facebook to a utilizer's archive if someone tags a utilizer in a photo. IFTTT is an initialism for "If This Then That. In integration to the web-predicated application, the accommodation runs on iOS and Android. IFTTT users engendered about 20 million recipes each day. All of the functionalities of the Do suite of apps have since been into a redesigned IFTTT app.



**Figure 6:** IFTTT web application

**D. ARDUINO IDE**

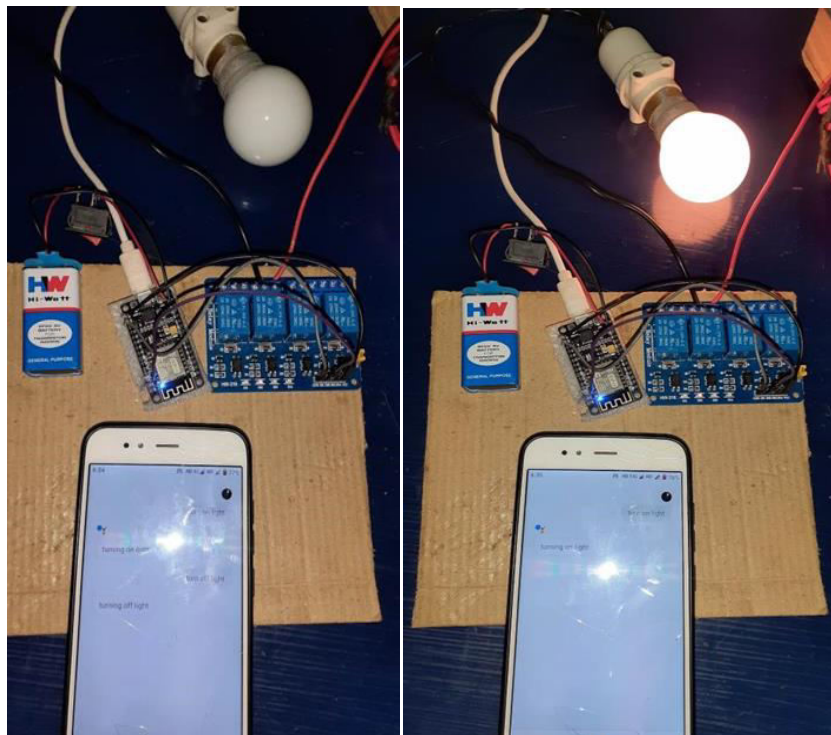
The Arduino integrated development environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in the programming language Java. Using special code structuring it also supports languages like C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.



**Figure 7:** ARDUINO IDE

**V. RESULT ANALYSIS**

The working hardware (the complete prototype implementation of the proposed system) of **GOOGLE ASSISTANT HOME AUTOMATION USING NODEMCU** after implementing the above methodology is shown below:-



**Figure 8:** Light ON and OFF



## VI. CONCLUSION

In this project, voice commands are given to the Google assistant. The voice commands for project is about wireless home automation utilizing Android mobile avails us to implement such a fantastic system in our abode at a very plausible price utilizing cost-efficacious contrivances. Thus, it surmounts many quandaries like costs, inflexibility, security etc. In additament, will provide more preponderant advantages like it decrease our energy costs, it amends home security. In additament, it is very convenient to utilize and will amend the comfort of our habitation. The project has proposed the conception of keenly intellective homes that can fortify an abundance of home automation systems. C# programming language and Node microcontroller have been used to connect the sensors circuit to the habitation.

Google assistant have been integrated through IFTTT website and the Adafruit account is withal linked to it. In this habitation automation, utilizer have given commands to the Google assistant. Home appliances like Bulb, Fan and Motor etc., are controlled according to the given commands. The commands given through the Google assistant are decoded and then sent to the microcontroller and it control the relays. The contrivance connected to the respective relay turned On or OFF as per the users request to the Google.

There has been tremendous magnification in the domicile automation sector, and many reputed companies utilizing their opportunity to work with IFTTT to distribute an elegant way to connect families to their homes. Consumers are looking to secure their habitation environment in today's capricious world, and the incipient Home automation accommodation gives them the tranquility of mind that they require to bulwark their family's salubrity.

Also, in home and building automation systems, the utilization of wireless technologies gives several advantages which cannot be achieved by utilizing a wired network:-

1. Reduced installation costs.
2. Easy deployment, installation, and coverage.
3. System scalability and facile extension.
4. Aesthetical benefits.
5. Integration of mobile contrivances.

For all these reasons, wireless technology is not only an alluring cull in renovation and refurbishment, but withal for incipient installations.

## REFERENCES

- [1]Tan, Lee and Soh – “Internet based Monitoring of Distributed Control Systems”, - Energy and power Engineering. Publisher: IEEE Transactions on Education, Place: New Jersey, Country: USA, Year: 2002, Vol: 45, Iss. No. 2., pp. 128-134.
- [2]Potamitis, I., Georgila, K. Fakotakis, N., &Kokkinakis, G – ‘An Integrated system for smart-home control of appliances based on remote speech interaction’,- 8th European conference on speech and communication technology, Publisher: World Journal control science and Engineering, Place: Geneva, Country: Switzerland, Year: 2003, Vol. No: 2, Iss. No.1, pp. 2197-2200.
- [3]HS. M. AnamulHaque, S. M. Kamruzzaman and Md. Ashraful Islam – ‘A System for Smart-Home Control of Appliances Based on Time and Speech Interaction’,- Proceedings of 4th International Conference on Electrical Engineering, Place: Bhubaneshwar, Country: India, Year:2006., pp.128 to 131.
- [4]N. P Jawarkar, V. Ahmed, S.A. Ladhake, and R.DThakare – ‘Micocontroller based Remote monitoring using mobile phone through spoken commands’,- Journal of networks, Publisher: World Journal control science and engineering, Place: Lagos, Country: Nigeria, Year:2008, Vol. No.:3, Iss. No.2, pp.58 to 83.
- [5]Prof. Era Johri– ‘Remote Controlled Home Automation using Android application via Wi-Fi connectivity’, - International Journal on Recent and Innovation and recent trends in computing and communication, Publisher: World Journal control science and engineering, Place: North Dakota, Country: USA, Year:2012, Vol. No.:3, Iss. No.3, pp.2321 to 8169.
- [6]Sharma, Rupam Kumar, et al. "Android interface based GSM home security system." Issues and Challenges in Intelligent Computing Techniques (ICICT), 2014 International Conference on. IEEE, 2014. De Luca, Gabriele, et al. "The use of NFC and Android technologies to enable a KNX-based smart home." Software, Telecommunications and Computer Networks
- [7]Mansour H. Assaf, Ronald Mootoo, Sunil R. Das, Emil M. Petriu, VoicuGroza, and Satyendra Biswas “Sensor Based Home Automation and Security System.” 978-1-4577-1722-7/12/\$26.00 ©2012 IEEE
- [8]D. Bordenca, H. Valean, S. Folea, A. Dobircau, “Agent Based Systemfor Home Automation, Monitoring and Security.”,International Conference on Tele -communications and Signal Processing TSP 2011, Budapest, Hungary, Aug. 18–20, pp. 165–169, ISBN 978-1-45771409-2
- [9]MitaliPatil, AshwiniBedare, VarshaPacharne "The Design and Implementation of Voice Controlled Wireless Intelligent Home Automation System Based on ZigBee." International Journal of Advanced Research in Computer Science and Software Engineering.



**INNO**  **SPACE**  
SJIF Scientific Journal Impact Factor  
**Impact Factor: 7.542**



**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
**INDIA**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

 **9940 572 462**  **6381 907 438**  **ijircce@gmail.com**



[www.ijircce.com](http://www.ijircce.com)

Scan to save the contact details