

Home Automation and Security Using IOT

Er. Dhananjali Singh¹, Satyendra Kumar Singh², Jitendra Kumar Yadav³,

Mohini Singh⁴, Shikha Singh⁵

Assistant Professor, PG Dept. of ECE, R.B.S. Engineering Technical Campus, Bichpuri, Agra, India¹

B. Tech, Final Year Students, PG Dept. of ECE, R.B.S. Engineering Technical Campus, Bichpuri, Agra, India^{2,3,4,5}

Abstract: The home automation and security using IOT project that we have designed is to make home more secure and automated by using internet of things. We have used Raspberry pi and Raspberry pi camera which is attached at the side of the door. When an authorised person comes in front of raspberry pi camera, it detects the face and start comparing with database images. If face matches with database images then gate automatically opens and if it does not matches then raspberry sends a message to owner of house that “home entry detected”. Then the owner can use VS380 Wi-Fi camera which is also attached on side of the door, for watching video outside of home through his mobile and he also can talk with unauthorised person. If owner get to know the person is guest or authorised person then he can open the door home by sending “*y#” message through his phone then gate will open and all home appliances will switch ON.

Keywords: Raspberry pi, IOT, Home Security, Automation

I. INTRODUCTION

Wireless Home security and automation are the major aspects of this project. When unauthorised user wants to enter in house then a message send to owner mobile phone. If the owner identifies that the person entering his house is not an intruder but an unexpected guest of his then, the owner can make arrangements such as opening the door, switching on various appliances inside the house, which are also connected and controlled by the micro-controller in the system to welcome his guest. The same can be done when the user himself enters the room and by virtue of the system he can make arrangements from his doorstep such that as soon as he enters his house he can make himself at full comfort without manually having to switch on the electrical appliances or his favourite T.V. channel for an exe. Thus using the same set of sensors the dual problems of home security and home automation can be solved on a complementary basis.

The existing Infra-Red (IR) or Blue-tooth remote controls present in the market are in general appliance specific and the same cannot be used interchangeably. Electrical appliances connected through Bluetooth making use of Blue-tooth enabled smart phones cannot be managed from a distant location. Thus functions such as being able to turn on an air-conditioner while returning home cannot be done with such systems. In contrast, this work gives a cost effective and simple solution for wireless home automation and home security systems. Many projects had made on IOT but we made face recognition security system. The difficulty faced by current home security/surveillance systems in providing information pertaining to the situation to users while being away from home is tried to overcome in this project. [8]

Objectives of our Project work- The main objective of our project is to make the home more secure and automated by using internet of things technology.

- The design system should make the home secure by face recognition system using at the door.
- The design system should make automatic door close or open and home appliances switch off or ON according to situation.
- The design system should be able owner can talk or see from any place who comes in front of the door.

II. LITERATURE REVIEW

The past decade has seen significant advancement in the field of consumer electronics. Various ‘intelligent’ appliances such as cellular phones, air-conditioners, home security devices, home theatres, etc. are set to realize the concept of a smart home. Busy families and individuals with physical limitation represent an attractive market for home automation and networking [1]. The Home Automation systems has seen a rapid changes due to introduction of various wireless technologies The explosion in the wireless technology has seen the emergence of many standards, especially in the Industrial, Scientific and Medical (ISM) radio band. ZigBee is an IEEE 802.15.4 standard for data communications with business and consumer devices [2]. There are many home automation technologies available in market out of which the popular technologies are X10, Z-Wave, Zigbee, GSM technology, INSTEON, and EnOcean. All



these technologies have its pros and cons. The proposed system is user friendly and easy to use. The system is using Global System for Mobile Communication (GSM) modem to control home appliances via Short Message Service (SMS) [3]. Wireless control is primary concern for everyone. Apart from remote control concern here we also take care of home automation. This paper gives the best solution for electrical power wastage. The home appliances are switched on/off using IR without actually going near to the switch boards or regulators. The water level of the tank can also be monitored and the motor can be controlled through automation [4]. To automate these appliances, we can use the different communication media like Infrared, Bluetooth, Radio frequency, RFID, GSM, DTMF and MATLAB GUI [5].

With the use of computers and electronics technology electrical appliances can be controlled from any part of the world. Consequently, greater amount of energy will be saved and hence the natural resources. This can be achieved by using the mobile phone [6]. Internet of Things (IOT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet. When it comes to our house, this concept can be aptly incorporated to make it smarter, safer and automated [7]. The Internet of Things is connecting everyday objects intelligently to the Internet to enable communication between things and people, and between things themselves. For the Objects to collect and exchange data electronics, software, sensors and network connectivity are embedded into them. This technology has endless possibilities and infinite applications. Everyday devices are made smart and intuitive and by enabling them to share data intelligently they can be used to improve people's lives. IOT has made a huge impact in the way people live, work and communicate [8]. Home automation or Smart Homes can be described as introduction of technology within the home environment to provide convenience, comfort, security and energy efficiency to its occupants adding intelligence to home environment can provide increased quality of life. [9]. The combination of the Internet and emerging technologies such as near field communications, real-time localization, and embedded sensors lets us transform everyday objects into smart objects that can understand and react to their environment. The Internet of Things is partly inspired by the success of RFID technology, which is now widely used for tracking objects, people, and animals. RFID system architecture is marked by a sharp dichotomy of simple RFID tags and an extensive infrastructure of networked RFID readers. This approach optimally supports tracking physical objects within well-defined confines (such as warehouses) but limits the sensing capabilities and deployment flexibility that more challenging application scenarios require [10].

III. METHODOLOGY

In our project home automation and security using IOT, we used raspberry pi 3 which is used as processing unit in this project. In raspberry pi, there is a camera used for face recognition. The specialty of this camera is capturing face of person and comparing with images stored in database. If face of person recognises by raspberry pi then it give yes action otherwise message sends to your mobile phone.

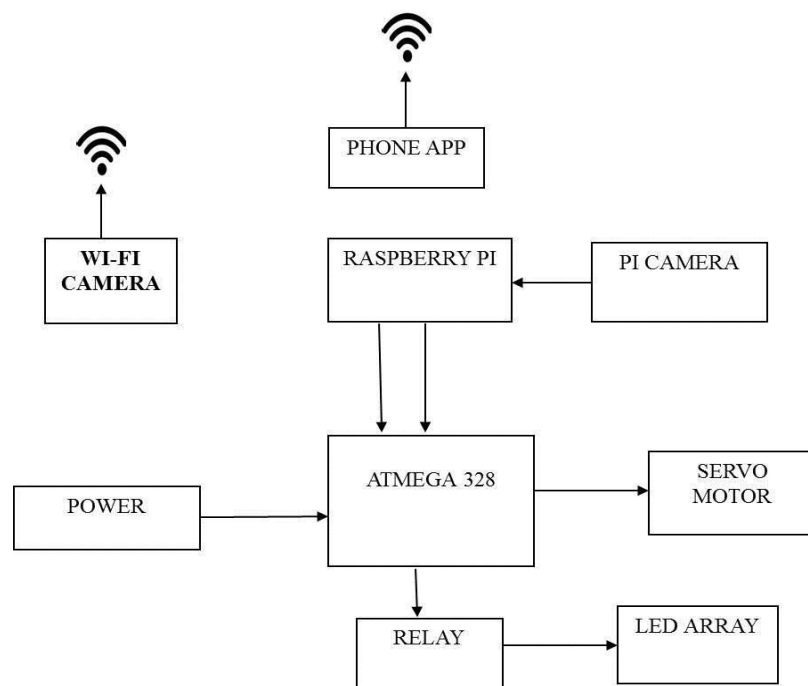


Fig. 1 Block Diagram of home automation and security using IOT.



We also used a Wi-Fi camera for watching action from far distance. We can watch action captured by Wi-Fi camera on mobile phone through V380S application. Servo motor is used for opening/closing gate automatically which is connected through AT mega 328. Relay is used as an automatic switch which is connected with both AT mega 328 and LED array.

IV. WORKING OF THE SYSTEM

A raspberry pi camera is attached on the side of door, if a person comes in front of door, the pi camera captures the person face and comparing with database images. If face of person matched with database images then door of home will open and other home appliances automatically switch ON otherwise a message is send to owner phone "HOME ENTRY DETECTED". A Wi-Fi camera is also attached at side of door. When owner receives message then he can identify that person, that person is authorized/unexpected guest or unauthorized by Wi-Fi camera. Owner can watch which person is come to his house or what action is happening outside the home and owner can also talked with that person by this camera. After that if owners get to know that person is unexpected guest then he can open the door of home by sending only one message *Y#. Home appliances are also automatically switched ON after opening of door.

V. RESULTS AND DISCUSSION

We proposed a new home automation and security system based on internet of things. The experimental results of our project show that when an authorised person will come in front of raspberry pi camera which is attached side of door, it will detect face and start comparing with database images. If face will match with database images then gate will automatically open and if it will not match then raspberry send a message to owner of house that "home entry detected". Then the owner can use VS380 Wi-Fi camera which is attached on side of the door, for watching video outside of home through his mobile and he also can talk with unauthorised person. If owner get to know the person is guest or authorised person then he can open the door home by sending "*y#" message through is phone then gate will open and all home appliances will switch ON.



Fig. 2 Hardware used in project

Face Detection

Python codes were developed for face detection from a given image, from a folder of images and for real time face detection. Detected face from a pi camera in real time is shown in Fig. 3.



Fig. 3 Image capturing

**For Authorized Person**

The result describes as the pi camera is detect the person face with images stored in database then gate will open and home appliances switch ON.

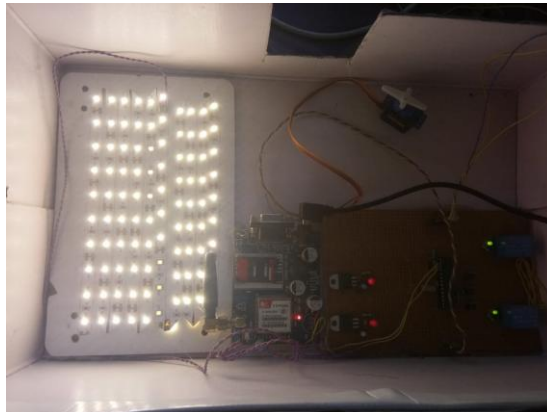


Fig. 4 PI camera detects person face from database

For Unauthorized Person

The result describes that if person face will detect then raspberry pi sends a message to owner “HOME ENTRY DETECTED” and if owner know his person then send “*Y# for opening of door and home appliances switch on otherwise owner send message “*N# for door remain closed.

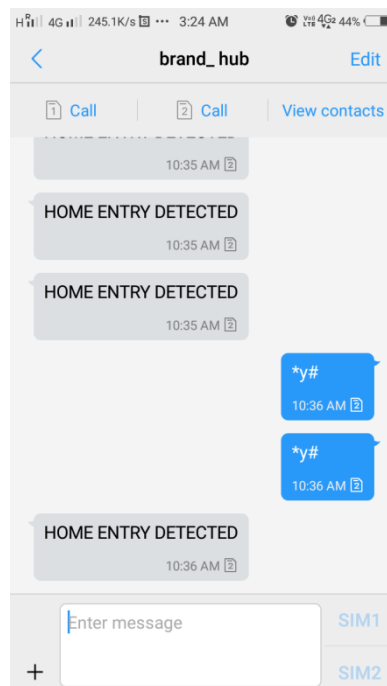


Fig. 5 Owner receives message for unauthorized entry

VI. CONCLUSION

The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet. We have designed and developed a wireless Home Security System through Internet of Things module and Raspberry Pi version 3. It is an active system which will show whether the person is authorized for home or unauthorized. Owner receives messages for unauthorized entry. It is a friendly user interface system. It is easily installable and can be used anywhere as this is a wireless system. This system is easily operable, low power consumption and low cost. This is developed for remotely controlled and uses the Wi-Fi for transmission of the data's. It is easily installed at any place and can be controlled from any remote area. In addition owner can watch the activity at outside the door from any remote area through Wi-Fi camera.



VII. FUTURE SCOPE

There are some drawbacks of this system which can be further improved. Using GSM module and sending text message may cost charges so an interface can be developed for communication of Arduino with a mobile phone. A GUI can be made which shows a blueprint of the room in which appliances like lights and fans can be controlled by touching them on the screen. A feedback mechanism or a power consumption mechanism can be added which shows the current status of appliances and power consumed by them. Image processing can also be implemented if any person comes in front of pi camera then camera capture the image of person and send it to on owner whatsapp or email. We can implement more sensors (PIR sensor, LPG gas detector sensor) for more automation home

REFERENCES

- [1]. N.Sriskanthan, F. Tan and A. Karande, "Bluetooth based home automation system", Microprocessors and Microsystems, vol. 26, no.6, (2002), pp. 281-289.
- [2]. Dhawan S. Thakur and Aditi Sharma", Voice Recognition Wireless Home Automation System Based On Zigbee "IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) e-ISSN: 2278-2834,p- ISSN: 2278-8735.Volume 6, Issue 1 (May. - Jun. 2013), PP 65-75
- [3]. Shrey Aggarwal, Sunny Verma, International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 , Vol.: 04 Issue: 1, Dec-2017.
- [4]. N. Sriskanthan*, F. Tan, A. Karand "Bluetooth based home automation system" School of Computer Engineering, Nanyang Technological University, Nanyang Avenue, Singapore, Singapore 639798,Received 17 September 2001; revised 8 May 2002; accepted 10 May 2002.
- [5]. Odinya, J. O, Anande, J.T and Kureve, D.T" Design and Implementation of an Arduino based Wireless Home Appliances Control System" Department of Electrical and Electronics Engineering, Federal University of Agriculture, Makurdi, Nigeria. IJARIE-ISSN (O)-2395-4396, Vol-3 Issue-4 2017
- [6]. Dhejesh S M Nandha, K,G Arun Kumar, P. Mahan Raj," IOT Based Home Automation and Security System using Raspberry PI" International Journal of Advanced Research in Basic Engineering Sciences and Technology (IARBEST) , ISSN : 2395-695X ,Vol.3, Special Issue.24, March 2017
- [7]. Priya Narke1, Supriya Barne2, Akshay Karne3, Pranav Jadhav4 " Iot Based Smart Security And Home Automation"International Journal of Advanced Research in Basic engineering science and Technology (IARBEST), ISSN: 2319-8354 Vol -7, special Issue 1January 2017.
- [8]. Ravi Kishore Kodali, Vishal Jain, Suvadeep Bose and Lakshmi Boppana" IOT Based Smart Security and Home Automation System", International Conference on Computing, Communication and Automation (ICCA2016)
- [9]. C. Floerkemeier et al., Proc. 1st Int'l Conf. Internet of Things (IOT 08), Springer, 2008; www.springer.com/ computer/hardware/book/978-3-540-78730-3.
- [10]. S.D.T. Kelly, N.K. Suryadevara, S.C. Mukhopadhyay, "Towards the Implementation of IOT for Environmental Condition Monitoring in Homes", IEEE, Vol. 13, pp. 3846-3853, 2013.