

IoT BASED MOTION DETECTOR USING NODE MCU AND BLYNK APP

S RAMAKRISHNAN[#] & S SUMA^{*}

[#]Sr. Asst. Prof., Dept of EEE, New Horizon College of Engg., Bangalore

^{*}Asst. Prof., Dept of CSE, Vemana Institute of Technology, Bangalore

Abstract: This paper is about the development of an Internet of Things (IoT) based smart wireless home security system, which sends an alert on intrusion. A PIR sensor is used to detect the motion of any human being in its vicinity. NODE MCU ESP8266 is used to connect the system to internet through WiFi. Whenever a movement is detected by the PIR sensor, a message is sent to a smart phone by the NODE MCU.

Keyword: NODE MCU ESP8266, PIR Sensor, Blynk App, Arduino IDE

I INTRODUCTION

IERC defines IoT as "The Internet of Things allows people and things to be connected Anytime, Anyplace, with Anything and Anyone, ideally using Any path/network and Any service." [1]. Number of connected IoT devices is increasing exponentially worldwide and it is expected to reach 75 billion by 2025 [2]. IoT has wide spread application in many fields of engineering in providing real time data and real time decisions and controlling the connected devices seamlessly in real time. IoT (Internet of Things) is the environment in which physical items interact with each other and user-to-computer communications, machine-to-machine communications are enabled and this communication is extended to "things" [3].

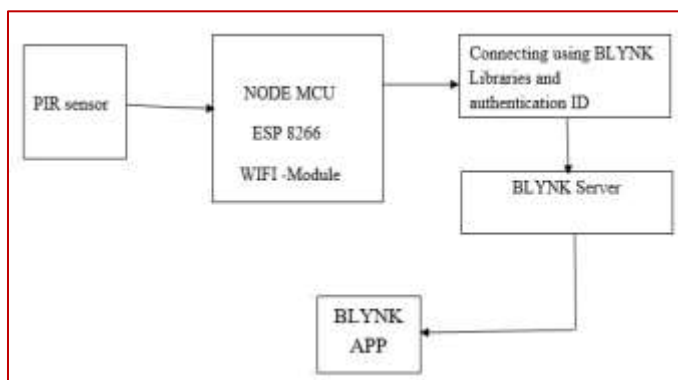


Fig 1: Block Diagram

Security is one of the useful applications of IoT. Intrusion detection is one of the challenges in home security. The common type of security system uses CCTV cameras and image processing and we are using it to create an inexpensive security system for homes as well as industrial use. The IoT network consists of embedded electronics, sensors and software from their home, they want to be assured that their home is protected by intruders and thieves while they are gone. This is why the proposed system keeps the owner informed in the real time about the security status of their home. With the tendency of house safety protection, the detecting

accuracy and privacy of intrusion detection system, which detects the human motion in indoor environment, has become a continuing concern.

II LITERATURE SURVEY

One is using web cameras such that whenever there is any motion detected by the camera, it sounds an alarm and sends a mail to the owner. This method of detecting intrusion is quite good, albeit somewhat expensive due to the cost of the cameras involved in the process. The cameras need to be of good quality which means it should have a wide range and the picture quality should be high enough to detect movement. Also if you go for movable cameras such as dome cameras they will cost even more than the fixed ones. SMS based system using GSM to use internet services to send messages or alert to the house owner instead of the conventional SMS [7]. Previously home security systems meant having an alarm that would go off when somebody would break in but a smart secure home can do much more than that. Therefore the main objective of our work is to design a system which can alert the owner and others of an intruder break-in by sending a notification to their smart phones.

III WORKING OF THE PASSIVE INFRARED (PIR) MOTION SENSOR

The module features adjustable sensitivity that allows for a motion detection range from 3 meters to 7 meters. The module also includes time delay adjustments and trigger selection that allow for fine tuning within your application. The device will detect motion inside a 110 degree cone with a range of 3 to 7 meters.



Fig 2. PIR Motion Sensor

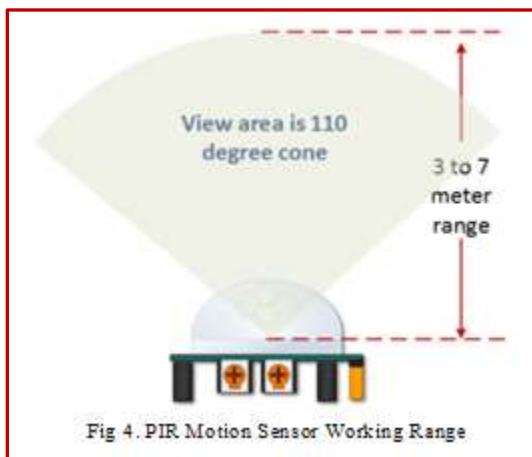


Fig 4. PIR Motion Sensor Working Range

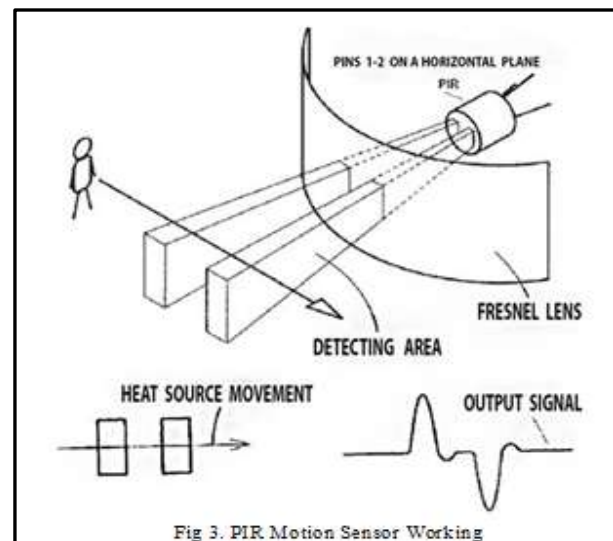


Fig 3. PIR Motion Sensor Working

Human Beings emits thermal energy of wavelength around 9-10 micro-meter every day. Pyroelectric or Passive Infrared Sensor (PIR) is an electronic device which is designed to detect this IR wavelength when a human being is in its proximity. To have a wide range for detection a simple lens is used. Sensors may also be calibrated in such a way so as to ignore domestic pets by setting a higher sensitivity threshold, or by ensuring that the floor of the room remains out of focus.

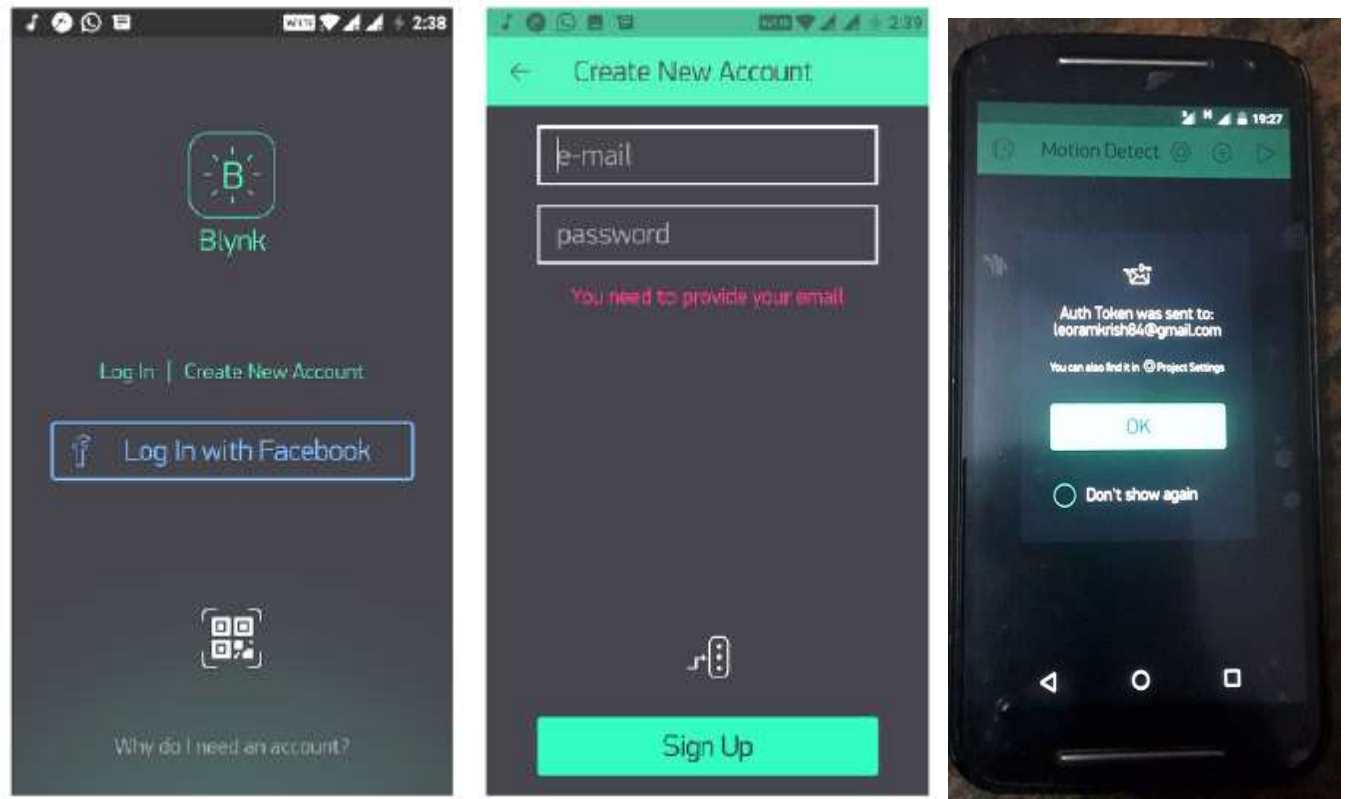


FIG 5.configuration of Blynk App

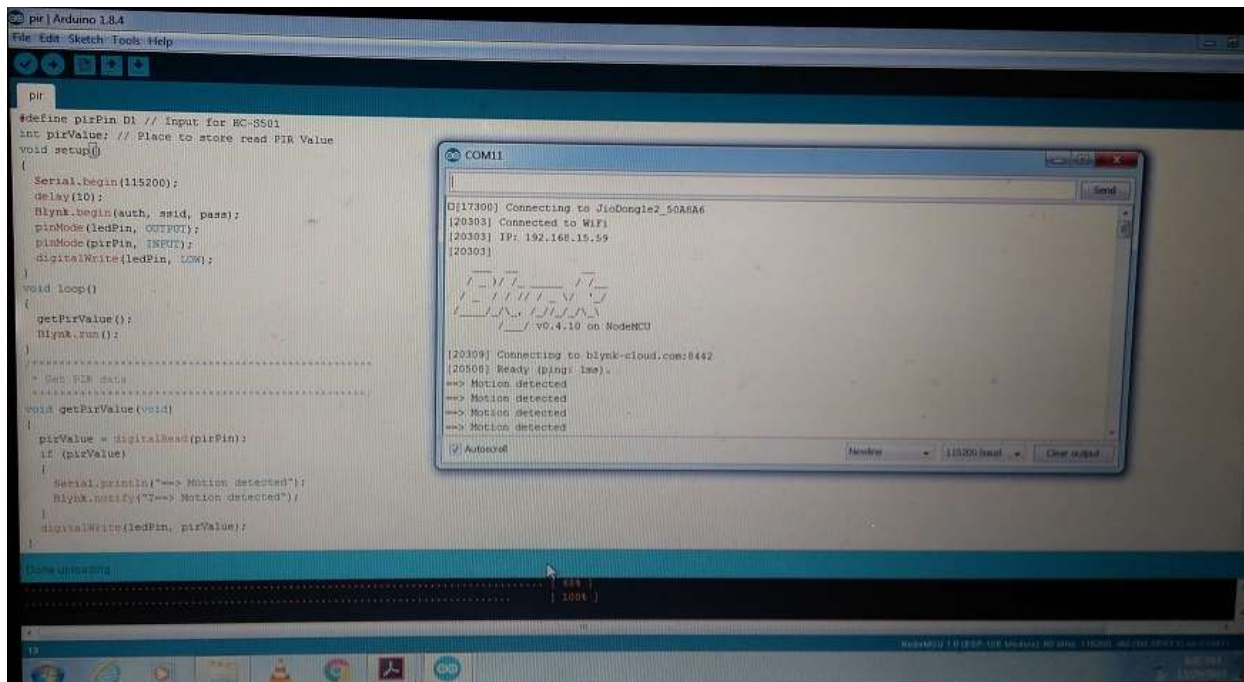


FIG 6 .Coding of Blynk App

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 their presence becomes the input trigger for the ESP 8266. The owner, who may or may not be present in that building, will be receiving a voice call on his mobile phone. Another important component of the project is the connectivity between the ESP8266 (WiFi module) and the Blynk server. The system successfully connected to the Blynk server using the authentication token and the Blynk libraries. As a result, we were able to get the notification on our smart phones as soon as there was any change in the status of the pir sensor. It was also observed that the Blynk app worked smoothly and carried out all communication between the hardware and the app very accurately.[4]

IV CONCLUSION

The sensors placed on the door inform the home owner as soon as the door is opened by sending a Push notification. The user will get this notification irrespective of whether the phone is locked or unlocked or even if any other app is opened at the moment. This was the main objective of the project. This setup can also be used in commercial offices where some areas are restricted for certain personnel, such a system will immediately inform the administrator of any unauthorized personnel trying to access such an area. The developed system can also be used to in industrial and commercial applications such as offices, warehouses and other areas where some areas are reserved for authorized personnel only or other places where safety and precautions are of primary concerns such as internet server room of a big MNC from where corporate data can be stolen. The system can also be easily upgraded to add extra safety features such as cameras for increased safety. The system can also further be developed by adding an RFID scanner so that the authorized users need only carry a RFID or NFC tag with them on their person. The RFID scanner will work by scanning the tag wirelessly and if the user is authorized to enter, the alarm system will be disabled for some time so that the user can enter.

V REFERENCES

- [1] P. Guillemin and P. Friess, "Internet of things strategic research roadmap," The Cluster of European Research Projects, Tech. Rep., September 2009, http://www.internet-of-things-research.eu/pdf/IoT_Cluster_Strategic_Research_Agenda_2009.pdf
- [2] <https://www.statista.com/statistics/471264/iot-number-of-connected-devices-worldwide/>
- [3] Vishwajeet Hari Bhide, Dr.Sanjeev Wagh," i-Learning IoT: An Intelligent Self Learning System for Home Automation Using IoT", International Conference on Communication and Signal Processing,, pp. 1763-1767, 2015
- [4] Anitha A, Kalra S and Shrivastav 2016 A Cyber defence using artificial home automation system using IoT International Journal of Pharmacy and Technology 25358-64.
- [5] Lee C T, Shen T C, Lee W D and Weng K W 2016 A novel electronic lock using optical Morse code based on the Internet of Things Proceedings of the IEEE International Conference on Advanced Materials for Science and Engineering eds. Meen, Prior & Lam.
- [6] Yue Jin, Zengshan Tian, Mu Zhou, Senior Member, IEEE, Ze Li, Zhenyuan Zhang A Whole-Home Level Intrusion Detection System using WiFi-enabled IoT.
- [7] Jayashri B and Arvind S 2013 Design and Implementation of Security for Smart Home based on GSM technology International Journal of Smart Home 7 201-08
- [8] R. Teymourzadeh, Salah Addin Ahmed, Kok Wai Chan and Mok Vee Hoong, "Smart GSM based Home Automation System," Systems, Process & Control (ICSPC), 2013 IEEE Conference on, Kuala Lumpur, 2013, pp. 306-309.
- [9] B. R. Pavithra, D., "Iot based monitoring and control system for home automation," pp. 169 – 173, April 2015.
- [10] Home automation," pp. 169 – 173, April 2015.
- [11] VinaySagar K and Kusuma S, Home Automation Using Internet of Things, International Research Journal of Engineering and Technology, Volume 2, Issue 3 on pp. 1965 1970, June 2015.
- [12] Yong Tae Park, Pranesh Sthapit, Jae-Young Pyun, "Smart Digital Door Lock for the Home Automation", IEEE, pp. 1-6, TENCON 2009.
- [13] Ravi Kishore Kodali, Vishal Jain, Suvadeep Bose and Lakshmi Boppana. "IoT Based Smart Security and Home Automation System",pp. 1286-1289, 2016.
- [14] Kyoung Nam Hal , Kyung Chang Lee², Suk Lee³ Department of Mechanical and Intelligent Systems Engineering, Pusan National University, Busan, Korea "Development of PIR sensor based indoor location detection system for smart home".
- [15] Syafa'ah, L., Minarno, A. E., Sumadi, F. D. S., & Rahayu, D. A. P. (2019). ESP 8266 For Control And Monitoring In Smart Home Application. 2019 International Conference on Computer Science, Information Technology, and Electrical Engineering (ICOMITEE). doi:10.1109/icomitee.2019.8921287 .
- [16] Kodali, R. K., & Mahesh, K. S. (2017, September). Low cost implementation of smart home automation. In Advances in Computing, Communications and Informatics (ICACCI), 2017 International Conference on (pp. 461-466). IEEE