International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 03 | Mar 2020 www.irjet.net p-ISSN: 2395-0072

Smart Classroom Automation based on IoT

Vishal Kolambkar [1], Tejas Patil [2], Sagar Anute [3], Prof. Rasika Shintre [4]

[1,2,3]Student, Computer Engineering, SIGCE, Navi Mumbai, Maharashtra, India
[4]Asst. Professor, Computer Engineering, Smt. Indira Gandhi College of Engineering, Navi Mumbai, Maharashtra, India

---

Abstract - *The internet has become a daily necessity to utmost of the effective participants in which we interact and communicate among ourselves by switching data and information sensed about the environment and atmosphere. From this IoT they relate autonomously to the real-world events and offer us with services with or without direct human interference. Automation of the surrounding environment of a modern human being allows increasing his work efficiency and comfort. An automation system is a precisely planned change in a physical or administrative task utilizing a new process, method, or machine that increases productivity, quality, and profit while providing methodological control and analysis. There has been a significant development in the area of an individual's routine tasks and those can be automated. Automation gives an individual the ability to remotely or automatically control things around the home using the mobile application.*

Key Words: **energy efficient environmental conditions, automated applications, web server logic design, security system, controls sensors**

1. INTRODUCTION

As we enter the 21st century, the interaction between humans and computer is breaking the old barriers and entering a new realm. Today's homes require sophistication control in its different gadgets which are basically electronic appliances. This has revolutionized the area of home automation with respect to an increased level of affordability and simplicity through the integration of home appliances with smart phone and tablet connectivity. Smart phones are already feature-perfect and can be made to communicate to any other devices in an ad hoc network with a connectivity options like Bluetooth and WiFi. In the highly technology driven world of today's computer and cell phones have become a part of our lifestyles. Computers are no longer tool to manage data and neither cell phone is just communication tool.

Now days Home automation has become important issue. Many types of solutions were developed and implemented. The wireless communication in mobile network has proved to be the best solution among all and has become a fast-growing business. With the recent development in the mobile computing devices and the mobile networks new and better solution can be developed to make home automation more convenient and accessible for 24x7 from anywhere and anytime.

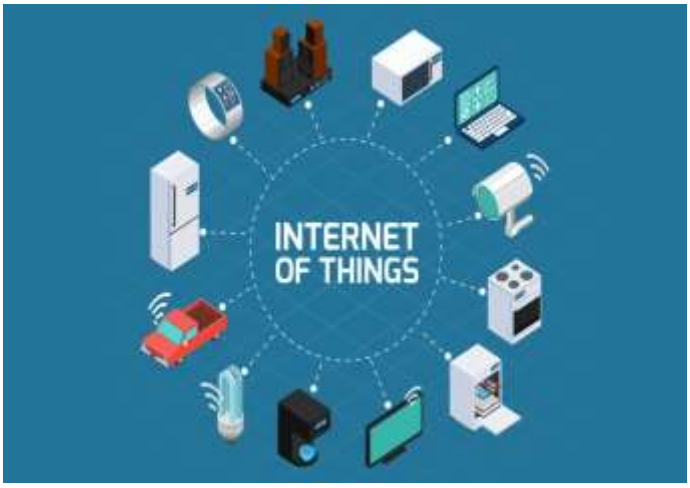

Fig -1: Internet of things

The Internet of Things (IoT) can be defined as a network of physical objects or people called "things" that are embedded with software, electronics, network, and sensors which allows these objects to collect and exchange data.

The goal of IoT is to extend to internet connectivity from standard devices like computer, mobile, tablet to relatively dumb devices like a toaster. IoT makes virtually everything "smart," by improving aspects of our life with the power of data collection, AI algorithm, and networks. The thing in IoT can also be a person with a diabetes monitor implant, an animal with tracking devices, etc. Connecting up all these different objects and adding sensors to them adds a level of digital intelligence to devices that would be otherwise dumb, enabling them to communicate real-time data without involving a human being. The Internet of Things is making the fabric of the world around us smarter and more responsive, merging the digital and physical universes.

2. LITERATURE SURVEY

The home automation system has become more popular in market. IoT makes it efficient and accessible to everywhere. As per Md. Rakib Ahsan, Zarif, Shamsul and Aminul in [1] 2019 home automation system controls the all kinds of devices connected to the single controlling device. It utilizes in every field such as energy consumption, manipulation improving the quality and efficiency. They used IoT technology where the switches are connected to microcontroller and then handled through the network.

In [2], research paper of Ravi Kishore Kodali ; Vishal Jain ; Suvadeep Bose ; Lakshmi Boppana has posted **IoT based smart security and home automation system** on 2016 saying his IoT project focuses on building a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and raises an alarm optionally. Besides, the same can also be utilized for home automation by making use of the same set of sensors. The leverage obtained by preferring this system over the similar kinds of existing systems is that the alerts and the status sent by the Wi-Fi connected microcontroller managed system can be received by the user on his phone from any distance irrespective of whether his mobile phone is connected to the internet. The microcontroller used in the current prototype is the TI-CC3200 Launchpad board which comes with an embedded micro-controller and an onboard Wi-Fi shield making use of which all the electrical appliances inside the home can be controlled and managed.

In [3], Mile Mrinal ; Lakade Priyanka ; Mashayak Saniya ; Katkar Poonam ; A.B. Gavali [3] has posted Smart home — Automation and security system based on sensing mechanism on 23 November 2017 saying home automation system technology is unique from other systems which give ability to the user to control the system from any location around the world through an internet connection. The existing system describes implementation of a security system that uses Android mobile devices with the use of Blue tooth as a wireless connection protocol. These systems allow users to lock and unlock a door, sense the temperature and humidity, controlling light switches from a remote location. The new generation is based on smart humans using smart technology. A smart technology makes human life easy and updated. The proposed system is designed for home automation with some increased functionalities and using Wi-Fi as an Internet connection protocol. The increased functionalities include Alarm based smart lock, controlling household appliances from remote Location, Mosquito sensing, Smart water tank. By making use of the proposed system diseases caused due to mosquitoes can be prevented. Also, this system helps in reducing the human efforts as it is automated.

In [4], R. Ani ; S. Krishna ; H. Akhil; U Arun has posted An Approach Towards Building an IoT Based Smart Classroom on 03 December 2018 saying A camera is used for recognizing the presence of people in the classroom and for analysing their seating position. Here a classroom is divided into two segments. Whenever a human presence is detected in a particular segment then the light and fan will be switched ON. The reasonable objective of this paper is how to build up a smart classroom where we can automate the electrical equipment with a focus towards energy conservation.

3. PROBLEM STATEMENT

Home automation systems are quickly emerging and becoming popular nowadays in the world. Which help in keeping electricity usage at minimal but other than minimizing electricity it can also perform other tasks. Nowadays motion sensor is only used to control the switches and door sensor used to monitor the door activity. Since only door sensor was able to track the activities for security purpose. But motion sensor can also work for security purpose for detecting motion in environment and sending notification to authorities.

4. PROPOSED SYSTEM

As for this project, the proposed solution is to develop an economical smart home system without increasing the complexity and using off the shelf components to reduce the cost and open source software to get around licensing requirements of software. The sensors will be controlled with the help of Arduino, and the website and GUI part has been developed on Visual Studio (2013), both of which are FOSS (Free Open Source Software). Arduino is an open-source prototyping platform that provides easy-to-use hardware and programming environments. It is relatively inexpensive compared to other microcontroller-based platforms like Beagle Bone. Thus, creating an economic and energy efficient system development.

The First objective is to automatically control the fan, lights and projector. The idea is to plant several sensors around the classroom and give a calculated feedback to the response these sensors receive. An example would be having PIR sensors around the class room that would detect the presence of human and turns the fan ON or OFF.

The Second objective is to detect Class Room Temperature, Humidity and Door Open/Close with IR Sensor and create one data package and sent to server.

The Third Objectives is to detect abnormality motion on Night Time and Alert the concerned person.

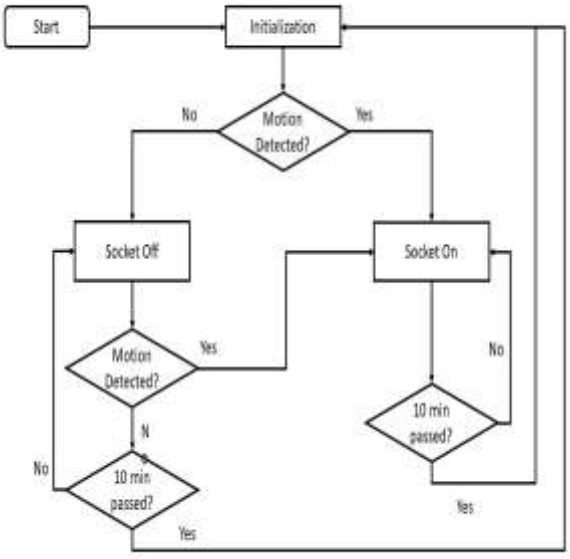

Fig -2: Working of sensors

4.1 Working:

- We are using Arduino Uno as a microcontroller, this microcontroller extract data from Motion, Temperature, Humidity and Door sensor
- Controller creates a packet with this data and send to the server
- Server receive this data of Motion, temperature, Humidity and Door sensor and update into data base
- Now data base compares the motion timing table, if motion detected at Non official time its sends Alert in the form SMS on concert persons mobile
- At same time PIR Motion sensor monitors surrounding motions and based on it ON/OFF the Applications like Bulb and Fan

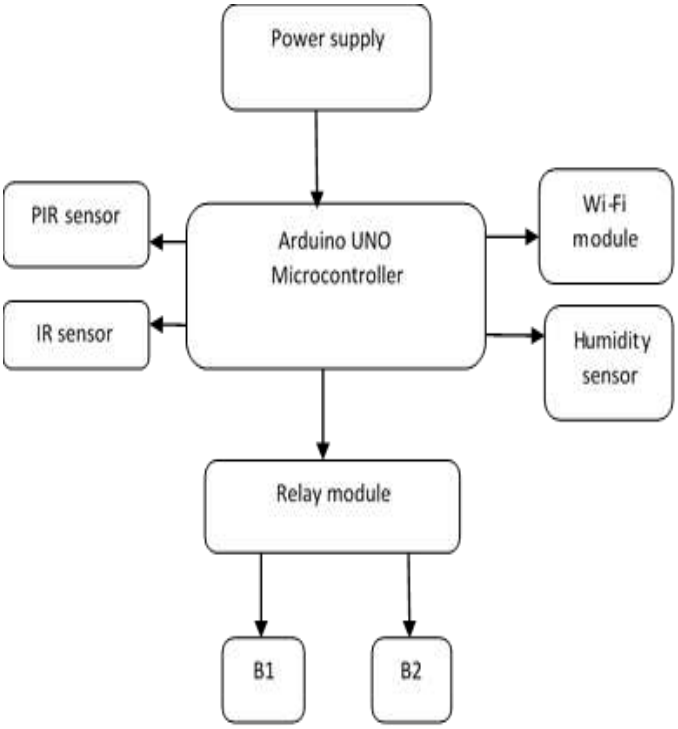

Fig. 3: Hardware block diagram

Wifi module further expands the system to connect the software part of this project. This is low cost project in which we are going to use freeware application for User Interface. This project monitors the live activities so that server is needed to access those activities from anywhere. Alert system will be activated in only Non-working hours because we are specially implementing for classroom and offices so that alert buzzer will not disturb security every minute. If authorized security is not online available then the alert will be sent to his/her phone number from server.

4.2 Hardware Required

- Adruino uno
- PIR motion sensor
- IR sensor
- Temp/Humidity sensor
- Wi-Fi module
- Relay module
- Power junction
- Adapter

Fig -4: Flowchart

This flowchart shows the working of our proposed project as we can see three types of sensors are connected and each of them having their separate operations at their specification level. Log is generated for sensors activity to monitor or track any malicious activity.

5. CONCLUSION

The smart classroom concept described from a completely new perspective i.e. real-time feedback on activity around environment using Internet of Things (IoT). The main contribution of this proposed system is an innovative approach to a smart classroom environment and multidisciplinary research subject. This perspective demands an understanding of problem statement so as to define parameters with further aim to create a better prologue for the system implementation. Our Proposed system mainly focuses on use of the monitoring and sensing technology to save the energy and detect the thief in an intelligent environment. The information collected can provide insight into classroom activity level by correlating the movement's existence and intensity.

ACKNOWLEDGEMENT

The success and final outcome of this research required a lot of guidance and assistance and we are extremely privileged to have got this all. All that we have done is only due to such supervision and assistance and we would not forget to thank them.

We respect and thank Prof. Rasika Shintre, for providing us insight and expertise that greatly assisted the research. We are extremely thankful to her for providing such a nice support and guidance.

REFERENCES

[1] Implementation of IOT based Smart Security and Home Automation System by Md. Rakib Ahsan , Sheikh Zarif Ahmad , Mohammad Shamsul Arefin , Md.Aminul Bari in IJERT Volume 08, Issue 06 (June 2019) https://www.ijert.org/implementation-of-iot-based-smart-security-and-home-automation-system

[2] IoT based smart security and home automation system by Ravi Kishore Kodali ; Vishal Jain ; Suvadeep Bose ; Lakshmi Boppana in 2016 International Conference on Computing, Communication and Automation (ICCCA) https://www.researchgate.net/publication/312559421_IoT_based_smart_security_and_home_automation_system

[3] Smart home — Automation and security system based on sensing mechanism by Mile Mrinal, L. Priyanka, Mashayak Saniya, Katkar Poonam, A.B. Gavali in Second International Conference on Electrical, Computer and Communication Technologies (ICECCT) 2017

[4] An Approach Towards Building an IoT Based Smart Classroom by R. Ani ; S. Krishna ; H. Akhil ; U Arun in 2018 International Conference on Advances in Computing, Communications and Informatics (ICACCI)

[5] Karthik Krishnamurthi, S. Irudaya Mary, B. N. Sumalatha, Adler Pereira, "Fringerprint based attendance system", International Journal of Advanced Research in Computer andCommunication Engineering, Vol. 4, Issue 3, March 2015

[6] Vishvendra Pal Singh Nagar," GSM led dotMatrix message display, International journal of advance research in science and engineering", Vol. 04, issue 8 August 2015 International Journal of Trend in Scientific Research and Development (IJTSRD) ISSN: 2456-6470 @ IJTSRD | Available Online @ www.ijtsrd.com | Volume – 2 | Issue – 2 | Jan-Feb 2018 Page: 313

[7] Vinay sagar K N,Kusuma S M, "Home automation using internet of things, International Research Journal of Engineering and Technology", in International Research Journal For Engineering and Technology Volume: 02 Issue: 03 | June-2015

[8] Md. Nahal Islam, Farah Tabassum, Gourab Kumar Sarker, Dhrubashish Sen, "Intelligent Classroom Management System" in BRAC University, December 2013

[9] Harsh Mehta, Kunal Jadhav, Avinash Mishra," Anushree Deshmukh, Iot Based Home Automation System Using Arduino Board", International Research Journal of Engineering and Technology Volume: 04 Issue: 01 | Jan -2017

[10] Song,shenghui, chan wai kit, chun man lung, "Android based Smart curtain system", International Journal of Latest Trends in Engineering and Technology Special Issue SACAIM 2016, pp. 533-536 e-ISSN:2278-621X

BIOGRAPHIES

Vishal Kolambkar is pursuing Bachelor degree (B.E.) in Computer Engineering from Smt. Indira Gandhi College of Engineering, Navi Mumbai.

Tejas Patil is pursuing Bachelor degree (B.E.) in Computer Engineering from Smt. Indira Gandhi College of Engineering, Navi Mumbai.

Sagar Anute is pursuing Bachelor degree (B.E.) in Computer Engineering from Smt. Indira Gandhi College of Engineering, Navi Mumbai.

Prof. Rasika Shintre, Obtained the Bachelor degree (B.E. Computer) in the year 2011 from Ramrao Adik Institute of Technology (RAIT), Nerul, and Master degree (M.E. Computer) from Bharati Vidyapeeth College of Engineering, Navi Mumbai. She is Asst. Professor in Smt. Indira Gandhi College of Engineering of Mumbai university and having about 8 yrs. of experience. Her area of interest includes Data mining & information retrieval.