

HOME AUTOMATION USING HAND GESTURE

KONDASANI PRATHAP REDDY

Department of Computer Science and Engineering, Koneru Lakshmaiah Educational Foundation, Vaddeswaram,
AP, India.

MADALA AJITH

Department of Computer Science and Engineering, Koneru Lakshmaiah Educational Foundation, Vaddeswaram,
AP, India.

RUPAVATH SOWMYA

Department of Computer Science and Engineering, Koneru Lakshmaiah Educational Foundation, Vaddeswaram, AP,
India.

YAKKALA KRISHNA SAI

Department of Computer Science and Engineering, Koneru Lakshmaiah Educational Foundation, Vaddeswaram,
AP, India.

GOGINENI KRISHNA CHAITANYA, Assistant Professor

Department of Computer Science and Engineering, Koneru Lakshmaiah Educational Foundation, Vaddeswaram, AP,
India.

ABSTRACT

Variety of apparatuses have been introduced in a house with the advancement of social economy and fast increment in the requirements of the individuals. There is an issue in the administration and control of these apparatuses in order to meet the solace, wellbeing and security at home. To beat this issue a savvy control-based framework has been proposed. At the point when we talk about Internet of things (IoT), there are enormous quantities of particular gadgets which are associated all through various frameworks. These frameworks give open stage to every single computerized gadget getting to information from such frameworks. Along these lines, it turns out to be very hard to structure such a framework for IoT which can deal with enormous grouping of gadgets and furthermore advancements like connection layer related to it. To interface such a modern system on IoT one have to have focal (server could be made over Wi-Fi organize) which can encourage every single advanced mobile phone, tablets and other computerized gadgets. The ongoing innovation in home robotization gives security, wellbeing and agreeable life at home. That is the reason in the serious condition and quick world, home computerization innovation is required for

each individual. This purposed home mechanization innovation gives savvy observing and control of the home apparatuses just as entryway authorization framework for connection between the guest and home/office proprietor. The control and observing the status (ON/OFF of the machines) have been executed utilizing numerous ways, for example, The Internet, electrical switch, and Graphical User Interface (GUI) interface. The framework has minimal effort plan, easy to understand interface, and simple establishment in home or multi-reason building. Utilizing this innovation, the shopper can decrease the wastage of electrical force by normal checking of home machines or the best possible ON/OFF planning of the gadgets

Keywords: Home automation, gesture, IOT, accelerometer.

1. Introduction:

IoT is the inter connection of the devices or any other embedded system that comprises of sensors, software's, electronics which enables these devices to exchange each other's data. IoT has made a fundamental change in working of all the industries from healthcare to agriculture. In a time span of few years all these industries will be connected to each other. With such inter connections among the industries it will

become more difficult to store data over the internet because of the large amount of data for which new ways of storing and transmitting data has to be encountered. Inter connection among these devices will result in guiding to automation in every field expanding to the concept of smart cities. These devices with the help of existing technologies are capable of collecting the useful data and then exchanging the data with other devices “Home Automation” is an example of such technology existing in the market. According to the survey conducted by Gartner, there will be nearly 20.8 billion devices on the IoT by 2020. Various applications of IoT are as follow: Environmental Monitoring, it generally uses sensors to help in environmental protection like monitoring of water quality, air quality, soil conditions, monitoring the endangered species by following their movements and their habitats. In case of natural disasters like earthquakes and tsunami, early warning systems can be used to reduce or minimize the impact and provide a better aid. Another application of IoT can be infrastructure management, in this rural and urban infrastructure such as railway tracks, bridges can be monitored. This IoT infrastructure can be used to monitor the events that cause the change in the structure that makes it more risky, it can also help in organising the repair activities

at regular intervals. Many other applications of IoT are agriculture, weather predictions can help the farmers to improve and innovate new farming methods and techniques. Energy Management, Medical and healthcare are other few application of IoT.

Home automation is a method to control or monitor devices of your home from remote places by means of a smartphone or computer. Home security through automation is monitoring your house using sensor networks which notifies you every time sensor reads. Home automation not only helps you control the appliances of your home but also helps saving energy too like it helps detecting appliances on standby and turn them off when not in use and thus saves energy. Securing your home has never been much simpler as it is today with automation user can remotely look after their home and the home itself notifies them in case of emergency. Gartner projected that 4.9 billion connected devices will be in use by 2016, which is approximately 30% higher than previous year. These smart devices are useful on their own, their combined power can make a real difference in the lives of people and the world as whole. Consumers worry because of the present state of security of their data. They want proper safety and security of their data from hackers and malicious users on

internet and proper safety of their home family through usage of smart devices IoT gives people the power to remain connected with their home anytime and from anywhere using any service and any network. Security is another application of IoT, it is using pir sensors, temperature sensors, thermal sensors, cameras or gas and smoke sensors for safety and security of your house. IoT is the future of household and is conquering market at good pace. One can always argue about the benefits and harms of it as hackers can always attack as your data is out there open in cloud and on the other hand you are moving towards a digital world.

2. Literature work:

Home automation architecture design with three main components uses arduino mega as centralized controller, an Ethernet shield to create a web server, a sensors network and an android smartphone to communicate and give commands remotely via internet to the microcontroller to control the appliances. It also notifies user by sending an email to the registered email id of the user in case the sensors read anything user can control lights fans and air conditioner too and check the appliances if it is already on and can switch then off or on from anywhere. It gives user the comfort and power to monitor their home in their absence.[4] In Kumar's proposed[7] system

an Android application is designed for the sole purpose of providing user the convenience to controlling and monitoring. Any device with android operating system can be used. The application also has voice command functionality and timers can also be set to turn the appliances on and off.

Ambient control home automation architecture[5] is also proposed which controls the ambient of the room according to the temperature of the room it uses lm35 temperature sensor along with an amplifier and relays and stepper motors to control the speed of the fans and runs according to the temperature of the room. The sensor reads the data and sends it to the controller the data is analysed and further instruction is sent to turn the relays close or open accordingly. It is a smart way of home automation provides convenient to the user however lights also plays an important role in the ambient of the room future work can be an improved architecture to control the intensity of the lights too.

Hand gesture controlled electronic devices are gaining more popularity these days it is fine piece of technology, a hand gesture based infrared device controlled system is proposed which mainly uses three main components an accelerometer, and ir emitter and a microcontroller the gesture is detected using the accelerometer and Ir emitter sends the command to the receiver

in the appliance like television or air conditioner [6] and task is performed accordingly Bluetooth technology is used for the devices which do not use infrared gesture is detected and command is send to device through microcontroller via Bluetooth.[6] Proposed system of control networks using hand gestures. The user uses a glove to make hand gestures to control the system, although it seem a bit futuristic system but it too have a disadvantages of inaccurate gesture making like if the device does not recognize the accurate gesture and detect something else and perform wrong actions[4].

3. Proposed work

Home automation as the term indicates is the automation of home using the network of sensors and other input and output devices like buzzers and relays for getting control on the appliances and lights in the house. Security has been evolved a lot in time and will grow and evolve in coming time. Home security is an extension of home automation. New concepts of home security in automation provides the comfort and convenience to the occupants and on the same hand gives them a safe environment i.e. safety from the intruders in their absence. This thesis focuses on the concept of providing the home security when the user is away from home. The proposed system uses internet and network

of sensors to detect intruder break in, fire and gas leaks to alert user when from home. The system proposed here uses an ATMEGA328P based microcontroller and an Ethernet shield to connect the board to the internet and uses HC-SR501 Pir sensor for motion detection, MQ-2 gas sensor, TMP36 temperature sensor and a buzzer. Sensors connected to the microcontroller get readings from the house and accordingly send sensor data to the microcontroller the controller then responds according to the situation and notifies user on the phone via email and buzzer will alarm the neighbours. The whole purpose of the system is to notify the user in case of intruder break in, fire or gas leaks in the house if the owner of the house is not present.

System Design

The proposed model of smart home security system is prepared using low cost hardware so as to make it affordable for tier 2 as well as tier 3 people too. It consists of various sensors like pir motion sensor, temperature sensor and gas sensor it also includes a buzzer to notify people nearby in case of emergency.

The proposed system is controlled by ATMEGA328P microcontroller. The purpose of using this microcontroller is to make the system economical. The

microcontroller collects data from the sensors and makes decision accordingly and if it detects any interruption in the sensors or any suspicious data it sends immediate notification to the home owner. If the temperature is risen above a certain level or the gas sensor goes high it notifies the owner and alarm the buzzer.

Hardware system contains sensors ATMEGA328P microcontroller, Ethernet shield and buzzer. The system design is shown in figure.

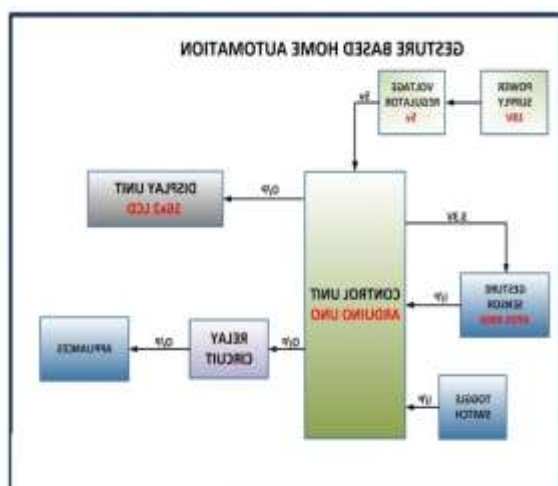


Fig-1: Proposed architecture

The outputs of the temperature and gas sensor are connected to the analog input as these sensors will give some numeric values according to which the decision will be taken by the microcontroller, and the output of the pir sensor is connected to the digital input. The pir sensor will be installed

on the windows and gas and temperature sensors near the kitchen. Sensors will monitor continuously the temperature if the reading exceeds the defined limit it will notify user same is for gas sensor if the value goes high user will be notified.

4. Results and discussions:

In order for the system to work properly the kit must always be connected to the internet, Results are taken both with internet connected to the kit and without the internet cable connected to the kit screenshot of both the results is shown below.

Fig-2: Home automation output

5. Conclusion:

Our work is focused on the home automation architecture proposed as to physically challenged people to control home Electronic devices by hand gestures using accelerometer. The device helps the aged persons too. Consumers are interested to spend money on smart devices for better sleep, higher comfort and improved safety and security. Converting daily life products into connected products and linking them into smart home system is a complex process. However, home users experience must be easy and intuitive. By achieving the ease of use through entire process including purchase, installation configuration,

operation and management of smart home solutions, smart home technology can be made more popular and accessible to everyone. Advantages of the proposed system: 1. It is very cost effective even people with not very high income can afford it. 2. No extra cost is included as it sends notifications via internet and nowadays everyone is connected to it.

References:

- [1] 2013_home_automation_bluetooth. Javale, Deepali. 2013, International Journal of Electronics Communication and Computer Technology., p. 4.
- [2] 2013_Home_Security_GSM. Shaligram, Jayashri bangali and Arvind. 2013, International journal for smart home, p. 8.
- [3] 2014_home_security_wificamera_gsm. Reddy, Theja Vardhan Reddy and Dr. K. Sreenivasa. 2014, International journal of Advanced Research, p. 12.s
- [4] Ubiquitous Smart Home System Using Android. Kumar, Shiu. 2014, International Journal of Computer Networks & Communications, vol. 6(1) pp. 33-43.
- [5] Temperature Based automatic power controller for electrical devices. Alam, Md. Murshadul Hoque and Shariful. 2014, International Journal of Advanced Science and Technology, vol. 63 pp. 1-8.
- [6] hand gesture based home automation. Bharambhe, Apoorva. 2015, International Journal of Advanced Research in Computer Science and Software Engineering , vol. 5 issue 2.
- [7] Exploiting bluetooth on android mobile devices for home security applications. Reddy, Kakatam Madhan Rayapa. 2015, International Journal of VLSI Design and Communication Systems, vol 3. issue 10, p 1471-1475.
- [8] Home security system using gsm and microcontroller. Hassan, Raqib ul. 2015, open journal of safety science and security, vol. 5. p. 55-62.
- [9] <http://electronics-project-automation-system>.
- [10] electronicsforu.com/electronics-projects/voice-controlles-home-automationsystem.
- [11] searchmobilecomputing.techtarget.com/definition/GSM.
- [12] en.wikipedia.org/wiki/GSM.
- [13] A ubiquitous smart home for elderly. Yang, M. W. Raad & L. T. s.l. : Springer, 2008, .
- [14] <https://www.electronicshouse.com/smart->

home/10-features-to-look-for-in-ahome-automation-system

[15] <http://www.afcdud.com/fr/smart-city/422-how-the-history-of-smart-homes.html>



Rupavath Sowmya is pursuing his bachelor's degree with Department of Computer Science and Engineering, Koneru Lakshmaiah Educational Foundation, Vaddeswaram, AP, India. His research interests include Internet of Things.



Kondasani Prathap Reddy is pursuing his bachelor's degree with Department of Computer Science and Engineering, Koneru Lakshmaiah Educational Foundation, Vaddeswaram, AP, India. His research interests include Internet of Things.



Madala Ajith is pursuing his bachelor's degree with Department of Computer Science and Engineering, Koneru Lakshmaiah Educational Foundation, Vaddeswaram, AP, India. His research interests include Internet of Things.



Yakkala Krishna Sai is pursuing his bachelor's degree with Department of Computer Science and Engineering, Koneru Lakshmaiah Educational Foundation, Vaddeswaram, AP, India. His research interests include Internet of Things.