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HOME AUTOMATION FOR PARALYZED PERSONS

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ABSTRACT

The development in home automation is moving forward towards the future in creating the ideal smart homes environment. Optionally, home automation system design also been developing for certain situation which for those who need a special attention such as old age person, sick patients, and handicapped person. A brain–computer interface (BCI), often called a mind-machine interface (MMI), or sometimes called a brain–machine interface (BMI), it is a direct communication pathway between the brain and an external device. A brain–computer interface (BCI) is a device that enables severely disabled people to communicate and interact with their environments using their brain waves. Most research investigating BCI in humans has used scalp-recorded electroencephalography or intracranial electrocorticography. The use of brain signals obtained directly from stereotactic depth electrodes to control a BCI has not previously been explored. In this paper, we present a smart home automation system using brain–computer interface. The scope of this research work will include the control and monitoring system for home appliances from Graphical User Interface (GUI) using brain–computer interface that use an input source and being control wirelessly. The research methodology involved is application of knowledge in the field of radio frequency communication, microcontroller and computer programming. This paper deals with discussion of different intelligent home automation systems and technologies from a various features standpoint. The effort targeted on the home automation concept of where the controlling and monitoring operations are expediting through smart devices.

Keywords: Home automation, radio frequency and Electrical loads

1. INTRODUCTION

Home automation focuses on making it possible for older adults and people with disabilities to remain at home, safe and comfortable. Home automation is becoming a viable option for older adults and people with disabilities who would prefer to stay in the comfort of their homes. Most of the people choose an easy way to reduce the time and effort. Automating the home is the easiest method to reduce the time and effort of the peoples. This system uses voice commands to operate the electrical home appliances. An android application is used to capture the voice commands using Google voice assistant. The system uses bluetooth module for transmitting data for controlling the function of electrical loads. The Bluetooth can receive input signal from a device which have Bluetooth compatibility such as smartphone. The smart home automation is most beneficial for handicapped or aged people. The system solves the problem of switching on/off electrical appliances because when user just have to give voice command to control the appliance or electrical loads. The system is designed in such a way user can control all appliances at once or can control each separately. The system works by interfacing on/off switches of electrical appliance or loads by using mechanical relay or solid state relay, after connecting relays in system the electrical switch works as two-way switch. The voice command is sent by using a software designed for controlling the system, a built in microphone and voice recognition system implemented in device. A micro-controller (Arduino Uno) is implemented in system, the micro controller receives input signal from user device and send signal to respective relay for turning on/off

electrical appliances connected with system such as bulbs, fan, air conditioner unit etc. It helps those people who are sick, bedridden, physically disabled or elderly to easily operate the home appliances. It will be an easiest method for them to turn on/off the home appliances from where they are. Most people find it difficult and lazy to walk near the switch, to turn on light, fan or any other home appliances. With voice commands it is easy for the users, even the blinds, to operate the home appliances from the android phone. It is an easy, cheap and efficient method which will attract the customer's attention. This product can be made available in the market and the installation is very simple, even the customers can install it by themselves.

2. LITERATURE REVIEW

2.1 IMPLEMENTATION OF INTERNET OF THINGS FOR HOME AUTOMATION:

Mamata Khatu, Neethu Kaimal, PratikJadhav and Syedali Adnan Rizvi [1] they presented a paper on the implementation of Internet of things for home automation. This paper mainly focused on IoT coverage that connects all the variety of objects like smartphone, tablets, digital cameras and sensors in the internet and thus provides many services and huge amount of data and information. They also focused on Cloud computing, Cloud based platform help to connect the things that surrounds as so that we can easily access anything at any time and in any place. They have illustrated sensing as a service on cloud by using certain application like Augmented Reality, Agriculture, Environment monitoring etc. and finally they have proposed a prototype model for providing sensing as a service on cloud. The society need new and scalable, compatible and secure solutions for both the management of the ever broader complexly networked Internet of Things. Security concern is overcome by this model since we are using Wi-Fi Wireless Equivalent Privacy (WEP) and Wi-Fi Protected Access (WPA) are two most used security accesses used in Wi-Fi

2.2 BLUETOOTH BASED WIRELESS HOME AUTOMATION SYSTEM USING FPGA:

B. Murali Krishna, V. NarasimhaNayak, K. Ravi Kishore Reddy, B. Rakesh, P. ManojKumar and N. Sandhya [2] they presented a paper on the Bluetooth based Wireless Home automation system using FPGA.Theyprimarilyfocused on Bluetooth technology. With the help of the Bluetooth module (HC-05) and Android Phone, they control the home appliances, which all connected to FPGA board. Thus, they have mentioned the advantages of the home automation, which not only reduces the human efforts, but it is also energy efficient and timesaving. Moreover, they have included that it is also help to the handicapped and old aged people to control the home appliance without any difficulties. We need module so that the range will be high as well as it can operate in different frequencies. This drawback is overcome by our model. Wi-Fi based networks work at 2.4, 3.6 and5 GHz. In addition, it can extend up to range100m.

2.3 HAND GESTURE BASED HOME AUTOMATION FOR VISUALLY CHALLENGED:

Smitha M, T. Ayesha Rumana and Sutha P [3] published a paper entitled Hand gesture based Home Automation for Visually Challenged People. They have designed a device for the visually challenged people to help them to operating the home appliances. They have used MEMS (Microelectromechanical Systems) accelerometer which is used to sense the accelerations of a hand in corresponding three perpendicular directions that is (x y z) and thus transmit the signal to wireless protocol using Radio frequency. The gesture templates were stored in a microcontroller at the receiver end. The received gesture and the hand gesture were compared by the templates. If the corresponding gesture were matched with the templates, then accordingly home appliances were controlled. In addition, these devices were help for the old aged person too. Since they have used four types of gesture and stored in the microcontroller and it processed further. However, we need the system to be automated without the use of gesture. We do not need the gesture to be stored in the controller. Nowadays, the application can be used by any means of people by the option "TALKBACK" in the android application AT mega Microcontroller and Android application. In this paper they have describe the design and development of a remote household appliance control system using the ATmega328microcontroller and android mobile through GSM technology. In addition, this appliance remotely using the SMS-based system that satisfying user needs and requirements. Thus, all electrical household appliances can be controlled by sending a text message from an Android mobile. For Controlling, the remote appliance scarried out by sending a SMS message from a mobile phone, which again congestion process and make system, complicated for the disabled persons. Here, we do not carry out this technique, we are using simple open source android application through Wi-Fi we can directly control the entire appliance with a greater extent. Thus, intend to be a reliable method.

2.4 E-MAIL INTERACTIVE HOME AUTOMATIONSYSTEM

Sirisilla Manohar and D. Mahesh Kumar [5] presented a paper on E-mail interactive Homeautomation system. They have enlightened on basic home automation application on the public domain through the subject of E-mail ID. The switching action were done by LED indication. They provide a basic application of home automation using GVT app, which can be easily implemented and used as efficiently. The coding which they provide is generic and flexible in user-friendly manner and can be controlled in any application like power control, surveillance etc easily. In addition, all the results were generated by a series of E-mail sent to the user of G-mail account. For each and every interrupts one email will have generated and will send to the user of the G-mail account, which again a tedious process. We can easily control the appliances instead of going through such process'

2.5 HOME AUTOMATION USING RF MODULE:

The important goal of Home Automation System is to build a home automation system using a RF controlled remote. Now technology is accelerating so homes are also getting smarter. Modern homes are deliberately relocating from current l switches to centralized control system, containing RF controlled switches. Today traditional wall switches situated in various parts of the home makes it laborious t for the end user to go near them to control and operate. Even further it turnsintomore problematic for the old persons or physically handicapped people to do so. Home Automation using remote implements an easier solution with RF technology. In order to accomplish this, a RF remote is combined to the microcontroller on transmitter side that sends ON/OFF signals to the receiver where devices are connected. By operating the stated remote switch on the transmitter, the loads can be turned ON/OFF globally using wireless technology. It has audio output that is from the Android device to the component and it also support for the component serves as one or more Human Interface Devices (HID) to the Android device. This paper depends upon Android and Arduino platform in which both are FOSS (Free Open Source Software). Including motion sensors for safety systems will detect an unauthorized action and it will automatically notice the user through cell phone or the security system.

2.6 CLOUD BASED HOME AUTOMATION SYSTEM:

Home Automation using cloud based system focuses on design and implementation of home gateway to collect data about data from home appliances and then send to the cloud-based data server to get store on Hadoop Distributed File System, it is process using MapReduce and use to implement a monitoring tasks to Remote User Presently Home Automation System is persistently developing its resilience by assimilating the current characteristics which gratify the rising interest of the people. This paper presents the design and development of home automation system that use the cloud computing as service. The current system consists of three important units: the first part is cloud server, handle and controls the data and information of client and users and the status of devices The hardware interface module is the second part which implement the relevant connection to the actuators and sensing devices which give the physical service. Last part is Home Server, which construct the hardware device and gives the user interface. This paper focus to build the web services using cloud which is need for security and storage and availability of the data. The current system is cost efficient, reliable and comfortable which also gives a secured home automation system for entire family. The system is made up of various client modules for made up of various client modules for various platforms.

Cloud server Cloud Server is a central server aims on implementing services to the other sub modules. Central server serves as the data respiratory system and brain It implements three connections to the three sub modules vizhome system, web configuration tool and mobile. The server evaluates the data it takes from the house, send current status to the mobile device and vice versa. A database is managing by the server and it is status gets updated as per the changes done at home end.

Embedded Program for Hardware Circuit Microcontroller.

Internet Client for any desktop or mobile phones.

2.7 RASPBERRY PIE HOME AUTOMATION WITH WIRELESS SENSORS USING SMART PHONE:

Home Automation System has been developed with Raspberry Pi by reading the algorithm and subject of Email. Raspberry Pi guarantees to be an efficient platform for implementation powerful, and economic smart home automation. home automation using Raspberry pi is better than any other home automation methods in several ways. For example, DTMF (dual tone multi-frequency) using home automation, the call tariff is a big demerit, which is not the problem in their proposed method. In Home Automation using web server, the design of web server and the memory space required is dismiss by this method, because it just uses the already established web server service given by G-mail. LEDs were used to identify the switching action. This System is efficient and flexible interactive.

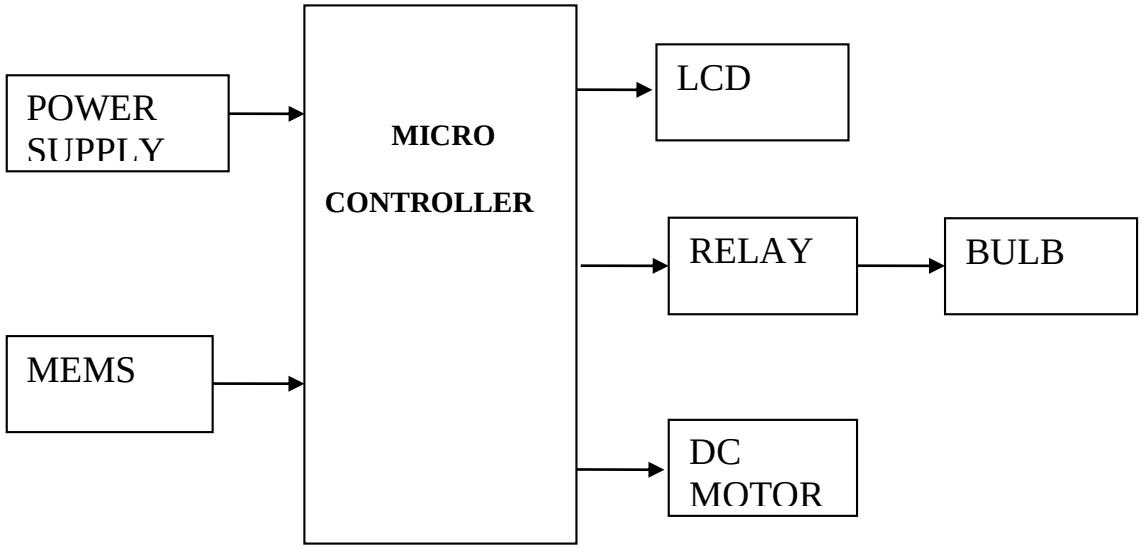
3. WIRELESS HOME AUTOMATION SYSTEM USING IOT

This system uses mobiles or computers to control basic home control and function automatically through internet from anywhere around the world globally, an automated home is sometimes called a smart home. It is meant to save the electric power and human energy. The proposed system is a distributed home automation system, consists of server i.e. Wi-Fi module, sensors. Server controls and monitors the various sensors, and can be easily configured to handle more hardware interface module (sensors). The Arduino board, with built in Wi-Fi module acts as web server. Automation System can be accessed from the web browser of any local PC using server IP, or remotely from any PC or mobile handheld device connected to the internet with appropriate web browser through server real IP (internet IP). Wi-Fi technology is selected to be the network infrastructure that connects server and the sensors. Wi-Fi is chosen to improve system security (by using secure Wi-Fi connection), and to increase system mobility and scalability. Integration of Bluetooth and Wi-Fi technology in Controlling home appliances can help and improve lifestyle of all user groups especially to the disabled and elderly people in term of safety and comfortable. The implementation of combined wired and wireless systems would be of most practical in designing a smart home system especially in cutting the system's installation cost for conventional home. The smart elderly home monitoring system (SEHMS) is divided into three different modules which are safety monitoring system, telehealth system and telecare system. The smart phone is then connected to the monitoring system by using the TCP/IP networking method via Wi-Fi. A graphical user interface (GUI) is developed as the monitoring system which exhibits the information gathered from the system. The GUI opens an option to the user to examine the fall as well as making the confirmation or cancellation. A remote panic button has also been tested and implemented in the same android based smartphone. In addition, the monitoring system can also answer the call automatically after the emergency alarm has started. The Sunspot development kit will be used to simulate smart home devices.

4. HOME AUTOMATION SOLUTION FOR PARALYZED PERSONS AND ACCESSIBLE SMART HOME DESIGN

Present industry is increasingly shifting towards automation. Two principle components of today's industrial automations are programmable controllers and robots. In order to aid the tedious work and to serve the mankind, today there is a general tendency to develop an intelligent operation. The proposed system "**HOME AUTOMATION FOR MEMS ACCELEROMETER**" is designed and developed to accomplish the various tasks in an adverse environment of an industry. The intelligent machine is loaded with several units such as Accelerometer Sensor LCD, microcontroller, and alarm which synchronously work with the help of a start-of-the-art microcontroller. This project is an owe to the technical advancement. This prototype system can be applied effectively and efficiently in an expanded dimension to fit for the requirement of industrial, research and commercial applications. Microcontroller is the heart of the device which handles all the sub devices connected across it. We have used as microcontroller. It has flash type reprogrammable memory. It has some peripheral devices to play this project perform. It also provides sufficient power to inbuilt peripheral devices. We need not give individually to all devices. The peripheral devices also activate as low power operation mode. These are the advantages are appearing here.

5. BLOCK DIAGRAM



6.SOFTWARE TOOLS

6.1 Arduino IDE

Arduino programs may be written in any programming language with a compiler that produces binary machine code. Atmel provides a development environment for their microcontrollers, AVR Studio and the newer Atmel Studio, which can be used for programming Arduino. The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It was created for people with no profound knowledge of electronics. It includes a code editor with features such as syntax highlighting, brace matching, cutting-pasting and searching-replacing text, and automatic indenting, and provides simple one-click mechanism to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a series of menus.

A program written with the IDE for Arduino is called a "sketch". Sketches are saved on the development computer as _les with the _le extension. ino. Arduino Software (IDE) pre-1.0 saved sketches with the extension. pde. The Arduino IDE supports the languages C and C++ using special rules to or genie code. 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 functions, for starting the sketch and the main programs loop, that are compiled and linked with a program stub main () into an executable cyclic executive program with the GNU toolchain A minimal Arduino C/C++ sketch, as seen by the Arduino IDE programmer, consist of only two functions _ setup (): This function is called once when a sketch starts after power-up or reset. It is used to initialize variables, input and output pin modes, and other libraries needed in the sketch.

6.2 CONCLUSION

In conclusion, home automation can be a powerful tool for improving the quality of life and independence of paralyzed individuals. However, it's essential to prioritize accessibility and ease of use when designing a smart home for them. By using voice-activated devices, tactile feedback devices, and high-contrast interfaces, individuals with paralysis can easily control their smart home devices and navigate their home environment. To ensure their physical safety, it's also essential to consider installing motion sensors, non-slip flooring, grab bars, and handrails to prevent falls and provide stability. Additionally, installing a medical alert system or emergency call button can provide added security in case of an emergency. Overall, accessible smart home design is crucial for creating an inclusive and safe environment for paralyzed individuals. By prioritizing accessibility and ease of use, we can empower paralyzed individuals to live more independently and improve their quality of life. When designing an accessible smart home, it's essential to consider the individual's needs and abilities, and to use devices and interfaces that are intuitive and easy to use. By prioritizing accessibility and ease of use, you can create a system that allows paralyzed individuals to easily control their environment, improve their comfort and safety, and enhance their overall quality of life. In summary, home automation solutions for paralyzed individuals should be tailored to their specific needs and abilities, prioritize safety and security, and be designed with accessibility and ease of use in mind. Consider using a single app or platform to control all devices to reduce confusion and complexity. Provide training and support to ensure the individual understands how to use the system and can troubleshoot any issues. Regularly review and adjust the system to ensure it remains accessible as the individual's needs change. By taking these steps, you can help ensure that paralyzed individuals can easily and effectively use their home automation system, improving their quality of life and independence.

6.2.1 PURPOSE

The purpose of home automation for paralyzed persons is to create an accessible living environment that enhances their independence, comfort, and safety. Home automation systems can be customized to meet the unique needs of paralyzed individuals, providing them with greater control over their living space and reducing their reliance on caregivers. With home automation, paralyzed individuals can control their environment using voice-activated devices, tactile feedback devices, and other accessible interfaces that make it easier to manage lighting, temperature, entertainment systems, and other appliances. This can lead to increased comfort and independence while reducing the physical and emotional strain on caregivers. In addition, home automation systems can also provide paralyzed individuals with greater security and emergency preparedness, allowing them to quickly and easily access emergency services and receive alerts for potential hazards or emergencies. Overall, the purpose of home automation for paralyzed persons is to improve their quality of life, enhance their independence, and provide them with greater control over their living environment.

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