An Iot Based Home Automation For Physically Challenged And Elderly People

M.Aashikha[1*], N. Abisheka Puvan[2], B.Gowsalya [3], D.Vijayakumar [4]

[1] Final Year Student, Computer Science Engineering, National Engineering College, Tuticorin, India,
[2] Final Year Student, Computer Science Engineering, National Engineering College, Tuticorin, India,
[3] Final Year Student, Computer Science Engineering, National Engineering College, Tuticorin, India,
[4] Assistant Professor(Senior Grade), Computer Science Engineering, National Engineering College, Tuticorin, India.

Abstract— *A day's smart home technology is very most widely used in today's generation that can give such applications that make everything easy. In modern-day, home appliances use wireless technology and can be accessed by the internet to make the resident's life more comfortable and organized. The home devices controlled by wireless communication topology can be processed by the internet channel, which will make the resident's life more comfortable and live happily. Internet-based house automation system is designed to assist people with physical disabilities and physically challenged people, old age people, to control the device's values using smartphones. The Load devices like fans, light other home appliances are controlled by the relay boards. Here the relay can acts as a switching logic to ON/OFF loads according to the user commands. The design uses an embedded controller board, and the home appliances are physically connected to this board's output ports via relays. The central control system using wireless communication technology to provide remote access from a smartphone or tablet. A Mobile app is used to establish wireless communication between the Android phone and the Nodemcu board. A mobile application is developed to provide a user-friendly graphical user interface (GUI) for remote control on home appliances. For future recommendations, the mobile device GUI can be equipped with speed regulation of fan in-home surveillance. Smart homes are cheap, low-power, cost-effective, efficient, and realize the automation of various domestic appliances using the user-friendly interface as a remote control or any other handheld device. Elderly, disabled patients and people with disabilities who have problems with locomotion difficulty benefit from this smart home to operate with high-performance appliances and devices from anywhere in the house. When a resident is living alone, the ubiquitous access becomes very useful.*

I. INTRODUCTION

Home automation for the elderly and disabled focuses on making it possible for older adults and people with disabilities to remain at home safely and comfortably. Home automation is becoming a viable option for older adults and people with disabilities who would prefer to stay in their homes' comfort rather than move to a healthcare facility. This field uses much of the same technology and equipment as home automation for security, entertainment, and energy conservation but tailors it towards older adults and people with disabilities.

There are two primary forms of home automation systems for the elderly:

Embedded health systems and private health networks. Embedded health systems integrate sensors and microprocessors in appliances, furniture, and clothing that collect data analyzed and can be used to diagnose diseases and recognize risk patterns. Private health networks implement wireless technology to connect portable devices and store data in a household health database. Due to the need for more healthcare options for the ageing population, "there is significant interest from industry and policymakers in developing these technologies."

Home automation is implemented in homes of older adults and people with disabilities to maintain their independence and safety, saving the costs and anxiety of moving to a health care facility. For disabled smart homes, they allow them to access freedom, provide emergency assistance systems, security features, fall prevention, automated timers, and alerts, and allow monitoring from family members via an internet connection.

II. METHODOLOGY

1. Android application in mobile sends the signal to the Wi-Fi module connected to the same network. Android application has all the GUI buttons for each appliance.

2. The Wi-Fi module receives the mobile application signal and gives it to the nodemcu board for processing.

3. We use the nodemcu board as a controller to control all the appliances. The Relay board and Wi-Fi module are connected to the nodemcu board. Each command is processed by nodemcu board and controls the relay board for switching on/off the appliances.

4. Relay board use as electrical switches for performing on/off operation. Powersupply is provided through the relay board to the appliances.

5. Finally, users can access the electrical appliances through an android application in mobile through the Wi-Fi module, which is connected to nodemcu, which can control all devices.

A. HARDWARE IMPLEMENTATION:

1. The design uses an embedded controller board, and the home appliances are physically connected to the output ports of this board via relays.

2. The central control system uses wireless communication technology to provide remote access from a smartphone or tablet.

3. A mobile application is used to establish wireless communication between the Android phone and the (Nodemcu board) board.

4. We developed an interface to provide a user-friendly graphical user interface(GUI) to control home appliances remotely.

5. The Load devices like fans, light other electrical sources are controlled by the relay boards.

6. Here the relay can acts as a switching logic to ON/OFF loads according to the user commands.
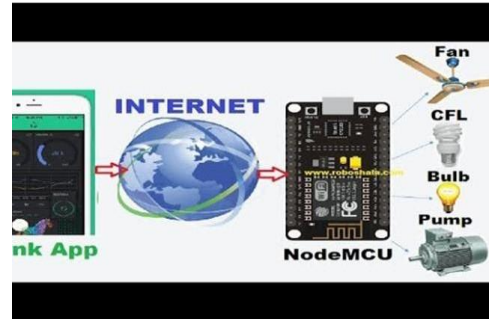
B. SOFTWARE IMPLEMENTATION:
ARDUINO IDE:

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards and, with the help of 3rd party cores and other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many standard input and output procedures. User-written code only requires two primary functions: starting the sketch and the main program loop compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding loaded into the Arduino board by a loader program in the board firmware. By default, avrdude is used as the uploading tool to flash the user code onto official Arduino boards. With the rising popularity of Arduino as a software platform, other vendors started to implement custom open-source compilers & tools (cores) that can build and upload sketches to other MCUs that are not supported by Arduino's official line of MCUs.

III. OUTPUTS

Figure 1.Connecting relay with nodemcu

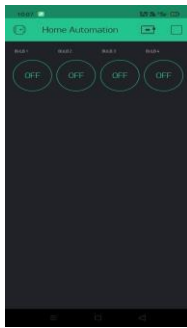**Figure 2.Connecting the entire setup with the power supply**

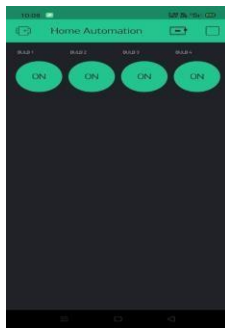**Figure 3.Mobile application for accessing home appliances**

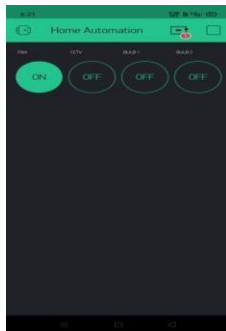**Figure 4.Home automation using the mobile application**

Figure 5.Connecting fan using the app

Figure 6.Connecting fan using an app

Figure 7.Connecting fan using an app

IV. RESULTS AND DISCUSSION

We use the nodemcu board as a controller to control all the appliances. The Relay board and the Wi-Fi module are connected to the nodemcu board. Each command is processed by nodemcu board and controls the relay board for switching on/off the appliances Relay board use as electrical switches for performing on/off operation. The power supply is provided through the relay board to the appliances. A mobile application is used to establish wireless communication between the Android phone and the (Nodemcu board) board. We developed an interface to provide a user-friendly graphical user interface (GUI) to control home appliances remotely.

V. CONCLUSION AND FUTURE SCOPE

Home automation systems had progressively developed as an essential field of control systems. The implementation of such systems continuously increased, notably with the tendency to standardize their processes. The capability of devices of different kinds and issuing from various manufacturers to cooperate, communicate, and function with high harmony levels becomes an essential factor. Moreover, advanced processes and numerous presented techniques intend to reduce smart home prices, make the integrated system easier and handled with simplicity and achieve permanent degrees of security.

For future recommendations, the mobile device GUI can be equipped with speed regulation of fan in-home surveillance. Smart homes are cheap, low-power, cost-effective, efficient, and realize the automation of various domestic appliances using the user-friendly interface as a remote control or any other handheld device. Elderly, disabled patients and people with disabilities who have problems with locomotion difficulty benefit from this smart home to operate with high-performance appliances and devices from anywhere in the house. When a resident is living alone, ubiquitous access becomes very useful.

REFERENCES

[1] Prof B.P Kulkarni, Aniket V Joshi, Vaibhav V Jadhav, Akshaykumar T DhamangeIOT Based Home Automation Using Raspberry PI, International Journal of Innovative Studies in Sciences and Engineering Technology (IJISSET),(2017).

[2] Harshal Patil Maitrey Talware, Saurabh Bhagwat, Ritesh Dhisale, Prof.AjitkumarShitole, IoT-Based Smart Band to Achieve Home Automation with Gesture Detection and Control, IEEE PAPER,(2017).

[3] Naresh Kumar Assistant Professor, MSIT, New Delhi, India. Praveer Singh B. Tech. Student, MSIT, New Delhi,

[4] Economical Home Automation System using Arduino UNO, Advances in Computational Sciences and Technology, ISSN,(2017).

[5] Krishna Rathi, Dinesh Patil, Sayli Bhavsar, Ketaki Jadhav, Prof. Saurabh V. Thakur, Gesture Human- Machine Interface (GHMI) in Home Automation, IRJET,(2017).

[6] N. Prathima, P. Sai Kumar, SK. Lal Ahmed, G. Chakradhar, Voice Recognition Based Home Automation System for Paralyzed People, ISSN,(2017).

[7] Waheb A. Jabbar; Tee Kok Kian; Roshahliza M. Ramli; Siti Nabila Zubir; Nurthaqifah S. M.Zamrizama, Design, and Fabrication of Smart Home With the Internet of Things Enabled Automation System, IEEE,(2019).

[8] Rajarshi BhattacharyaAyan DasUdita BoseAnanya MukhopadhyayNantu Das, Advanced Home Automation Using Internet of Things, Elsevier, and Springer journals (2020).