IoT Based Smart Home Automation

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Abstract

The main objective of this project is to develop a home automation system using an Arduino board. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system, involving remote controlled switches. Presently, conventional wall switches located in different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. As technology arises, we are going into smarter world and daily new technologies are invented Smart home automation can be done through so many ways like webservers and websites but now we are trying it using telegram application which is available in windows and android mobile phones.Remote controlled home automation system provides a most modern solution with smart phones. In this project, we are going to use both manual and automated controls for our home appliances to control anywhere form world. We will install a package in raspberry pi through that we can run our home appliances anywhere form world.

Keywords: Raspberry pi, Relay,telegram bot, telepot

I. Introduction

Nowadays, we have remote controls for our television sets and other electronic systems, which have made our lives real easy. This system is super-cost effective and can give the user, the ability to control any electronic device without even spending for a remote control. This project helps the user to control all the electronic devices using his/her smartphone. Time is a very valuable thing. Everybody wants to save time as much as they can. New technologies are being introduced to save our time. To save people's time we are introducing Home Automation system. Smart home automation refers to the use of technology to control and automate various home appliances and systems, such as lighting, heating, cooling, security, and entertainment, among others. It provides homeowners with greater control and convenience, as well as increased energy efficiency and improved security. Smart home automation typically involves the use of various devices and technologies, including smart sensors, smart thermostats, smart lighting, smart locks, and smart cameras. For example, homeowners can set their lights to turn on automatically when they enter a room, or program their thermostat to adjust to their preferred temperature at specific times of the day. They can also receive alerts and notifications if there is any unusual activity or if any of their devices require maintenance. Smart home automation can also help homeowners save money on energy bills. Moreover, smart home automation can improve home security. Smart cameras and sensors can detect and alert homeowners of any unusual activity or movement, and smart locks can allow

homeowners to control who enters their home and when. This can provide a greater sense of security and peace of mind. In the present day, home automation is becoming essential for the purpose of improving our life condition. Convenience and ease of using home appliances is what home automation is offering. Home automation offers a futuristic way of life in which an individual gets to control his entire house using a smart phone, from turning on a TV to locking/unlocking doors; it also offers an efficient use of energy. But to get or acquire such system installed will cost a lot of money and that is the major reason of why home automation has not received much demand and attention, adding to that also the complexity of installing it and configuring it. Thus it is essential to make it cost effective and easy to configure, if this is granted to people then they will be willing to acquire it in their homes, offices and schools.

II.Existing System

The Existing system based on with the GSM Module & Bluetooth Module only. The recent developments in technology which permit the Use of Bluetooth and Wi-Fi have enabled different devices to have capabilities of connecting with each other. Using a WIFI shield to act as a Micro web server for the Arduino eliminates the need for wired connections between the Arduino board and computer which reduces cost and enables it to work as a standalone device. The Wi-Fi shield needs connection to the internet from a wireless router or wireless hotspot and this would act as the gateway for the Arduino to communicate with the internet. With this in mind, an internet based home automation system for remote control of home appliances is designed.

III LITERATURE REVIEW

In their paper, Tan, Lee and Soh (2002) proposed the development of an Internet-based system to allow monitoring of important process variables from a distributed control system (DCS). This paper proposes hardware and software design considerations which enable the user to access the process variables on the DCS, remotely and effectively Potamitis, Georgila, Fakotakis, and Kokkinakis, G. (2003) suggested the use of speech to interact remotely with the home appliances to perform a particular action on behalf of the user. The approach is inclined for people with disability to perform real-life operations at home by directing appliances through speech. Voice separation strategy is selected to take appropriate decision by speech recognition In the year 2006 , S. M. AnamulHaque,S. M. Kamruzzaman and Md. Ashraful Islam proposed a system entitled "A System for Smart-Home Control of Appliances Based on Time and Speech Interaction" that controls the home appliances using the personal computer. This system is developed by using the Visual Basic 6.0 as programming language and Microsoft voice engine tools for speech recognition purpose. Appliances can be either controlled by timer or by voice command.

Ciubotaru-Petrescu, Chiciudean, Cioarga, and Stanescu (2006) present a design and implementation of SMS based control for monitoring systems. The paper has three modules involving sensing unit for monitoring the complex applications. A processing unit, that is microcontroller and a communication module that uses GPRS modem or cell phone via serial port RS-232. The SMS is used for status reporting such as power failure. Jawarkar, Ahmed, Ladhake, and Thakare (2008) propose remote monitoring through mobile phone involving the use of spoken commands. The spoken commands are generated and sent in the form of text SMS to the control system and then the microcontroller on the basis of SMS takes a decision of a particular task.

IV.PROPOSED ARCHITECTURE

Smart home architecture using Raspberry Pi and Telegram typically involves several components working together to create a functional and responsive system. Here's an overview of the typical architecture:RaspberryPiis the central device that controls the smart home. It runs the smart home software and connects to the various devices that make up the system.
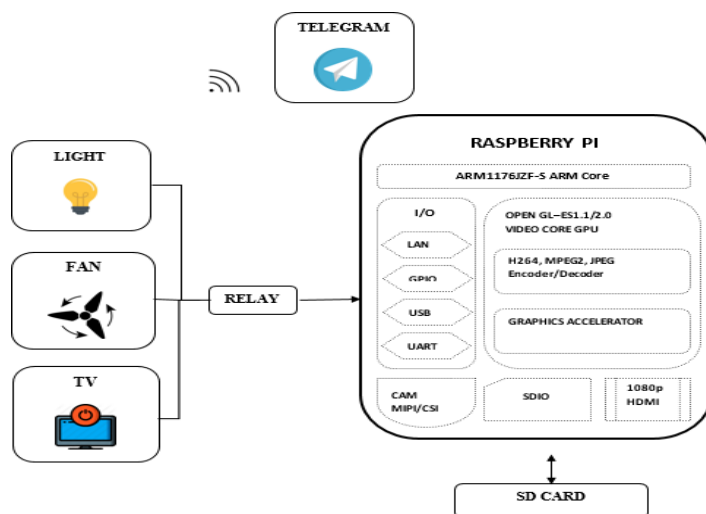
Fig 1:Architechture of Home Automation

The Raspberry Pi must be connected to the internet to communicate with the Telegram Bot and allow users to interact with the system remotely. This smart home architecture using Raspberry Pi and Telegram is designed to be flexible, customizable, and easy to use.

- Raspberry pi 3 B+:Raspberry pi is a credit card sized computer which contains GPIO pins which are generally called general purpose input output pins which are used to connect sensors and devices to the raspberry pi and perform some operations.it runs with raspbian os the installation of os is described in raspberry p iofficial website.

- A relay is an electrical device which is generally used to control high voltages using very low voltage as an Input. This consists of a coil wrapped around a pole and a two small metal flaps(nodes) that are used to close the circuit. One of the node is fixed and other is movable. Whenever an electricity is passed through the coil, it creates a magnetic field and attracts the moving node towards the static node and the circuit gets completed. So, just by applying small voltage to power up the coil we can actually complete the circuit for the high voltage to travel. Also, as the static node is not physically connected to the coil there is very less chance that the Microcontroller powering the coil gets damaged if something goes wrong.

- Telegram:Telegram is a cloud-based instant messaging app that allows users to send and receive messages, photos, videos, and other files. Telegram was launched in 2013 and has since become a popular messaging app, particularly among users who value privacy and security.One of the unique features of Telegram is the ability to create Telegram Bots. Telegram Bots are automated programs that can be programmed to perform specific tasks or provide information on various topics. These bots can be created using a programming language like Python and can be integrated with other applications or services.

The proposed system working after executing the code in raspberry pi the message that is sent in telegram bot will be received to raspberry pi python input line
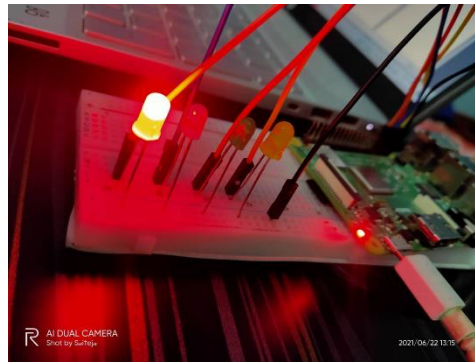
Fig 2: LED-1 switched ON as per command given.

Fig3: LED-1 Switched OFF and LED-2 switched ON per command given.
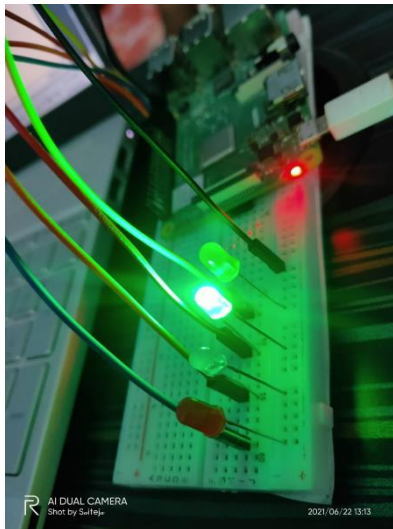

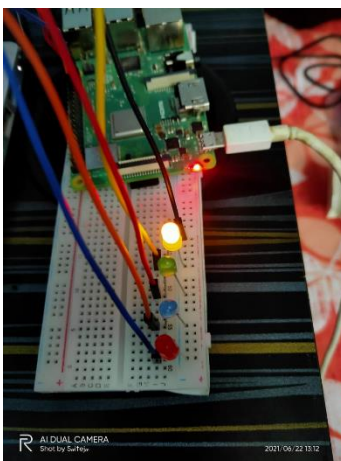Fig 4: LED-2 Switched OFF and LED-3 switched ON as per command given.

Fig 5: LED-3 Switched OFF and LED-4 switched ON as per command given.

V. CONCLUSION

In this paper, a novel architecture for low cost and flexible home controland monitoring system using Rasberry Pi is proposed and implemented.Smart home control using raspberry pi and telegram bot uses telepot library to implement the smart control of appliances. The controlling and acknowledging of telegram bot are verified in telegram application.

References

1. Das, S.R., Chita, S., Peterson, N., Shirazi, B.A., Bhadkamkar, M.,"Home automation and security for mobile devices," IEEE PERCOMWorkshops, pp. 141146, 2011
2. S.D.T. Kelly, N.K. Suryadevara, S.C. Mukhopadhyay, "Towardsthe Implementation of IoT for Environmental Condition Monitoring inHomes", IEEE, Vol. 13, pp. 3846-3853, 2013
3. Rajeev Piyare "Internet of Things: Ubiquitous Home Control andMonitoring System using Android based Smart Phone" InternationalJournal of Internet of Things 2013, 2(1): 5-11 DOI:10.5923/j.ijit.20130201.02
4. G. Kortuem, F. Kawsar, D. Fitton, and V.Sundramoorthy, "Smartobjects as building blocks for the internet of things," InternetComputing, IEEE, vol. 14, pp. 44-51, 2010.
5. C.-H. Chen, C.-C. Gao, and J.-J. Chen, "Intelligent Home Energy Conservation System Based On WSN," presented at the International Conference on Electrical, Electronics and Civil Engineering, Pattaya, 2011.
6. Basma M. Mohammad El-Basioni1, Sherine M. Abd El-kader2 andMahmoudAbdelmonim Fakhreldin3, "Smart Home Design usingWireless Sensor Network and Biometric Technologies" at Volume 2,Issue 3, March 2013
7. Inderpreet Kaur, "Microcontroller Based Home AutomationSystem With Security" at IJACSA) International Journal of AdvancedComputer Science and Applications, Vol. 1, No. 6, December 2010
8. Rosslin John Robles and Tai-hoon Kim, "Review: ContextAware Tools for Smart Home Development", International Journal ofSmart Home, Vol.4, No.1, January, 2010
9. HitendraRawat, Ashish Kushwah, Khyati Asthana, AkankshaShivhare, "LPG Gas Leakage Detection & Control System", NationalConference on Synergetic Trends in engineering and Technology(STET-2014) International Journal of Engineering and TechnicalResearch ISSN: 2321-0869, Special Issue
10. A.Rajesh, Dr.E.Mohan, "Classification of microcalcification based on wave atom transform", Journal of computer science, 10 (9), 1543-1547, 2014.
11. Venkatachalam, K., Reddy, V. P., Amudhan, M., Raguraman, A., & Mohan, E. (2021, June). An implementation of K-means clustering for efficient image segmentation. In 2021 10th IEEE

international conference on Communication Systems and Network Technologies (CSNT) (pp. 224-229). IEEE.

12. Gladstan, T., & Mohan, E. (2017). A Novel Approach Object Recognition Using Efficient Support Vector Machine Classifier. International Journal of Electronics and Communication Engineering and Technology, 8(2), 81-90.

13. Rajesh, A., & Mohan, E. (2016). Classification of Mammogram Using Wave Atom Transform and Support Vector Machine Classifier. International Journal of Computer Science and, 467-470

14. Mohan, E., Sugumar, R., &Venkatachalam, K. (2014). Automatic brain and tumor segmentation in MRI using fuzzy classification with integrated Bayesian. *Int. J. Appl. Eng. Res*, *9*(24), 25859-25870.

15. ThambuGladstan, Dr.E.Mohan.Object Recognition Based on Wave Atom Transform. RJAET. 8(13): 1613-1617, 2014.

16. Nicholas D., Darrell B., Somsak S., "Home Automation usingCloud Network and Mobile Devices", IEEE Southeastcon 2012,Proceedings of IEEE.

17. Chan, M., Campo, E., Esteve, D., Fourniols, J.Y., "Smart homescurrentfeatures and future perspectives," Maturitas, vol. 64, issue 2, pp.90-97, 2009