WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Automated Lighting System for Smart Homes using Sound Detection

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DOI: https://doi.org/10.5281/zenodo.8130148

Abstract

In this paper, we present an automated lighting system for smart homes that utilizes sound detection as the primary trigger for turning the lights on and off. The system is designed to provide a convenient and energy-efficient solution to the common problem of leaving lights on when they are not needed. The system works by detecting sound using a microphone and triggering a smart switch to turn the lights on or off based on the sound level detected. The system is implemented using a Raspberry Pi microcontroller and is controlled through a web-based interface. The results of our experiments demonstrate that the system is accurate and reliable in detecting sound and can be used to automate the lighting in homes.

Keywords:-Automated lightning, smart homes, sound detection, Energy savings, light controlling.

Introduction:

Automated lighting systems have become increasingly popular in recent years due to their convenience and energy-saving capabilities. These systems can be programmed to turn the lights on and off automatically based on various triggers, such as time of day or motion detection. However, one common problem with these systems is that they may leave the lights on when they are not needed, wasting energy and increasing electricity bills. In this paper, we propose an automated lighting system for smart homes that uses sound detection as the primary trigger for turning the lights on and off. This system can help solve the problem of leaving lights on when they are not needed, while also providing a convenient and hands-free solution for controlling the lights in the home.

Methodology: The automated lighting system is implemented using a Raspberry Pi microcontroller connected to a microphone and a smart switch. The microphone is used to detect sound in the environment, and the smart switch is used to turn the lights on and off. The system is controlled through a web-based interface that allows the user to configure various settings, such as the sound threshold level and the lighting schedule.

To detect sound, we use a Python library called PyAudio, which provides an interface for recording and processing audio data in real-time. The system continuously records audio data from the microphone and processes it to detect the sound level. If the sound level exceeds a predetermined threshold, the system triggers the smart switch to turn the lights on. If the sound level drops below the threshold, the system turns the lights off.

Results:

To evaluate the performance of the system, we conducted a series of experiments in a typical home environment. We measured the accuracy of the system in detecting sound and the response time of the system in turning the lights on and off. The results of our experiments demonstrate that the system is accurate in detecting sound and can respond quickly to turn the lights on and off. We also found that the system can be easily configured through the web-based interface to adjust the sound threshold level and the lighting schedule.

Conclusion:

In this paper, we presented an automated lighting system for smart homes that uses sound detection as the primary trigger for turning the lights on and off. The system is implemented using a Raspberry Pi microcontroller and is controlled through a web-based interface. Our experiments demonstrate that the system is accurate and reliable in detecting sound and can be used to automate the lighting in homes. This system provides a convenient and energy-efficient solution to the common problem of leaving lights on when they are not needed. Future work can explore additional features, such as integrating the system with other smart home devices, to further enhance the functionality of the system.

References:-

1. 1.N. Sriskanthan and Tan Karand. Bluetooth Based Home Automation System. Journal of Microprocessors and Microsystems

2. 2.Muhammad Izhar Ramli, Mohd Helmy Abd Wahab, Nabihah, Towards Smart Home: Control Electrical Devices Online,Nornabihah Ahmad International Conference on Science and Technology: Application in Industry and Education.

3. 3.E. Yavuz, B. Hasan, I. Serkan and K. Duygu. Safe and Secure PIC Based Remote Control Application for Intelligent Home. International Journal of Computer Science and Network Security.

4. Amul Jadhav, S. Anand, Nilesh Dhangare, K.S. Wagh Universal Mobile Application Development (UMAD) On Home Automation Marathwada Mitra Mandal's Institute of Technology, University of Pune, India Network and Complex Systems (2012)

5. 5.PratikGadtaula, Home Automation, Telemark University College, Faculty of Technology, Master's Thesis

6. 6.A. J. Jara, Wearable Internet: Powering Personal Devices with the Internet of Things Capabilities 2014 International Conference on Identification, Information and Knowledge in the Internet of Things, Beijing,, pp. 7-7(2014)

7. Y. Kung, S. Liou, G. Qiu, B. Zu, Z. Wang and G. Jong, Home monitoring system based internet of things 2018 IEEE International Conference on Applied System Invention (ICASI), Chiba, pp. 325-327(2018)

8. Y. Sun, Y. Xia, H. Song and R. Bie, Internet of Things Services for Small Town 2014

International Conference on Identification, Information and Knowledge in the Internet of Things, Beijing, , pp. 92-95(2014).

9. D. Pavithra and R. Balakrishnan, IoT based monitoring and control system for home automation, Global Conference on Communication Technologies (GCCT), Thuckalay, , pp. 169-173.(2015)

10. H. V. Bhatnagar, P. Kumar, S. Rawat and T. Choudhury, Implementation model of Wi-Fi based Smart Home System, International Conference on Advances in Computing and Communication Engineering (ICACCE), Paris, pp. 23-28(2018).

11. M. C. Domingo, An overview of the Internet of Things for people with disabilities, Journal of Network and Computer Applications, vol. 35, Issue 2, pp. 584-596, (2012).

12. A. Olteanu, G. Oprina, N. Tapus and S. Zeisberg, Enabling Mobile Devices for Home Automation Using ZigBee,19th International Conference on Control Systems and Computer Science, Bucharest,pp. 189-195(2018)

13. R. Piyare and M. Tazil, Bluetooth based home automation system using cell phone, 2011 IEEE 15th International Symposium on Consumer Electronics (ISCE), Singapore, pp. 192-195(2011)

14. Y. Upadhyay, A. Borole and D. Dileepan, MQTT based secured home automation system Symposium on Colossal Data Analysis and Networking (CDAN), Indore, pp. 1-4 (2016)

15. T. Wang, Y. Li and H. Gao, The smart home system based on TCP/IP and DTMF technology 2008 7th World Congress on Intelligent Control and Automation, Chongqing, pp. 7686-7691(2008).

16. T. M. Ladwa, S. M. Ladwa, R. S. Kaarthik, A. R. Dhara and N. Dalei, Control of remote domestic system using DTMF, International Conference on Instrumentation, Communication, Information Technology, and Biomedical Engineering 2009, Bandung, pp. 1-6 (2009)

17. N. M. Morshed, G. M. Muid-Ur-Rahman, M. R. Karim and H. U. Zaman, Microcontroller based home automation system using Bluetooth, GSM, Wi-Fi and DTMF, 2015 International Conference on Advances in Electrical Engineering (ICAEE), Dhaka,pp. 101-104(2015)

18. H. Brooke Stauffer Smart Enabling System for Home automation, IEEE Transactions on Consumer Electronics, Vol. 37(2) , pp. 29-35.(1991)