

Home Automation System using Arduino and Bluetooth

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Abstract: Protection of our personal properties is a key challenge and prior responsibility every time which affects massively on a day-to-day life. The current system of achieving security has plenty of drawbacks and less secure. The main goal of implementing a home automation system is to achieve a powerful and more secure way to handle the day-to-day stuff preventing from misuse hands and keeping track of usage of home electrical appliances to know the necessary and unnecessary actions. The system is built on IoT (Internet of things) to make more accurate and error-free control over the flow of the system. To make the difference from the existing system, in this proposed system we built the communication of hardware devices with an application where devices take commands and operate it while application rise the commands and keeps track of each transaction made so far. The combination of hardware and software will make life easier and safer for its users.

Keywords: Home Automation

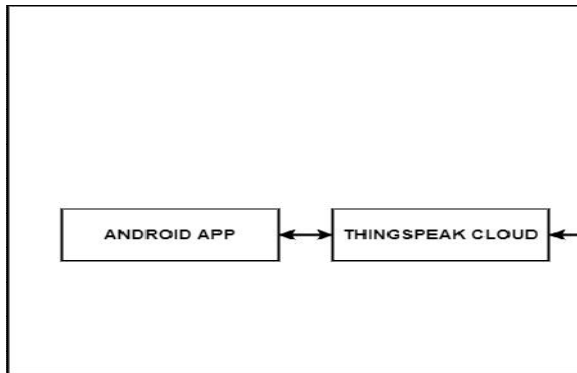
I. INTRODUCTION

The home Automation system is an idea of lock/unlock and turn on/off devices of home appliances through using microcontroller Node MCU ESP8266, fingerprint sensor, and application, where it becomes more trustable and feel more secure. The direct benefit of this system is zero redundancy, no duplicate fingerprint access can happen, saving them time and cost. The system introduced to overcome the ongoing obstacles in theft crime issues where privacy becomes very important. The home security system can be done in the simplest ways with controlling devices with limited features with fingerprint sensor of phone and other devices. The implementation of the home security and automation system is kept simpler towards the end-user front-end to make it more user-friendly and easier to adapt, where the back-end process makes more complex things from managing hardware and software. This idea is not only limited to home but also can be used in various areas like offices, banks, etc.

II. SYSTEM ARCHITECTURE



III. STRUCTURE OF HOME AUTOMATION SYSTEM USING ARDUINO BLUETOOTH



IV. METHODOLOGY

The system uses NODEMCU microcontroller.

It is selected since it has inbuilt Wi-Fi which is suitable for IoT Application.

A 4 Channel Relay is used for automating 4 devices. It can be increased as per requirement.

An Android App is developed using Kodular while Thing Speak is used as cloud storage.

The app has a feature of authentication using REST API as well as fingerprint authentication to avoid security issue.

V. LITERATURE REVIEW

Home automation systems have evolved to allow for remote control and monitoring of home appliances via various technologies. Bluetooth-based systems utilize Arduino boards for a secure, wireless connection between phones and appliances. Zigbee-based systems leverage a wireless network to efficiently control devices, using a preconfigured Wi-Fi setup for enhanced security. GSM-based systems incorporate mobile technology, offering options like SMS, GPRS, and DTMF for communication between appliances and users. Wi-Fi-based systems enable remote access through internet-connected servers and web applications. RF module-based automation provides a simpler solution with RF remote controls for ease of use. Cloud-based systems integrate home appliances with cloud servers for data storage and remote monitoring. Raspberry Pi-based systems offer a cost-effective and flexible approach, utilizing existing web services for control. Lastly, IoT-based systems employ Wi-Fi technology for global access to home controls, aiming to improve energy efficiency and convenience. These systems demonstrate the increasing integration of digital technology in home management, catering to the demand for security, convenience, and energy efficiency.

VI. CONCLUSION

This project presented is a low cost and flexible home control and monitoring system using Node MCU Board with internet and various sensors remotely controlled by Android OS smart phone. In this, Node MCU micro controller is used as an interface between user and hardware components. It is programmed and connected to several components according to the requirements. A micro web server is used as an application layer for communication between remote users and home devices, security systems.

This entire system communication is enabled through internet. User can operate wirelessly. All these together forms a complete capable, flexible smart home control and monitoring system, based on IOT technology.

REFERENCES

- [1] V. Lohan and R. P. Singh, "Home Automation Using Internet of Things," in Lecture Notes in Networks and Systems, 2019.
- [2] M. Mrinal, L. Priyanka, M. Saniya, K. Poonam, and A. B. Gavali, "Smart home - Automation and security system based on sensing mechanism," in Proceedings of the 2017 2nd IEEE International Conference on Electrical, Computer and Communication Technologies, ICECCT 2017, 2017, doi: 10.1109/ICECCT.2017.8117986.

- [3] K. Gill, S. H. Yang, F. Yao, and X. Lu, "A ZigBee-based home automation system," IEEE Trans. Consume. Electron., 2009, doi: 10.1109/TCE.2009.5174403.
- [4] R. Teymourzadeh, S. A. Ahmed, K. W. Chan, and M. V. Hoong, "Smart GSM based home automation system," in Proceedings - 2013 IEEE Conference on Systems, Process and Control, ICSPC 2013, 2013, doi: 10.1109/SPC.2013.6735152.
- [5] A. Elshafee and K. A. Hamed, "Design and Implementation of a Wi-Fi Based Home Automation System," World Acad. Sci. Eng. Technol., 2012.
- [6] A. Z. Alkar, J. Roach, and D. Baysal, "IP based home automation system," IEEE Trans. Consume. Electron., 2010, doi: 10.1109/TCE.2010.5681091.
- [7] X. Ye and J. Huang, "A framework for cloudbased smart home," in Proceedings of 2011 International Conference on Computer Science and Network Technology, ICCSNT 2011, 2011, doi: 10.1109/ICCSNT.2011.6182105.
- [8] M. Asadullah and A. Raza, "An overview of home automation systems," in 2016 2nd International Conference on Robotics and Artificial Intelligence, ICRAI 2016, 2016, doi: 10.1109/ICRAI.2016.7791223.
- [9] I. I. Pătru, M. Carabaş, M. Bărbulescu, and L. Gheorghe, "Smart home IoT system," in Networking in Education and Research: RoEduNet International Conference 15th Edition, RoEduNet 2016 - Proceedings, 2016, doi: 10.1109/RoEduNet.2016.7753232.
- [10] K. Mandula, R. Parupalli, C. H. A. S. Murty, E. Magesh, and R. Lunagariya, "Mobile based home automation using Internet of Things(IoT)," in 2015 International Conference on Control Instrumentation Communication and Computational Technologies, ICCICCT 2015, 2016, doi: 10.1109/ICCICCT.2015.7475301.
- [11] Abhishek Kumar, Bishwajeet Pandey, D M Akbar Hussain, Mohammad Atiqur Rahman, Vishal Jain and Ayoub Bahanasse, "Frequency Scaling and HighSpeed Transceiver Logic Based Low Power UART design on 45nm FPGA", "2019 11th International Conference on Computational Intelligence and Communication Networks (CICN)" during 3rd - 6th January, 2019 at University of Hawaii, USA.
- [12] Anirudh Khanna, Bhagwan Das, Bishwajeet Pandey, DMA Hussain, and Vishal Jain, "A Discussion about Upgrading the Quick Script Platform to Create Natural Language based IoT Systems", Indian Journal of Science and Technology, Volume 9, Issue 46, December 2016, page no. 1-4 having ISSN No. 0974- 6846 .
- [13] V.M.Prabhakaran , Prof.S.Balamurugan , S.Charanyaa, "A Strategy for Secured Uploading of Encrypted Microdata in Cloud Environments", International Advanced Research Journal in Science, Engineering and Technology Vol. 1, Issue 3, November 2014
- [14] R Santhya, S Balamurugan, "A Survey on Privacy Preserving Data Publishing of Numerical Sensitive Data", International Journal of Innovative Research in Computer and Communication Engineering , Vol. 2, Issue 10, October 2014
- [15] Balamurugan Shanmugam, Dr. Visalakshi Palani swami, Santhya. R, Venkatesh. R.S., "Strategies for Privacy Preserving Publishing of Functionally Dependent Sensitive Data: A State-of-the art Survey. Aust. J. Basic & Appl. Sci., 8(15): 353-365, 2014