Chapter 8

IOT BASED HOME AUTOMATION AND SECURITY SYSTEM

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Abstract

Home Automation industry is growing rapidly, this is fulfilled by the need to provide supporting systems for the elderly and the disabled, especially those who live alone. Coupled with this, the world population is confirmed to be getting older. Home automation systems must comply with the household standards and convenience of usage. Home automation is one of the major growing industries that can change the way people live. Some of these home automation systems target those seeking luxury and sophisticated home automation platforms; others target those with special needs like the elderly and the disabled. Typical wireless home automation system allows one to control household appliances from a centralized control unit which is wireless.

These appliances usually have to be specially designed to be compatible with each other and with the control unit for most commercially available home automation systems. The developed system can be integrated as a single portable unit and allows one to wirelessly control lights, fans, air conditioners, television sets, security cameras, electronic doors, computer systems, audio/visual equipment's etc. and turn ON or OFF any appliance that is plugged into a wall outlet, get the status of different sensors and take decision accordingly. The system is portable and constructed in a way that is easy to install, configure, run, and maintain.

The perfect user interface still does not exist at present and to build a good interface requires knowledge of both sociology and technology fields. The problem lies with the situation of the elderly or disabled people, who cannot usually help themselves to move around, and might require external assistance. People who live alone might also need a helping hand at home. Therefore, an android app-controlled home automation system is designed, so that the users can perform certain tasks by just the use of their phones. Having a phone as a remote will make the system more user-friendly and portable.

Keywords: Home Automation, Smart Home, Wireless Home Automation.

Introduction

This project presents the overall design of Home Automation System with low cost and wireless system. It specifically focuses on the development of an IOT based home automation system that is able to control various components via internet or be automatically programmed to operate from ambient conditions. A smart-house developed on the basis of the Internet of Things (IoT) can save more energy, where IoT is a network system consisting of electronic devices, software, sensors and networks that connect all concerned network entities together to make the system more valuable and able to provide many more services to users.

Managing all of your home devices from one place, the convenience factor here is enormous. Being able to keep all of the technology in your home connected through one interface is a massive step forward for technology and home management. Also, when you incorporate security and surveillance features in your smart home network, your home is protected and safe.

This IoT project focuses on building a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and turn on the lights automatically after a specific time. Besides, the same can also be utilized for home automation by making use of the same set of sensors. The leverage obtained by preferring this system over the similar kinds of existing systems is that the alerts and the status sent by the Wi-Fi connected microcontroller managed system can be received by the user on his phone from any distance irrespective of whether his mobile phone is connected to the internet.

Methodology

In this proposed system we are including security and device control together which is not common in-home automation system in today's market. Also, we introduce wireless control of home appliances and monitoring status of those appliances. A list of familiar persons is added along with their contact and other details which notifies us on android phone when they are detected in the camera. The equipment is switched on automatically at specific time(night) if an unknown person is detected. The appliances in the above-mentioned environment can be controlled in intra-network, so range issues are solved.

The system can be implemented in homes, small offices and malls as well. With a strong existing possibility of adding and integrating more features and appliances to the system, the designed system is highly extensible in nature AGILE methodology is a practise that promotes continuous iteration of development and testing throughout the software development lifecycle of the project. Both development and testing activities are concurrent unlike the waterfall model. The agile software development emphasizes on four core values.

Existing System

The existing infra-red (IR) or Blue-tooth remote controls present in the market are in general appliance specific and the same cannot be used interchangeably. Electrical appliances connected through Bluetooth making use of Blue-tooth enabled smart phones cannot be managed from a distant location. Thus, functions such as being able to turn on an air-conditioner while returning home cannot be done with such systems.

Proposed System

In the proposed system we are including security and device control together which is not common in-home automation system in today's market. Also, we introduce wireless control of home appliances and monitoring status of those appliances. A list of familiar persons is added along with their contact and other details which notifies us on android phone when they are detected in the camera.

The equipment is switched on automatically at specific time(night) if an unknown person is detected. The appliances in the above-mentioned environment can be controlled in intra-network, so range issues are solved. The system can be implemented in homes, small offices and malls as well. With a strong existing possibility of adding and integrating more features and appliances to the system, the designed system is highly extensible in nature.

System Requirement Specification

The following requirements are only the minimal requirements to run this utility more successfully and efficiently, there should sufficient memory and software tools for efficient processing.

Hardware Requirements

- Processor: 64 bits
- RAM: Min 3 GB
- Hard Disk: 320 GB
- Embedded device: Integrated with Microcontroller Arduino Uno
- Web cam

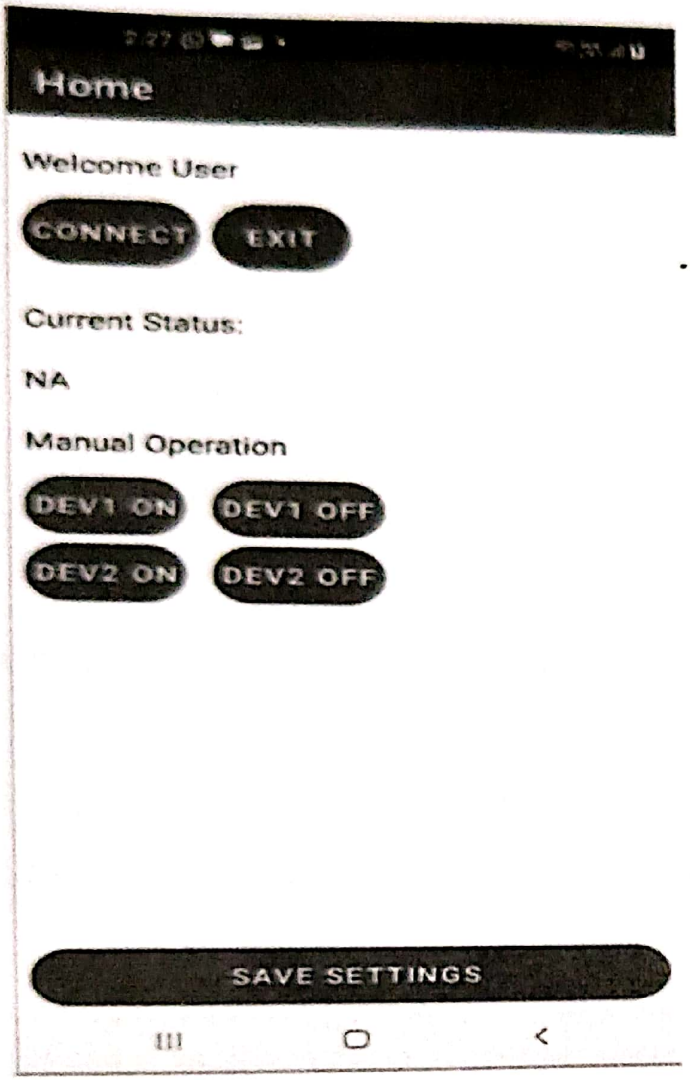
- Software Requirements
- Operating system: Windows 7 or above, Android
- Technology Used: Python, Embedded, Android (application)
- Languages Used: Python, C program, java
- IDE: PyCharm / Android Studio
- Framework: Flask
- Database: MySQL

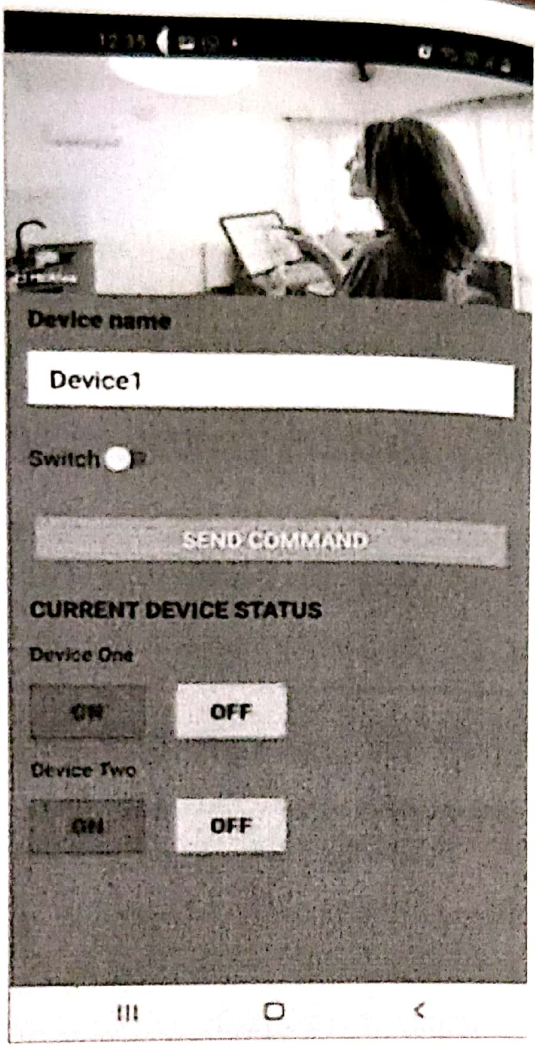
System Implementation

The implementation phase of a project covers the period from the acceptance of the tested design to its satisfactory operations, supported by the appropriated user and the operation manual. It is major operation across the whole organization structure and requires the great deal of planning. Planning of implementation must begin from initial conception of the project.

It requires a thorough knowledge of the new system, its personal need, hardware and software requirements, file and procedure conversion activities and of the current system where interface with the new, the change to it, the job that will be superseded, etc. Only the analyst responsible for creation the new system wills possess this knowledge. The new system analyst can plan, schedule and coordinate, but has no executive power. Planning must cover the following aspects:

- Organization of implementation.
- Control of resources.
- Motivation of the users.
- Training and production manuals.
- Change over.





Conclusion

It is evident from this project work that an individual control home automation system can be cheaply made from low-cost locally available components and can be used to control multifarious home appliances ranging from the security lamps, the television to the air conditioning system and even the entire house lighting system. And better still, the components required are so small and few that they can be packaged into a small inconspicuous container. Looking at the current situation we can build cross platform system that can be deployed on various platforms like iOS, Windows.

Limitation to control only several devices can be removed by extending automation of all other home appliances. This project is beneficial for elderly people who struggle to get up themselves and those who moves far from home for various reasons. This system provides security surveillance along with device control. Scope of this project can be expanded to many areas by not restricting to only home, but to small offices and other institutions

Reference

[1]. Sudha Kousalya, G Reddi, Priya Vasanthi, B Venkatesh, IOT Based Smart Security and Smart Home Automation presented at International Journal of Engineering Research & Technology 04, April-2018.

[2]. K Eswari, DeviK Shravani, M Kalyani, Mr. Abbas Hussain, Mrs. N Gayathri "Real-Time Implementation of Light and Fan Automation using Arduino", presented at International Journal for Research in Applied Science & Engineering Technology (IJRASET), 06, June-2020

[3]. Bouzid Mohamed Amine, Chaib Fatima Zohra, Hamani Ilyes, Aid Lahcen, Alaoui Tayeb, "SMART HOME AUTOMATION SYSTEM." Presented at International Journal of Robotics and Automation (IJRA) ,4 | Dec. 2018

[4]. Ayush Gajjar, Deepak Mishra, Shubham Ingale, Aniket Kore, "SMART HOME SYSTEM." Presented at International Research Journal of Engineering and Technology (IRJET), 01 | Jan 2019.

Websites:

[5]. http://www.w3schools.com

[6]. http://www.stackoverflow.com

[7]. http://www.sololearn.com