Digital Home Optimization

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Abstract- ***This paper deals with the design and implementation of Raspberry pi based IOT concept it means internet of things. In this present generation everything is going on internet itself. So, in this project we concentrate totally on the present generation life how they can get security to their home or office and control the devices by using android app just by using internet in their smart phones. This project presents the overall design of Home Automation System (HAS) with low cost and wireless system. This system is designed to assist and provide support in order to fulfil the needs of elderly and disabled in home. Also, the smart home concept in the system improves the standard living at home. The switch mode and voice mode are used to control the home appliances. The main control system implements wireless technology to provide remote access from smart phone. The design remains the existing electrical switches and provides more safety control on the switches with low voltage activating method. The switches status is synchronized in all the control system whereby every user interface indicates the real time existing switches status. The system intended to control electrical appliances and devices in house with relatively low-cost design, user-friendly interface and ease of installation.***

Indexed Terms- ***Intelligence home, Network appliance, video streaming, Transmitter.***

I. INTRODUCTION

The “Home Automation” concept has existed for many years. The terms “Smart Home”, “Intelligent Home” followed and has been used to introduce the concept of Networking appliances and devices in the house. Home automation Systems (HASs) represents a great research opportunity in creating new fields in engineering, and Computing. HASs includes centralized control of lighting, appliances, security locks of gates and doors and other systems, to provide improved comfort, energy efficiency and security system. HASs becoming popular nowadays and enter quickly in this emerging market. However, end users, especially the disabled and elderly due to their complexity and cost, do not always accept these systems. The design of security door lock using the finger print technology was built around a microcontroller, PIC16F628A, which reads in finger prints from finger print scanner and grant access, to a protected room, only to pre-registered finger print(s). The Goal is to develop an Embedded System, which is used to control home appliances by android mobile using Bluetooth.

Fingerprint Sensor: Fingerprint processing includes two parts: fingerprint enrolment and fingerprint matching. When enrolling, user needs to enter the finger two times. The system will process the two-time finger images, generate a template of the finger based on processing results and store the template. When matching, user enters the finger through optical sensor and system will generate a template of the finger and compare it with templates of the finger library. For matching, system will compare the live finger with specific template designated in the Module; for 1: N matching, or searching, system will search the whole finger library for the matching finger.

Tap Controller: The circuit is built around 555 timers and comprises transmitter and receiver sections. Both the transmitter and the receiver work off 5V DC. The IR rays continuously emitted by the transmitter fall on the receiver. As soon as an obstacle comes in between the receiver and the transmitter, interrupting the IR rays, the output of the IR sensor goes low momentarily to trigger the timer circuit in the receiver and water comes out for eleven seconds through the tap.

II. DESIGN

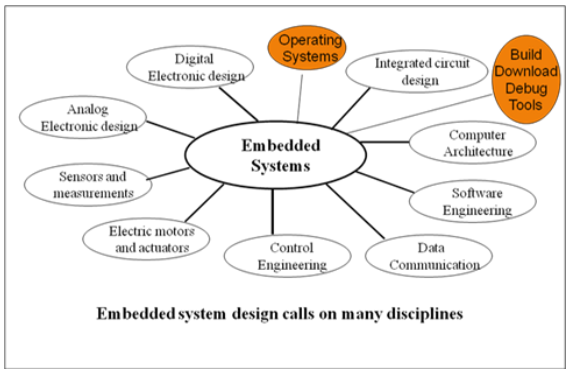

Fig. A. Embedded System Design Calls

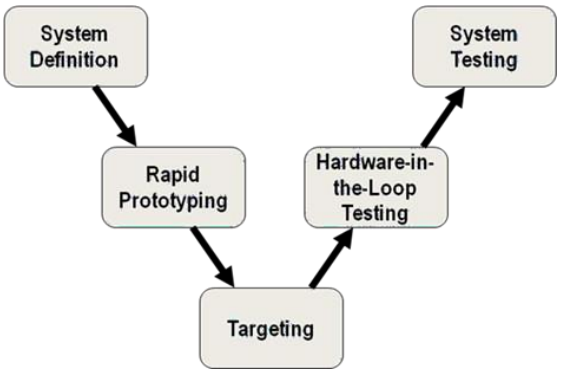

Fig. B: V Diagram

III. LITERATURE SURVEY

As per our survey, there exist many systems that can control home appliances using android based phones/tablets. Each system has its unique features. Currently certain companies are officially registered and are working to provide better home automation system features.

Following models describes the work being performed by others.

i. K. Bromley, M. Perry, and G. Webb, 2003 "Trends in Smart Home Systems, Connectivity and Services", www.nextwave.org.uk.

ii. M. Kovatsch, M. Weiss, and D. Guinard, 2010,"Embedding internet technology for home automation", Proc. of ETFA, pp. 1-8.

iii. F. Moraes, A. Amory, N. Calazans, E. Bezerra, and J. Petrini, 2001"Using the CAN protocol and reconfigurable computing technology for Web-based smart house automation", 14th Symposium on Integrated Circuits and Systems Design, pp. 38-43.

iv. K. Gill, S.-H. Yang, F. Yao, and X. Lu, May 2009"A zigbee-based home automation system", IEEE Transactions on Consumer Electronics, vol. 55, no. 2, pp. 422-430.

v. N. Sriskanthan, F. Tan, and A. Karande, 2002, "Bluetooth based home automation system", Microprocessors and Microsystems, vol. 26, no. 6, pp. 281-289,.

vi. A.R. Al-Ali and M. Al-Rousan, 2004 "Java-based home automation system", IEEE Transactions on Consumer Electronics, vol. 50, no. 2, pp. 498-504,.

vii. H. Ardam and I. Coskun, 1291-1297, 1998 "A remote controller for home and office appliances by telephone", IEEE Transactions on Consumer Electronics, vol. 44, no. 4, pp.

viii. E.O. Heierman III and D.J. Cook, 2003, "Improving home automation by discovering regularly occurring device usage patterns", Proc. of Int. Conf. on Data Mining, pp. 537-540.

ix. Grid-Control web site, www.grid-control.com/Heimautomatisierung.htm (accessed 24 November 2013).

x. Alessandro Farina, Zsolt M. Kovacs-Vajna, Alberto leone, 1999, "Fingerprint minutiae extraction from skeletonized binary images, Pattern Recognition", Vol.32, No.4, pp877-889.

xi. N. Ratha, S. Chen and A.K. Jain, November 1995,"Adaptive Flow Orientation Based Feature Extraction in Fingerprint Images", Pattern Recognition, Vol. 28, pp. 1657-1672.

xii. Blythe, J., Jain, S., Deelaman, E., Gil, Y., Vahi, K., Mandal, A., & Kennedy, K. 2005. Task scheduling strategies for workflow-based applications in grids. In Proceedings of the 5th IEEE International Symposium on Cluster Computing and the Grid.

Our designed system has application layer prototype. The application is able to synthesize the speech data with the help of Google Voice Reorganization. The synthesized data are analysed and further processing is carried out. In layman words, our design system provides features of controlling the home appliances using voice commands.

The use of socket programming is performed to connect the android application with the raspberry pi. This further adds security to our system. The data are received only by the server at the specified port and

data are further analysed x. Our project is different in a sense it has its own software level application to control the home appliances.

IV. WORKING OF PROJECT

Presently, conventional walls are located in different parts of home makes it difficult to the user to go near them to operate and thus requires a lot of maintenance and effort. Even for elderly and physically challenged people to do so, it is difficult. This project demonstrates a simple home automation system that allows the user to control it with a wireless device such as a Wi-Fi or Bluetooth enabled mobile phone. A desktop PC is used to run the server software.

The System allows the user to control each of the lights and fans individually. It can automatically turn off the main lights and turn on a night lamp at a specified time. By measuring the signal strength, it can detect when the user enters room and automatically turn on the light and fans, and then automatically turn them off when the user leaves the room.

Fingerprint door locks are advanced security locks of door control units that allow you to use your fingerprint and, in most cases, pin codes and regular keys on doors (both in business and in your home). curing household with biometric fingerprint Securing household with biometric fingerprint technology. Owners do not need to carry keys technology. Owners do not need to carry keys anymore. Users can open the door simply by anymore. Users can open the door simply by touching the fingerprint reader. touching the fingerprint reader.

Make your washbasin tap work automatically when you put your hands just below the water tap outlet. This infrared-based automatic washbasin tap controller system detects any interruption of the IR rays by your hands or utensil and water automatically starts flowing out of the tap.

CONCLUSION

The prime objective of our project is to use the Smartphone to control the home appliances effectively. The switch mode and voice mode are used to control the home appliances. The video feedback is received in the android app which streams the video of IP- Camera.

This project is based on the Raspberry pi, Android platform Java and Python. These platforms are Free Open-Source Software. So, the overall implementation cost is low and can be easily configured. User can easily interact with the android phone/tablet. The user can send commands via the switch mode or speech mode. The data are being analyzed by the application and are sent over a network. The Raspberry pi acts as a server, analyses the data and activates the GPIO (General Purpose Input Output) Pins. The GPIO Pins are connected to the relays switch which activated the required home appliances.

In this way, automation process is carried out. This is a simple prototype. Using this as a reference further it can be expanded to many other programs.

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