Android Based Home Automation System Using Raspberry PI

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Abstract-*This project represents the style of Home Automation System (HAS) with low value and wireless system. This technique is intended to help and supply support so as to satisfy the wants of aged and disables in home. Also, the smart home idea within the system improves the quality living reception. The switch mode area and voice mode area unit accustomed management the house appliances. The video feedback is received within the mechanical man application that streams the video of IP Camera. The main system implements wireless technology to produce remote access from sensible phone the look remains the present electrical switches and provides additional safety management on the switches with low voltage activating methodology. The switch standing is synchronic altogether the system whereby each computer programming indicates the S64000 time existing switches standing. The system meant to regulate electrical appliances and devices in house with relatively value style, easy interface and easy installation.*

I. INTRODUCTION

several years. The terms “Smart Home”, “Intelligent Home” followed and has been accustomed to introduce the thought of networking appliances and devices within the house. Home Automation Systems(HASs) represents an excellent analysis chance in making new fields in engineering and computing. HASs include centralized management of lighting appliances, security locks of gates and doors and different systems, to supply improved comfort, energy potency and security system. HASs are changing into style these days and enter quickly during this emerging market. However, end users, particularly the disabled and aged thanks to complexity and value, don’t invariably settle for these systems. Due to the advancement of wireless technology, the square measure, many completely different of connections square measure introduced like GSM, Wi-Fi and Bluetooth. Every connection has their own distinctive specifications and applications. Among the four popular wireless connections that are always enforced in HAS project, LAN is being chosen with its appropriate capability. The capabilities if {WiFi|wiree=less local square measure network|WLAN|wireless fidelity|Wi-Fi|local area network|LAN} are quite enough to be enforced within the style. Also most of the present laptop/ notebook or smartphones keep company with inbuilt LAN adapter. It’ll indirectly cut back the value of this system. This project forwards the planning of home automation and security system victimization Raspberry Pi, a credit sized pc. Raspberry Pi provides the options of a mini computer, extra with its GPIO pins wherever different elements and devices may be connected. GPIO registers of Raspberry Pi square measure used for the output functions. We have designed an influence strip which will be simply connected to GPIO pins of the Raspberry Pi. The home appliances square measure connected to the input/output ports of Raspberry Pi on with the facility strip and their standing is passed to the Raspberry Pi . The humanoid running OS in any phone connected to a network will access the standing of the house appliances via an application. It presents the planning and implementation of an automation system that can monitor and management home appliances in humanoid phone or pill.

II. RELATED WORK

As per our survey, there exist several systems which will manage home appliances mistreatment home appliances mistreatment android based mostly phone/tablets, every system has its distinctive options presently bound companies area unit formally registered and area unit operating to produce higher home automation system options. Following model describes the work being performed by others.

N. Sriskantham explained the model for home automation mistreatment Bluetooth via laptop. But sadly the system lacks to support mobile technology.[7] Muhammad Izhar Ramli designed an image device system using web. They conjointly set the server with machine restart if the server condition is currently down.[8] Hassan has developed a phone booth and a PIC remote controlled device for dominant the devices pin check rule has been introduced where it absolutely was with cable network but not wireless communication.[11] Amul Jadhav developed associate nursing application during a universal XML format which might be easily ported to the other mobile devices instead of targeting one platform.[14]

Each of those system has their own distinctive options and on comparison to at least one another lacks some advancement. Our designed system has application layer

image the appliance is in a position to synthesize the speech knowledge with the assistance of Google Voice Reorganization. The synthesized knowledge area unit analyzed and additional process is allotted. In common words, our style system provides options of dominant the house appliances mistreatment voice commands. The use of socket programming is performed to attack the mechanical application with Raspberry Pi. This additional adds a security to our system the information area unit received solely by the server at the required port and knowledge area unit additional analyzed. Our project is different during a sensing its own software system level applications to manage the house appliances.There exist many systems on home automation based on Bluetooth, internet etc. But they have their own limitations.

III. PROPOSED SYSTEM

The focus of this project is on serving to users to control home appliances with their own smartphones and to assist senior or incapacitated individuals, live additional freelance life as long as potential the target of our system is to require care of many domestic systems which will unremarkably be tough for those that are handicapped or senior, to require care of. The projected plan can permit a user with any golem enabled device to run a bit of downloadable software package on any mobile device like golem smartphones. The application can permit the user to manage a tool that's connected to any appliance that's Pi enabled. The main target of this application are going to be a direct a system with door sensing element notification, a light weight system, temperature sensors, etc. Sensors are going to be connected to the house appliance with Pi in order that they will be monitored and controlled. The user might conjointly check the standing of the skin lightweight and switch on and off the sunshine while not the necessity to usage out of bed. These devices would conjointly profit users with restricted quality which will have a tough time attending to or perhaps reaching their lightweight switch. The objectives need an outsized quantity of technology. The program should be as straight forward and powerful as potential and operates in a very self-organized manner.

3.1. System Architecture

The following diagram shows the system architecture.

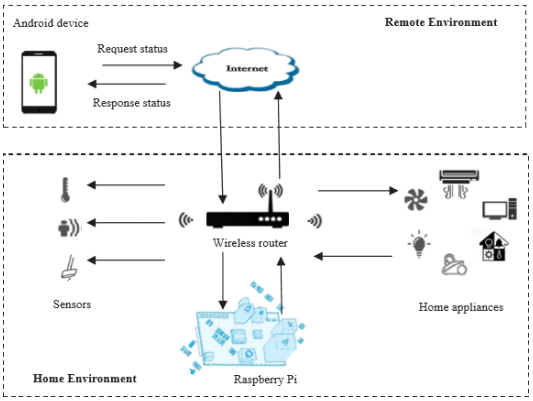

Fig 5.1 System Architecture

3.2. System Modules

This represents a smart home automation system using Raspberry Pi, an android device using wireless router. The main objective is to provide a comfortable, convenient user interface by monitoring and controlling the devices present in the home environment. Raspberry Pi controls the flow between android device and sensors. The OS which is used on Raspberry Pi is Raspbian OS. MySQL database is created on it which contains information about the sensors. An application is installed on a smartphone. Any remote user can monitor and control the home environment using the application and this communication can be done locally or remotely. All the appliances generate information about current status. This status is generated by a sensor which is integrated with the device. Different sensors are used according to the device. Devices such as light switches, power plugs, etc. which are compatible with the transmission mode and a connected control system are used. The project is divided into 2 parts, hardware part and software part. The hardware part consists of controlling relay circuit using Raspberry Pi and the software part consists of programming for web browser and the android application.

3.2.1 Hardware Implementation:

The Raspberry Pi is a credit-card-sized single board computer developed in the UK. The hardware interaction takes place through Wi-Fi. All the devices are also connected to the Raspberry Pi through Ethernet. A relay is electrically operated switch. It allows low power circuits to switch a relatively high voltage. Relay coils operate from a particular voltage which is often 5V or 12V. Relay circuits are used to control appliances.

3.2.2 Software Implementation:

Software part is the programming for the web browser and the android application. The Python code serves as an interface for Raspberry Pi to connect to appliances and

sensors. Web User Interface is used to control the on/off buttons from web. The application is developed using Android studio. This application consists of buttons to turn on/off the appliance. The back-end of this button consists of "post" requests which is used to turn on/off the appliance.

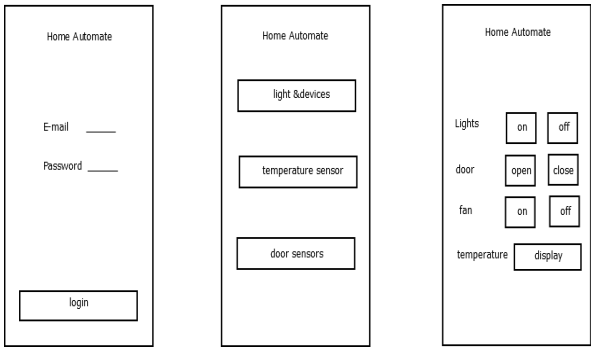

Fig. 2: Proposed interface for android application

IV. APPLICATIONS

To make the home appliances flexible in control, any device capable of Wi-Fi connectivity will be able to control the home appliances from remote location. The application is to be highly extensible, with possibility of adding features in the future as needed. Android management LED sensible Home Automation ought to be able to control the house appliances wirelessly with effectively and expeditiously. To develop Associate in Nursing application options, the features of Switch mode application. Switch mode or Voice mode may be accustomed management the switches of home appliances. Use of secure protocols over Wi-Fi so different devices cannot management the appliances choices for secure association is SSL over, SSH. To make the house appliances versatile and device capable of Wi-Fi connectivity can able to manage the house appliances from remote location. The application is to be extremely extensible with chance of adding options within the future. This system is meant to help and supply support so as to satisfy the needs of old and disabled in home. Home appliances are often simply controlled via a Mobile. Standing of sunshine, fan and alternative electrical appliances will be known. With the assistance of online-management appliances are often manages. This helps to produce security.

V. FUTURE SCOPE

The project aims at planning for dominant the house appliances which will be controlled wirelessly via Associate in Android application that has the options of switch mode. Associate in Android application is run on humanoid device. The system integrated with completely different options are often applied within the following fields. The system is often employed in home, tiny offices to the large malls. The system is often used from house to offices to regulate electrical appliances for remote access of appliances in web or computer network. The home/office appliances are often controlled in intra-network or are often accessed via Web, for the event of technology friendly atmosphere. The system incorporated the utilization of technology and creating it. Sensible home automation. By the utilization of day to day gadgets we are able to utilize them for various prospective. Technology Exposures are Google's Android open source technology, Wi-Fi technology, Interfacing Wireless Adapter to Raspberry pi, Interfacing relays, Embedded programming. Further Enhancements: Looking at this state of affairs we are able to build cross platform system which will be deployed on numerous platforms like iOS, Windows. Limitation to manage solely many devices is removed by extending automation of all different home appliances. Network is connected to web and security. Camera is controlled from other places, permitting the user to look at activity around a home or business. Security systems will embody motion sensors which will observe any quite unauthorized movement and apprise the user. Scope of this project is expanded to several areas by not limiting to solely home.

VI. CONCLUSION

The main goal of the paper was to design a home automation system which is easy to implement and can work under a short-range. The appliances which were used are easily available and this project is not just limited to the appliances discussed in this paper. This technology can be implemented in a wide variety of applications with the use of sensors and Raspberry Pi. This system required only a small amount of expertise. With the use of android application, user can monitor and control the home automation system. This will also help to save electricity and is less time consuming and helps senior citizens also.

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