ANDROID APP-BASED DIGITAL HOME AUTOMATION SYSTEM

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ABSTRACT

Now a day's technology becomes ever more invasive, the design challenges in home automation are an increasing number of obvious. This project is a part of this revolution. Even more it becomes more difficult for the elderly or physically handicapped people to do so. This paper portrays how to control home appliances utilizing android application

This project aims for having a centralized control over all the electrical and electronic appliances used at a home. Domestic home equipment can personally be controlled both from in the domestic and remotely. This is useful to bodily challenged humans.

Keywords: Internet of Things (IoT), Pic Microcontroller, Node MCU, Home Automation

I. INTRODUCTION

In recent times, we’ve remote controls for our television sets and other electronic systems, that have made our lives actual easy. Have you ever puzzled about home automation which would provide the ability of controlling tube lighting, fans and other electrical appliances at home using a remote control? Off-course, Yes! But, are the available options price-powerful? If the answer is not any, we’ve found a approach to it. We have provide you with a new system called home automation. The concept of “Smart Home Automation” [1] was developed in 1984 by American Association of House Builders. The primary idea behind the development of clever Home Automation system is to fully automate the controls of various devices and home equipment.

This system is tremendous-cost effective and can give the user, the potential to manipulate any electronic tool without even spending for a remote control. This project allows the customer to govern all the electronic gadgets the use of his/her smart telephone. Time is a completely precious factor. Every person wants to keep time as plenty as they can. New technologies are being introduced to store our time. To save human beings’ time we are introducing Home Automation system. With the help of this device you could control your property home equipment out of your mobile phone. You may switch on or off your home appliances.

II. OBJECTIVES

• To construct a wireless home automation system controlled by a smart phone specifically an android device.
• To layout and enforce value powerful home automation system
• To design a user pleasant and a safe system to manipulate home appliances mainly aimed to resource the elders and handicapped.

III. EXISTING WORK

• R. Piyare has implemented low cost flexible and wireless solution to the home automation system
• N. Sriskanthan has implemented the model for home automation using bluetooth via pc, but bluetooth range is limited
• Jitendra R. Has implemented a system with ZigBee network and showed how to eliminate the complications wiring in case of automation
• Alper Gurek, Caner Gur, Cagri Gurakin, Mustafa Akdeniz, designed an Android based home automation system that allows multiple users to control the appliances by an Android application or through a web site.[3]
• Shiv Kumar designed a prototype in which the master controller of smart-home system supports both Bluetooth and Internet connectivity.[4]
IV. SCOPE AND LIMITATIONS

- Dependency on Internet.
- Setup and configuration.

V. COMPONENTS

1. Pic Microcontroller

PIC18F4520 microcontroller is used on this home automation system. PIC microcontroller is used to send instructions to obtained commands from Nodemcu (ESP8266 12e). Microcontroller switch on or flip off hundreds based totally on acquired instructions from Nodemcu wifi module. PIC microcontroller is interfaced with Nodemcu the use of serial verbal exchange. PIC18F4520 is a PIC microcontroller, introduced microchip, and mainly used in automation and embedded structures.

Fig 1. PIC18F4520 Microcontroller

2. Wifi module: ESP8266

The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack which can supply any microcontroller get entry to for your WiFi network. The ESP8266 is capable of both website hosting an application or offloading all networking functions from any other application processor.

The ESP8266 module is a very value powerful board with a huge, and ever growing, network. Esp8266 is a low fee, compact and powerful module. The ESP8266 is a completely user friendly and low fee, compact and powerful module. The ESP8266 is a completely user friendly and low fee tool to provide internet connectivity to your initiatives. It could without wifi wireless fetch records and add it to the internet making net of factors as clean as possible.

Fig 2. Wifi Module: ESP8266

3. Cloud Storage

Cloud IoT is a complete set of gear to connect, technique, store and analyze information each at the threshold and within the cloud. The platform in includes scalable, fully-managed cloud services; an incorporated software stack for side/on-premises computing with device gaining knowledge of skills for all of your IoT desires.

4. Android Application

Android is a mobile operating system based totally on a changed version of the Linux kernel and other open supply software program, designed typically for contact cellular devices such as smart telephones and mobile. Android is evolved via a consortium of developers referred to as the Open Handset Alliance, with the principle contributor and commercial marketer being Google.
5. Relay

The relay module is a separate hardware tool used for switching gadgets on or off. Relay is nothing but it's miles the electromagnetic switch. Relay lets in one circuit to interchange another circuit at the same time as they're separated. Relay is used when a low voltage circuit to show on and rancid the tool which required high voltage for its operation.

![Relay Module](image)

**Fig 3. Relay Module**

6. PIC KIT 3

Microchip’s PICkit 3 is a Circuit Debugger or Programmer makes use of in-circuit debugging common sense integrated into every chip with Flash memory to offer a low-cost hardware debugger and programmer.

The MPLAB PICkit 3 permits debugging and programming of PIC18f4520. PIC KIT 3 connect to the pic microcontroller with respect to pin and the use of USB we are able to debug the program into the chip from MPLABX IDE.

![PIC KIT 3](image)

**Fig 4. PIC KIT 3**

7. MPLABX IDE

MPLAB X is the latest edition of MPLAB, and is developed on the NetBeans platform. MPLAB X Integrated Development Environment (IDE) is a software program that runs on a PC to develop applications for Microchip’s devices. It support project management, code editing, debugging and programming of Microchip 8-bit PIC and AVR (including ATMEGA) microcontrollers, 16-bit PIC24 and dsPIC microcontrollers, as well as 32-bit SAM (ARM) and PIC32 (MIPS) microcontrollers. Here we used this software to program our pic18f4520 microcontroller as per our requirement.
VI. PROPOSED METHODOLOGY

1. First we have to create the android application by connecting it with cloud with use of authentication token and api key of the cloud to send the data of appliance is on or not.

2. Later this data is fetched by the esp8266 by Arduino IDE

3. Then it is interfaced with the Pic microcontroller from which we can connect more than 42 appliances by android application.
VII. CONCLUSIONS

Based on all the systems surveyed and their benefits and drawbacks, this paper provides the functions to be possessed by using a great system for home automation. In this project, Android is interfaced with the firebase cloud and then data of cloud to be send to the esp8266 that is Wi-fi module. Wi-fi module is interfaced with the Wi-fi module. The user interface should be a web application that has an associated mobile application. So that people of all kinds can access the system. Such a system should also have the feature of being easy to install. Only then can automated homes become commercially viable.

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VIII. REFERENCES


[4] Shiv Kumar, Member, IEEE, “Android Based Smart Home System with Control via Bluetooth and Internet Connectivity”, School of Engineering and Physics University of the South Pacific Suva, Fiji 2014