

CAPTIOUS NIDUS

(Home Automation based On IoT (Internet of Things))

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Abstract— Earlier it was the Internet of computers, later it became internet of mobile, now the trend is internet of things or internet of everything where unconnected and uniform devices of our daily lifestyle communicate using internet. Our Project is about Home automation based on IoT(Internet of things) which includes everything that you can imagine to control and automate your home. Smart home is a very promising area, which has various benefits such as providing increased comfort, greater safety and security, a more rational use of energy and other resources thus contributing to a significant savings..This Project is implemented using Arduino Uno with the help of Ethernet shield. The Ethernet shield acts as a medium to connect to the internet , inturn reducing the overall cost of the project. The four channel relay device is used as an interface between the Arduino Uno and Electrical Appliances. Most importantly the project focuses on controlling and monitoring the home environment via a website which can be accessed by aremotePC from any place at anytime thus eliminating the need of Single dedicated PC.

I. INTRODUCTION

Home automation or smart homes (also known as domotic) can be described as introduction of technology within the home environment to provide convenience, comfort, security and energy efficiency to its occupants. The Internet of Things (IoTs) can be described as connecting everyday objects like smart-phones, Internet TVs, sensors and actuators to the Internet where the devices are intelligently linked together enabling new forms of communication between things and people, and between things themselves. With the introduction of the Internet of Things, the research and implementation of home automation are getting more popular. IoTs technology are been applied to create a new concept and wide development space for smart homes to provide intelligence, comfort and to improve the quality of life. Various wireless technologies that can support some form of remote data transfer, sensing and control such as Bluetooth, Wi-Fi, RFID, and cellular networks have been utilized to embed various levels of intelligence in the home.

Arduino is a platform that you can use to quickly prototype electronic systems. It is actually the perfect platform to build home automation systems. A Ethernet Shield based automation system is also implemented along with arduino for remotely controlling the appliances. The System work as a remote controller for the electrical appliances at home to check whether it is ON or OFF. We are integrating some of these systems in an Internet of things perspective by sending some data directly to the cloud server.

Although this system procedure overcome the shortcomings of communications techniques, this method provides a parallel implementation of hardware that results using fast algorithm execution. The proposed Arduino Uno controller provides a simple implementation to the system as compared to the other types of controllers. This system has two operational modes; the first one of them is based on a cellular phone while the second one is considered using a website. To support our claim, a hardware implementation for the proposed system is developed to verify its reliability and limitations. In order to address the mentioned issues of flexibility and functionality, we designed and implemented a novel, standalone, flexible and low cost home controlling and monitoring system.

II. NEED OF PROJECT

Existing System

When it comes to controlling of home humans have no option then to themselves go to the switching socket to switch ON or OFF the appliances as and when required. Also it's a human tendency to forget switching off the light and fan often when they leave their house in a hurry. Today no system prevails to address these issues smartly. Keeping this in mind our project utilizes web service in the most open and interoperable way to provide remote access of home devices to the users. In addition our project offers a powerful means for helping and supporting special needs of the elderly and people with disabilities by monitoring home environment through a single click on the control button of web page designed for it. This webpage created is controlled by the web browser of any local PC in the same LAN.

Problem Statement

Home automation systems face four main challenges, these are high cost of ownership, inflexibility, poor manageability, and difficulty in achieving security. The main objectives of this project is to design and implement a home automation system using IoT that is capable of controlling and automating most of the house appliances through an easy manageable web interface. The proposed system has a great flexibility by using Ethernet shield to interconnect its distributed appliances to home automation server. This will decrease the deployment cost and will increase the ability of upgrading and system reconfiguration.

Proposed System:

The proposed system is a distributed home automation system that consists of a server, Arduino and Ethernet shield. The server is configured to control and monitor more than one electrical appliances. Arduino Uno board with the ethernet shield connected to it acts as a web server. Automation system can be accessed from the web browser of any local PC in the same LAN using server IP. The Ethernet shield is a network infrastructure that connects server to Arduino which through relay gets connected to electrical devices. The Ethernet shield is chosen to improve the system security (instead of WiFi

connection) which helps to increase the scalability and reduces the overall cost.

Advantages:

The home appliances are monitored and controlled all the time, even after the devices are left on, when remembered it can be switched off immediately hence reducing the bill. The devices can be accessed from anywhere at any time virtually. As we are using Arduino not Raspberry pie, this system's speed has considerably increased. Also rather than user entering the code each time to on or off a device they can simply use a GUI interface. Thus securing our houses as no dangerous devices are kept on for a long time.

III. IMPLEMENTATION AND DESIGN

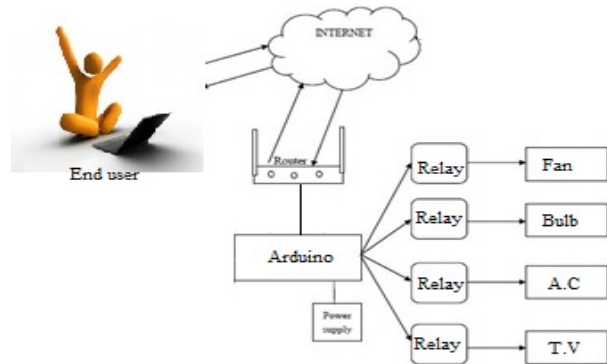


Fig1

The proposed home automation system as shown in fig1 consist of Arduino Uno, Ethernet shield (overlapped over the Arduino and connected to the laptop via Ethernet cable) and a four channel relay device. Initially arduino connects to the internet through the Ethernet shield and once the connection is established the script/code uploaded on the arduino board gets executed. The internet connection is supported by a web browser of a local desktop pc in the same LAN. The user needs to enter the server IP within the same LAN connection such that any remote pc or handheld device using internet can have an access to the web page created. In addition to this the fig1 also shows the relay connection wherein each different pins of a four channel relay are connected to the separate electrical appliance. The user can monitor the electrical appliance through the internet via a web server. So if the light/fans or any electrical appliances are left ON in hurry can be seen and turned of remotely through simply typing the IP address of the web page and clicking the OFF button of the required appliance.

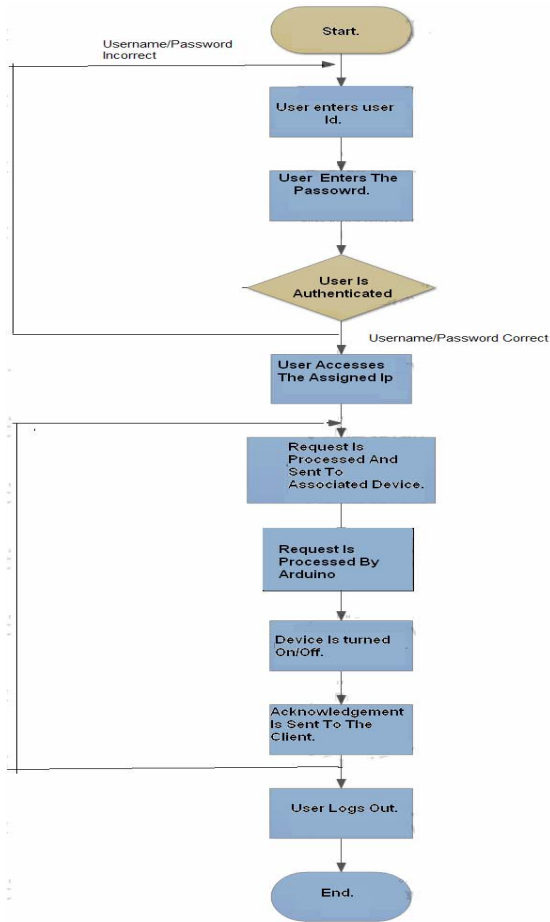


Fig 2

IV. RESULT

After the successful connection to the server, the data is sent to the web server for monitoring of the system. The figure shows the web server page which will allow us to monitor and control the system. By entering the assigned IP address in the web browser this web server page will appear. The web server gives the information of the motion state in the house. Basically it gives the status of the various electrical appliances like light, fan etc which we can control remotely.

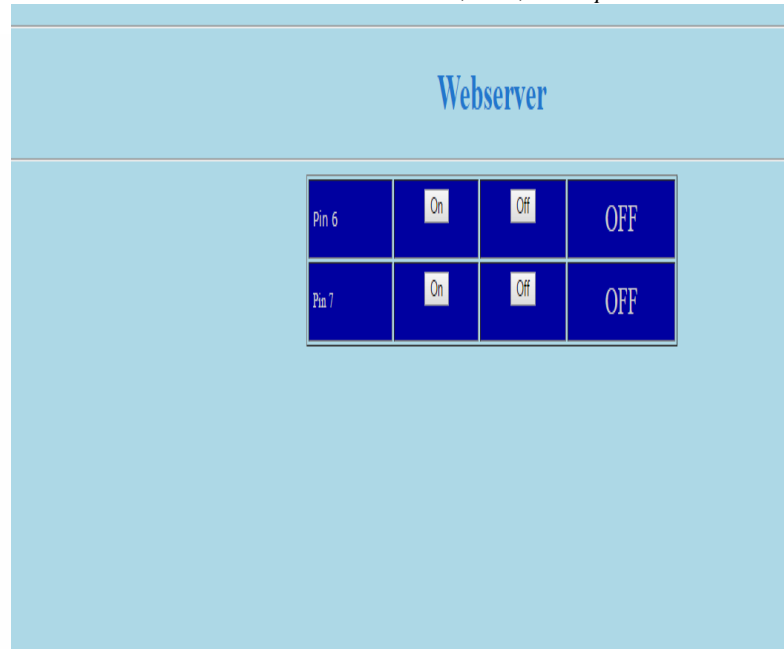


Fig 3

V. REQUIREMENTS

Software Requirements

- Arduino ide
- CSS
- AJAX
- Html
- Internet Explorer

Hardware Requirements

- Ethernet Shield
- Ethernet cable
- Relay
- Arduno uno (atmega 36)
- SD Card

VI. CONCLUSION

With the consciousness about energy efficiency growing and more and more people embracing it as a way to save money. Our project proves to be as a tool to provide effective energy efficiency at our homes. Also from providing

authenticated user the access to the smart home system , we also gurantee to provide them the required privacy.

VII. ACKNOWLEDGMENT

We wish to take this opportunity to thank our project guide **Prof. Bushra Shaikh** for her invaluable support and guidance throughout our project work. Her generous advice and suggestion helped us work on our weaknesses.

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