HOME AUTOMATION USING Wi-Fi INTERCONNECTION

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Abstract: Automation is a technique or a system of controlling a process by electronic devices with reducing human involvement to a minimum. This report presents a design of monitoring and controlling home automation system from an android application based on Arduino. This system uses Wi-Fi technology as a communication protocol to connect system components. Home automation system consists of two main components; the first part is android application that can give orders to units that one wishes to control by locally or remotely and the second part is Arduino that has an appropriate interface to sensors and appliances of a home automation system and communicates with an android application through wireless technology. The Automation system can have a vital role in reducing the total energy consumed by home appliances. The main objective of home automation is to help handicapped and old aged people who will enable themselves in controlling home appliances.

Keywords: **Arduino, ESP8266 Wi-Fi module, Light Control, Temperature Control.**

INTRODUCTION

The home automation systems are gaining popularity day by day due to their ease of use and wide operations capabilities. Some require home automation system to satisfy their needs and comfort while for physically challenged people it can provide great assistance. There have been several researches and developments on the home automation systems. In the present times, we can find most of the people clinging to their mobile phones and smart devices throughout the day. Hence with the help of his companion – a mobile phone, some daily household tasks can be accomplished by personifying the use of the mobile phone. To develop an Automatic Control system that helps in controlling the devices connected to it, with the help of Wi-Fi interconnection. To ease the way of accessing the devices in controlling it, and maintaining the proper log of the data which the device senses. To develop a system which would be very useful for handicapped persons in doing works on their own without seeking any help.

1.1 EXISTING SYSTEM

The literature related to the research topic has been reviewed for last twenty years in order to find out work

carried out by various researchers. There are many systems for remote monitoring and control designed as commercial products or experimental research platforms. It is noticed that most of the research carried out belongs to the following categories

A. Internet based Monitoring using Servers, GPRS modems, etc. with different approaches.

B. GSM-SMS protocols using GSM module individually or in combination with Internet Technologies.

C. Wireless Monitoring using Bluetooth, Wi-Fi, Zigbee and RF.
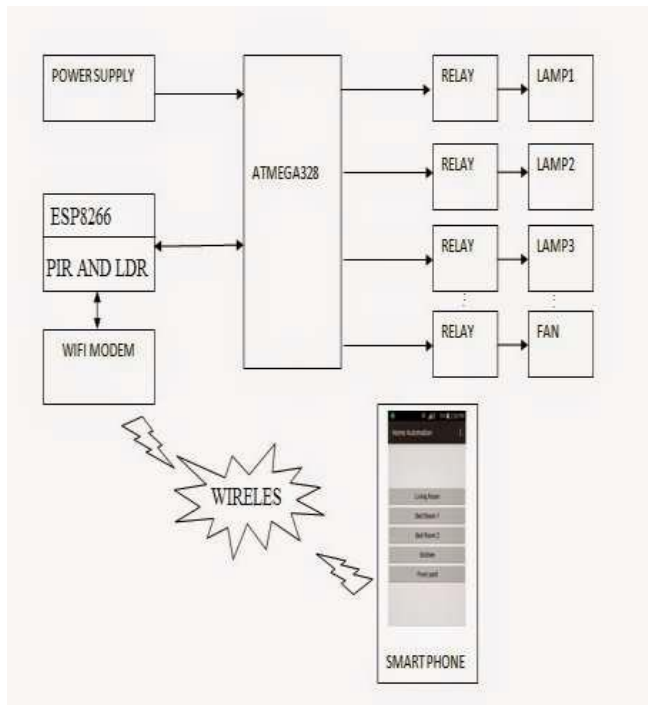
Fig.1.1 Circuit diagram

Fig.1.2 Block diagram

The entire appliance attached to relay are controlled by Microcontroller.
ESP8266 is a Wi-Fi module interface to Microcontroller for wireless communication.

1.2 PROBLEM IDENTIFICATION

DUE TO WIRING: connection of the devices is set through wires which reduces the speed in data transfer and also if there is any cut in the wires, it's not so easy to identify for a longer connection.
SLOW DATA TRANSFER: transfer of data is very slow in process and it takes time for performing any action.

CONNECTIVITY PROBLEM: connectivity methods like Bluetooth, radio frequency and zig-bee has a bit short range for the connection to be enabled.
SLOW PROCESSING: only a single board is used in connecting all the devices which makes it slower in terms of processing the data and also only one process could run at a time.

PROPOSED SYSTEM

a) The proposed system is based on the interconnection between Wi-Fi modules in which the client wifi modules will be connetected to the station wifi module which will be giving commands through the smart phone which is connected to the same as an external device, will have priority in giving instructions and extracting work over them, works in master-slave principle.

b) There won't be any relay connections between the devices which helps in reducing the time required in data transfer and loosing of data.

c) There would be a continuous monitoring of data that is being transferred and also generating a log out of it.

d) Mobile application is being developed for a user friendly interaction between the user and the devices.

e) The whole system is wireless, so there won't be any loss in data at maximum and also there won't be any problem due to wiring.
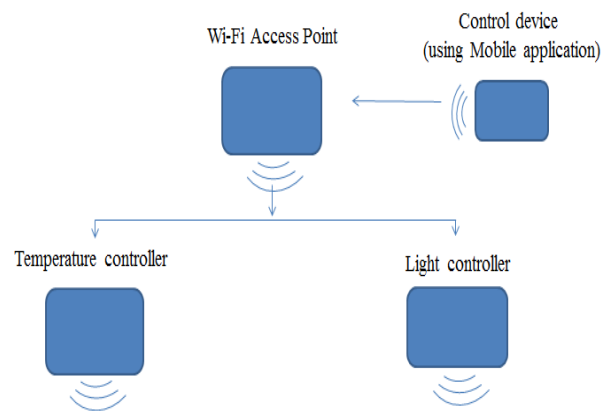

Fig.2.1 Block diagram

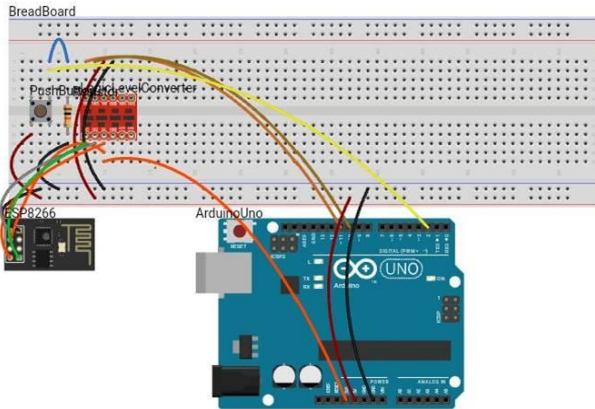## 2.1 EXPERIMENTAL SETUP

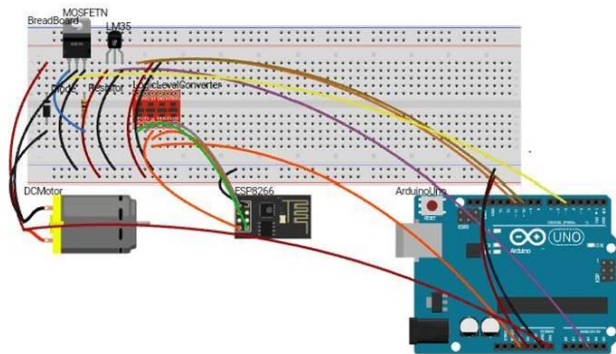Fig.2.2 Hotspot Device (Station)

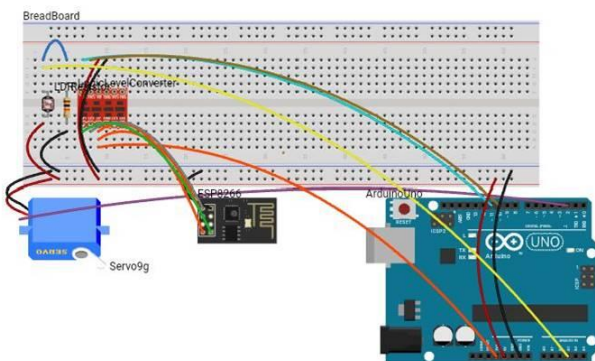Fig.2.3 Temperature control Device (Client)

Fig.2.4 Light control Device (Client)

2.2 EXPERIMENTAL PROCEDURE

i.   Design and implementation of the Temperature Control device, Light Control device and Access point device with the use of Wi-Fi module for interconnection.

ii. Using AT commands in the Wi-Fi module ESP8266 and modifying it as an access point for one Device.

iii. For the rest of the Device, modifying the module ESP8266 as node for both transferring and Receiving the date.

iv. Developing an application that is suitable for the android device which will be able to control the Devices by connecting it to the access point Device and giving away the command for the operation to be performed.

RESULT

The future smart homes have many complications and thus a new technology is being introduced in recent times, hence people automate their own works or duties. In this paper, instead of using relays, Wi-Fi

is used for communication and integrating all the devices in wireless mode. It makes the transfer of data faster and the processing of data much faster than other technology. This system is mainly proposed for the old aged and dis-abled people for doing their very own domestic works.

CONCLUSION

Home automation system will bring more convenience and comfort to people's life. The android-based smart home application communicates with the Wi-Fi module ESP8266 which acts as an access point. Using android application user could control and monitor the smart home environment. Arduino provides an economic and efficient platform to implement the smart home automation system. This system can be used to communicate with many numbers of devices. It minimizes the wastage of electricity and it consumes less time, also it helps the old aged and dis-abled people in doing the basic domestic works on their own.

REFRENCES

[1] A.J. Bernheim Brush, Bongshin Lee, Ratul Mahajan, Sharad Agarwal,Stefan Saroiu, and Colin Dixon, "Home Automation in the Wild:Challenges and Opportunities", CHI

2011, May 7– 12, 2011, Vancouver,BC, Canada

[2] N. Sriskanthan, F. Tan, A. Karande," Bluetooth based home automation system" , Microprocessors and Microsystems journal, issue 26 (2002) pages 281– 289, Elsevier Science B.V., 2002

[3] Malik Sikandar Hayat Khiyal, Aihab Khan, and Erum Shehzadi, "SMS Based Wireless Home Appliance Control System (HACS) for Automating Appliances and Security", Issues in Informing Science and Information Technology Volume 6, 2009

[4] D. Greaves, "Control Software for Home Automation, Design Aspects"

[5] http://esp8266.com

[6] http://arduino.cc

[7] http://arduino.org

[8] http://openhomeautomation.com

[9] http://instructables.com