B.Sc. Thesis Synopsis

HOME AUTOMATION SYSTEM Using IoT

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Abstract:

In modern era, home automation will become a necessity. Home automation is basically the digital connectivity among various devices. This project involves the making of a home automation system using IOT and STM32F407VG microcontroller. As we know that with each passing day world is moving towards advanced technology, trying to bring relief in man's doings and advancing the worth of life. Living in such a world, the use of automatic home switching is becoming a prerequisite. The potential of IOT is shown in this paper by designing and implementing a home automation system. The home automation system which is based on IOT gives remote access to the user for controlling and monitoring purposes. Due to low power utilization, Zigbee wireless devices are the most preferred. By taking benefit of a short-range wireless protocol, Zigbee provides complete interoperability. Complete home automation which is wireless, is made. The home switches can be controlled by a IOT-enabled touch screen. You can control and operate your electronic devices in any corner of your home. This application is useful for elderly or handicapped people who find it problematic to go near the board switch for the processing of a certain electronic device. Additionally, the working of the home automatic system is encompassed in this report and this report will also highlight the advantages and drawbacks of an automatic home robotics system.

Keywords—Home Automation System; ZigBee; Internet of things (IoTs).

Introduction:

Just think of the moment that how you will feel if you are able of switching ON your fan without even moving close to switch board? How about having a system that operates by sensing the certain physical quantities i.e. temperature, pressure and that detects the usage of extra power and electricity and it alerts you? I know you are feeling very excited to have such system. This is basically what we called as Home Automation System using IOT (internet of things). Home automation system is becoming very popular day by day as it enhances the quality of life and make the life easier for all of us. In such an advanced technology era, everyone wants to have systems like home automation to reduce the burdens and to make life easier and more comfortable. A home robotics system makes the processes of house electronic applications more convenient and it also helps in saving energy. Numerous home automation systems practice mobile phones to interconnect with microcontrollers using wire and wireless communication techniques such as Bluetooth [1], GSM [2], ZigBee [3], Wi-Fi [4] and EnOcean [5]. Automation, is information of technology used to control electrical and

electronics equipment's in order to reduce the human involvement. Home automation system is basically automatic governing of all electronic appliance in homes or even remotely through wireless communication. All electronics appliances used in homes such as automatic machines, air-conditioners, audio and video systems, computers, kitchen appliances and lightening systems are controlled and their operation is possible with this system. It grants the end-users to control and monitor electrical appliances. The hardware construction of the system comprises of relay module, capacitors, voltage regulators, resistors, connectors, IOT, MT8077IC, STM 32F407VG microcontroller and mobile-phone. From IOT protocol, various applications can be benefited: home security systems, building automation networks, industrial control networks, PC peripherals, and remote metering, etc. IOT wireless protocol provides few resources requirements, less complexity, and a standard set of specifications, in contrast to other wireless protocols. The aim of this article is to develop advanced electrical appliances such as pumps, fans and other devices as well as controlling and monitoring at home by wireless IOT devices from a distant location. On a special-purpose processor, the system runs a user-defined program, by using real-world sensor inputs as operands. For Zigbee-protocol there is basically three layers in home automation system. The uppermost layer is sensor/input layer, that can be from limit switches, sensors, or any other type of input. The Control Unit is the middle layer. The middle layer reads the input as well as carries out actions on the basis of value of inputs and control program specified by user. The command is given to the actuator layer by control unit outputs. The purpose of the actuator layer is to form and send commands to real-world systems i.e. music systems, security systems, air conditioners, lights, and fans.

Working:

The basic working of home automation system is such that, first of all we give 230V AC supply to a step down transformer which steps down the voltage from 30V to 12V AC. We use a full wave bridge rectifier that converts the AC to DC, but output of rectifier is not pure DC so we use capacitors that behave as a filter circuit. Capacitor, behaves as a filter that basically filters out the ripples from the rectified output voltage waveform and fed the output to voltage regulator that changes 12V DC to 5V DC used by STM 32F407 microcontroller. The signal from mobile phone or any other source is received by MT8077IC that is capable of getting signal in binary form from the mobile phone and that information is transmitted to microcontroller. We place 4 LED's to show which number is pressed and to show its binary representation on respective 4 LED's. After receiving signal by microcontroller, the program will run and then according to respective signal and program instructions the relay module will

work. Which relay will operate depends upon the sending signal by smart phone. After the operation of relay module, the respective load connected with the working relay (whose led is ON) is in active state while other loads are still inactive as their respective led will not operate. We also use a 16*2 (LCD) light crystal display and a mobile phone application for the user interface. This system permits the handlers to regulate home utilizations by sending a message from android application to GSM modem. Furthermore, the LCD is used to represent some important notifications about the which signal is received and what is the state of relays

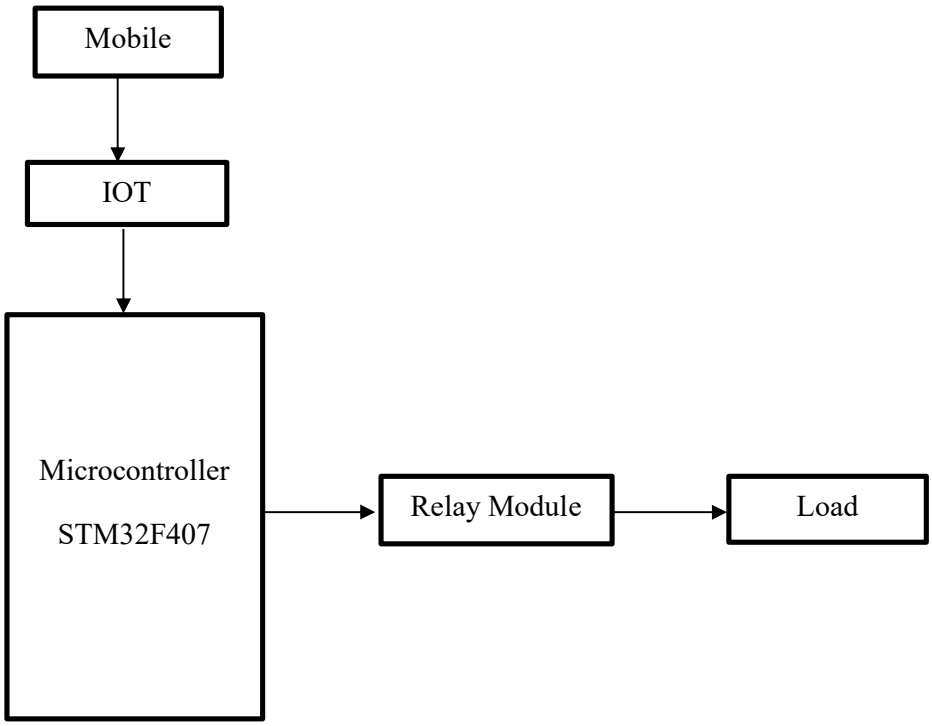

Fig. 1: Block Diagram of home automation system using IoT

Expected Results:

The main idea of this project is to construct a home automation system that makes life easier and more comfortable for all of us. The expected results of the project will be such that when we give signal which is transmitted or received by RF transceiver or can be send through a signal in form of binary bits using MT8870 IC, the particular load that concerned with that signal will be in operating mode by working of respective relay module. The basic goal is that there should be no false and wrong detection and wrong load will operate. The microcontroller should receive correct signal from RF transceiver and then transmit it to respective relay

module. The microcontroller will display correct information about the particular working on LCD.

Methodology:

The methodology of this report is such that it will be divided in the subsequent stages with proper stretch.

1. Wide-ranging and thorough study of construction and working of home automation systems.
2. Proper understanding and debugging of software portions.
3. Comprehensive knowledge of hardware components usage and their placements.
4. Examining the experimental results in demand to guarantee the accuracy of the project.
5. Writing a report that includes the advantages and drawbacks of the system.

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Comments of Supervisor

I certify that this is my own work. This work has not, in whole or in part, been presented elsewhere for assessment. Where material has been used from other sources it has been acknowledged. If this statement is untrue, I acknowledged that I will have committed an assessment offence and should be penalized accordingly.

Signature of Supervisor _____ Signature of Students_____

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Endst. No. Unive/ _____ Date_____

This proposal duly recommended by the Undergraduate Committee of the Department of Electrical Engineering meeting held on _____ is hereby forwarded to the Director Research for obtaining the approval of the Vice Chancellor.

Chairman,

Department of Electrical Engineering New Campus