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Survey on IOT based Home Automation System using ATMEGA 48 Microcontroller

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ABSTRACT: Home automation is becoming popular due to its numerous benefits. Home automation refers to the control of home appliances and domestic features by local networking or by remote control. Artificial Intelligence provides us the framework to go real-time decision and automation for Internet of Things (IoT). Complete autonomous control of an entire facility is the goal that any modern automation system attempts to achieve. The distributed control system - the computer networking of electronic devices designed to monitor and control the mechanical, security, fire, lighting, HVAC and humidity control and ventilation systems in a building or across several campuses .The Building Automation System (BAS) core functionality is to keep building climate within a specified range, light rooms based on an occupancy schedule, monitor performance and device failures in all systems and provide malfunction alarms. Automation systems reduce building energy and maintenance costs compared to a non-controlled building. Typically they are financed through energy and insurance savings and other savings associated with pre-emptive maintenance and quick detection of issues.

KEYWORDS: Home-Automation, Intelligence, Microcontroller(ATMEGA48), Sensor System, User-friendly Interface.

I.INTRODUCTION

Automation is a technique, method, or system of operating or controlling a process by electronic devices with reducing human involvement to a minimum. The fundamental of building an automation system for an office or home is increasing day-by-day with numerous benefits. Industrialist and researchers are working to build efficient and affordability automatic systems to monitor and control different machines like lights, fans, AC based on the requirement. Automation makes not only an efficient but also an economical use of the electricity and water and reduces much of the wastage[1]. IoT grant to people and things to be connected Any-time, anyplace, with anyone, ideally using any network and any service[2]. Automation is another important application of IoT technologies. It is the monitoring of the energy consumption and the Controlling the environment in buildings, schools, offices and museums by using different types of sensors and actuators that control lights, temperature, and humidity. 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[3]. Now anyone, from anytime and anywhere can have connectivity for anything and it is expected that these connections will extend and create an entirely advanced dynamic network of IoTs.

Hardware requirements:

- ATMEGA 48 microcontroller
- Power Supply
- LM7805Cv (Regulator)

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- MAX232 & DB9 connector
- Humidity sensor
- MQ135 gas sensor
- Motor
- Relay
- LM35 temperature sensor

Software requirements:

- CVAVR cross compiler
- AVR studio programmer
- Embedded C

II.BLOCK DIAGRAM

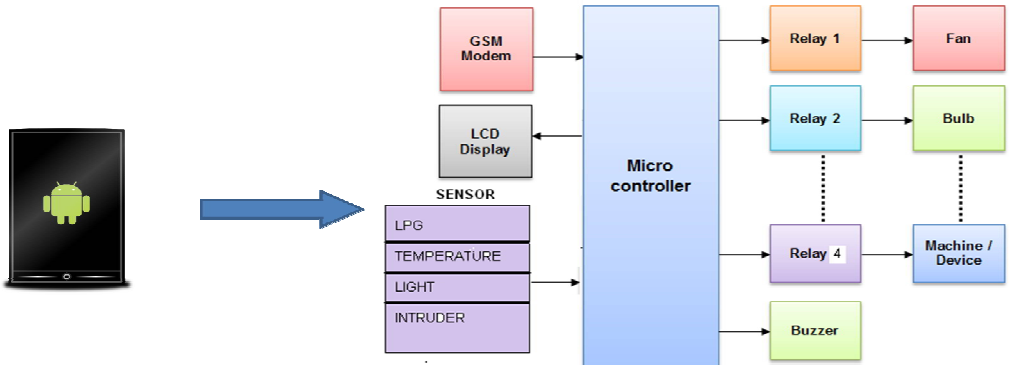

Fig1: Block Diagram

III.LITERATURE SURVEY

The home network which monitors the appliances and sensors and transmits data to the cloud-based data server which manages the information and provides services for users by transmitting data and receiving user commands from mobile application[4]. The proposed system has good modularity and configurability characteristics with very low power consumption in cost efficient way. Application developed using the Android platform controlled and monitored from a remote location using the smart home app and an Arduino Ethernet based micro web-server[5]. The sensors and actuators/relays are directly interfaced to the main controller. Proposed design offers are the control of energy management systems such as lightings, heating, air conditioning, security, fire detection and intrusion detection with siren and email notifications.

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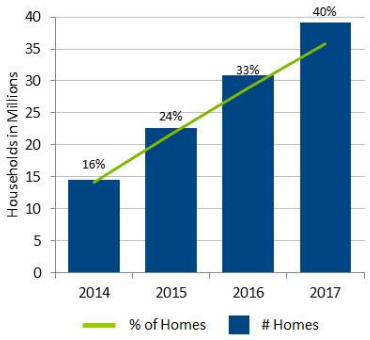

Fig2: Popularity of Smart home in market

IV.WORKING

The proposed method utilizes the GPRS network to transfer data between the Host computer and the embedded system. The proposed communication is based on UDP data transfer and it utilizes Stand-Alone GPRS Controller to relay data From and to the GPRS network. The ease of implementation is seen through the use of standard SPI communication between the Stand-Alone GPRS Controller and the embedded device, simplifying the implementation in existing embedded systems.

The GPRS block contains a full featured 10 Mbps or 100 Mbps GPRS MAC (Media Access Controller) designed to provide optimized performance through the use of DMA hardware acceleration.

The sensor data needs to be read by the controller for further processing. Because the sensor data is not in a suitable form to read by the ADC converter needs to be converted to the required form which is done using signal conditioning/process circuit.

If we consider the example for temperature sensor, the output of the sensor being used might be of some resistance variation or minute voltage changes with respect to the read temperature value. This value from the sensors cannot be read directly by the microcontroller so we need to have a additional circuit that forms the block for this conversion. The signal conditioning circuit involves the use of bridges and amplifiers.

The signal conditioned data from the sensors are fed to the microcontroller which is in turn connected to the ADC which is inbuilt.

The GPRS block is an AHB master that drives the AHB bus matrix. Through the matrix, it has access to all on-chip RAM memories. A recommended use of RAM by the GPRS is to use one of the RAM blocks exclusively for GPRS traffic. That RAM would then be accessed only by the GPRS and the CPU, and possibly the GPDMA, giving maximum bandwidth to the GPRS function.

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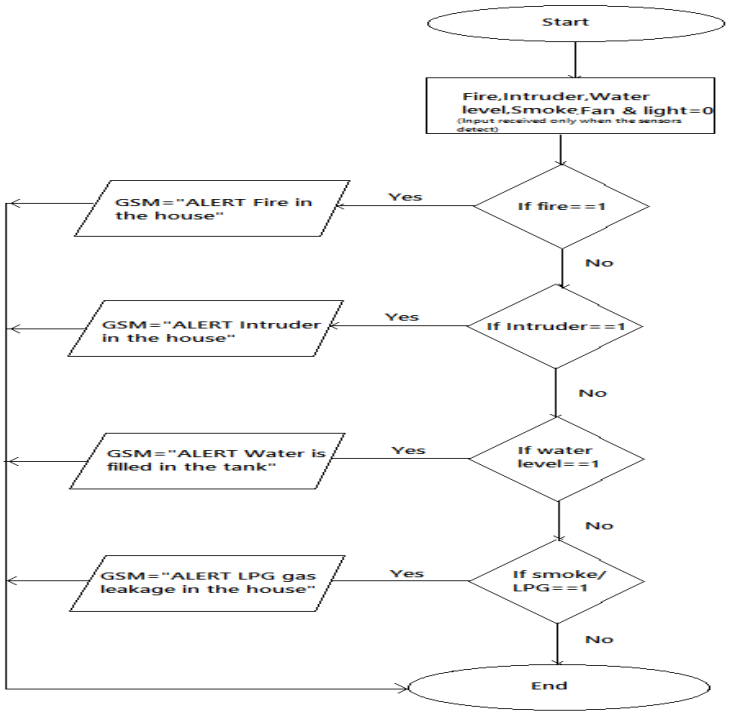
V.FLOWCHART



VI.CONCLUSION

As the saying goes “Necessity is the mother of all inventions”, a need for software which would control process and devices was recognized. The design approach used here has given satisfactory results and the microcontroller is sufficient for measuring the required parameters. The power consumption has been kept as low as possible and the measurements made by the device are quite reliable. Accordingly a highly interactive user friendly module based embedded technology with microcontrollers was developed to solve the problem. The module which is developed will make the job of process easier. The user module has resulted in reducing work of human also makes more comfortable. The module is, therefore functioning as a very good tool. Incorporating the future enhancement as specified earlier would make the software a perfect tool, which would help the user.

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