

IOT BASED DESIGN AND IMPLEMENTATION OF AN ADVANCED SECURITY SYSTEM

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Abstract

In the world today, home security is becoming necessary nowadays as the possibilities of intrusion are increasing day by day. This design adopts the idea of “Internet of Things close to life and easy to use” as a design concept, and builds a smart home system based on the internet of things. The modules included in this design include a getaway board module and an APP module. The main functions realized are: the LCD can display the pir, gas, fire, temperature and humidity data collected by the node board through the browser and control the switch state of the Light And fan of the control node board through the browser, and can also display the temperature and humidity data collected by the node board through an APP and control the switch state of the Light and fan of the gusset plate.

INTRODUCTION

Since the beginning of history, search for good quality technologies to motivate and encourage human to live from stone age to copper, bronze, and iron ages are on. (Postman, 2011). They manufactured improvement of the out of date human headways like Egyptians who made and used essential machines and other old community foundations that upgraded most advances, for instance, point of reference Greek devised development has changed the lives of people, has saved us stacks of time and has made life more straightforward for us all. The thought of far-off control that controls equipment following the World War 1 in Germany conceived an offspring of computerization.(Graham, 2012) Computerization can be characterized as the utilization of control frameworks, human exercises and bids in everyday issues which has quickly extended from the blend of mechanized gadgets with scientific and authoritative instruments that has made complex frameworks which is being utilized in modern, business, monetary, and public scopes of man's lifecycle.(Frischmann & Selinger, 2018). The advancement of controllers and robotization has been creating and will keep on creating to nowadays. Home computerization is a simple method to screen and control everyday gadgets we use at home. Likewise extraordinary remote headways help in partner from remote spots, when an individual need to partner with various things. (Kesavan et al., 2016). We use at home, for example, window ornaments, entryways lighting components, ACs and other home appliances. Arduino gives you access to gadgets in your home from your cell phone wherever you are on the

planet. This more precisely portrays smart homes, where nearly everything which ranges from light, apparatuses, electrical outlets, cooling and warming frameworks have been a remotely controllable system. A savvy home is one that is furnished with lights, roasting, also electrical apparatuses that might stay skillful distantly by a cell phone or by revenues of the internet. Web puts self-possessed home programming Framework centered with regards to controlling home electronic gadgets regardless of you're outside or inside your home. Home apparatus utilizes brilliant innovation or technique for each component we are running with and we are utilizing HVAC (heater, ventilation, air conditioner and controller) in the present way of life. The possibility of remote control of the household devices over the web from anywhere, at whatsoever point on the planet today can be a truth. (Hoglund, & McGraw, 2004). Expect a configuration where from the working environment work region, the customer could see the status of the contraptions and takes control by turning on his television to a channel of his choice, turns on/off the a/c, and turns off/on a part of lights. The customer can walk around home and simply find a really agreeable, wonderful home. The incessant augmentations now progress with the usage of Bluetooth and wi-fi which have enabled unique mechanisms to make sure forthright partner with each other. Using Wi-Fi shield to go about as a littler scale network server to the Arduino arranges of the want for wired connection among the Arduino board and PC which lessen cost and empowers it to fill in as a free wi-fi shield which needs connotation with the web from remote switch or remote hotspot and this would go about as per the important course.

Both our personal and professional life is largely dependent on modern technology developed in recent years. Technology has developed with time and it has transformed the way we purchase products, the today's way of living, the way we communicate, the way we travel, the way we learn and so many other changes have been brought about by the continuous technological advancements. As people's demands and life style are rapidly changing, the demand for advancing the type of technology is obvious [1]. Almost everything we use today has been innovated to better standards so that we can keep up to the ever-progressing times. In the twenty-first century, wireless communication is growing faster than other technological advancements because of its

ease of usage and cheaper costs. From WIFI based electronic devices to wireless home automation, people have got advantages in many ways for making their lives easier with lesser stress [2]. This paper proposes a low cost, simple and efficient technology about how to control the home appliances. Based on the Wi-Fi and Arduino the instrument and technique suggested will show how to improve the standard of living with less stress in daily life, particularly efficient for the handicapped persons who have little option to get support from other family members. The security system, in the suggested technology, is also highly effective as well as safer.

II.LITERATURE REVIEW

Internet and quick development of innovations furnish us with useful assets and give us capacity to get the data from everywhere throughout the world. New inserted OS and diverse sensors give us capacity to associate things to the Internet. Today, over 99% of things in physical world are not associated with the web. In any case, the most recent idea – Internet of Things implies that now you can associate all that you can envision. That is why by utilizing microsensors, inserted stages and OS, ordinary items can wind up associated and become savvy. The primary clue in picking the IoT equipment is to comprehend your necessities and how much assets you have. Yet anyway a portion of this stages increasingly prominent and have more points of interest than other. A standout amongst the most mainstream is Arduino Yun. This board has capacity to be interfaced by Ethernet or Wi – Fi. As a major, this stage also accompanies USB and Linux appropriation dependent on OpenWrt. Solid CPU ATmega32u4 or Atheros AR9331 permits to run diverse programming and give clients all sort of instruments and utilities. With this highlights and extraordinary specialized help from network, Arduino Yun turns into an incredible stage for creating IoT ventures. (Polianytsia, Starkova and Herarymenko 2016) The World of home computerization is an energizing area which has detonated with Fresh innovations and today is known as a region where the “internet of things” (IoT) vision progresses toward becoming reality. The essential points of interest that come from this idea incorporate how every gadget frames a little piece of the Internet, by which the propelled framework can cooperate and impart, boosts wellbeing, security, solace, accommodation and vitality reserve funds. The execution of Sensor Web hub as a piece of IOT utilizing a Raspberry Pi – economical, completely adjustable and programmable little PC with help for countless and organized correspondence is observed to be powerful. Utilizing this innovation, in a case of checking and deciding the certainty of frame in structure, a full framework, in light of Sensor Web

components, is made and created beginning from the scratch. (Vujovic and Maksimovic, 2015) For what reason is the keen home a developing and possibly imperative field of innovative work? Three wide perspectives are obvious in the writing: an utilitarian opinion; an influential opinion; and a socio-specialized sight. The utilitarian observation savvy homes as a method for better dealing with the requests of every-day living through innovation. The influential outlook stresses savvy homes' likely for overseeing as well as diminishing vitality request in families as a major aspect of a more extensive progress to low-carbon future.

III.DESIGN OF HARDWARE

This chapter briefly explains about the Hardware implementation of . It discusses the circuit diagram of each module in detail.

3.1 ARDUINO:

The most common version of Arduino is the Arduino Uno. This board is what most people are talking about when they refer to an Arduino. The Uno is one of the more popular boards in the Arduino family and a great choice for beginners. There are different revisions of Arduino Uno, below detail is the most recent revision (Rev3 or R3).

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

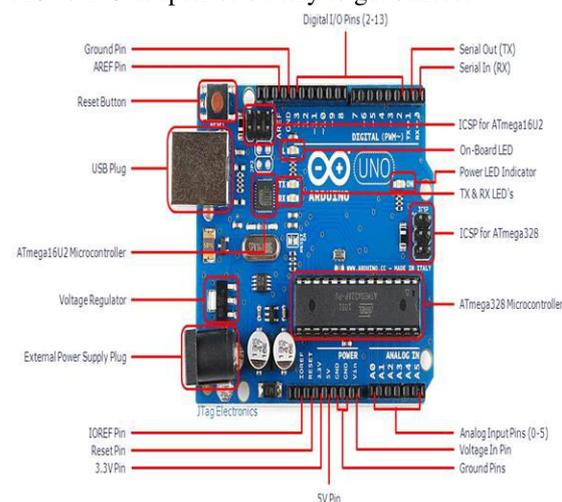


fig 3.1 ArduinoUno R3 Board

POWER SUPPLY:

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can be broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage

constant irrespective of a.c mains fluctuations or load variations is known as “Regulated D.C Power Supply”.

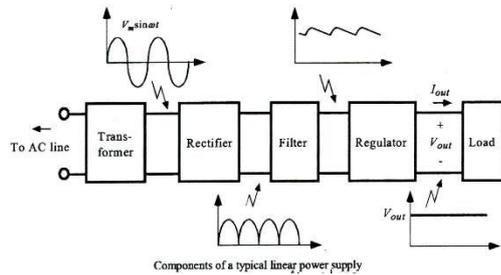


Fig.: Block Diagram of Power Supply

LCD:

A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

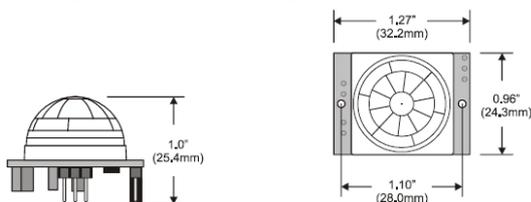


Fig: 4.10. LCD

PIR SENSOR:

The PIR (Passive Infra-Red) Sensor is a pyroelectric device that detects motion by measuring changes in the infrared levels emitted by surrounding objects. This motion can be detected by checking for a high signal on a single I/O pin.

MODULE DIMENSIONS

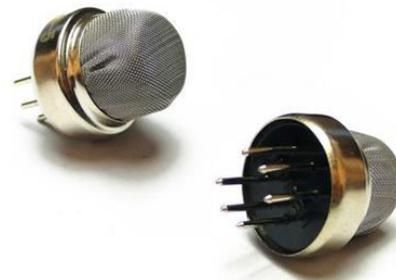


TEMPERATURE SENSOR (LM35):

In order to monitor the temperature continuously and compare this with the set temperature preprogrammed in the microcontroller, initially this temperature value has to be read and fed to the microcontroller. This temperature value has to be sensed. Thus a sensor has to be used and the sensor used in this project is LM35. It converts temperature value into electrical signals.

LM35 series sensors are precision integrated-circuit temperature sensors whose output voltage is linearly proportional to the Celsius temperature. The LM35 requires no external calibration since it is internally calibrated. The LM35 does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4^\circ\text{C}$ at room temperature and $\pm 3/4^\circ\text{C}$ over a full -55 to $+150^\circ\text{C}$ temperature range.

MQ2- SENSOR



DESCRIPTION

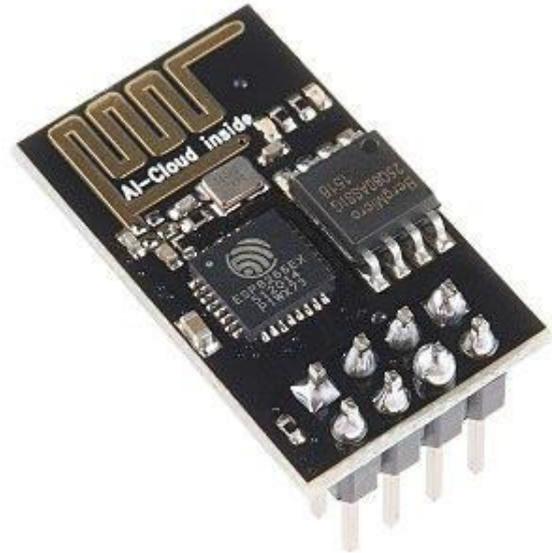
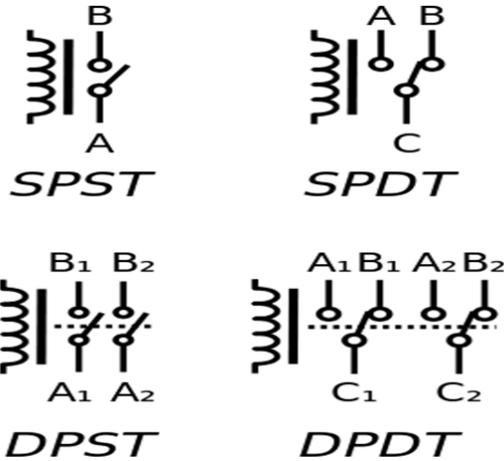
MQ2 flammable gas and smoke sensor detects the concentrations of combustible gas in the air and outputs its reading as an analog voltage. The sensor can measure concentrations of flammable gas of 300 to 10,000 ppm. The sensor can operate at temperatures from -20 to 50°C and consumes less than 150 mA at 5 V.

Connecting five volts across the heating (H) pins keeps the sensor hot enough to function correctly. Connecting five volts at either the A or B pins causes the sensor to emit an analog voltage on the other pins. A resistive load between the output pins and ground sets the sensitivity of the detector. Please note that the picture in the datasheet for the top configuration is wrong. Both configurations have the same pin out consistent with the bottom configuration. The resistive load should be calibrated for your particular application using the equations in the datasheet, but a good starting value for the resistor is 20 k Ω .

RELAYS

We know that most of the high end industrial application devices have relays for their effective working. Relays are simple switches which are operated both electrically and mechanically. Relays consist of a n electromagnet

and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. There are also other operating principles for its working. But they differ according to their applications. Most of the devices have the application of relays.



ESP8266 WIFI

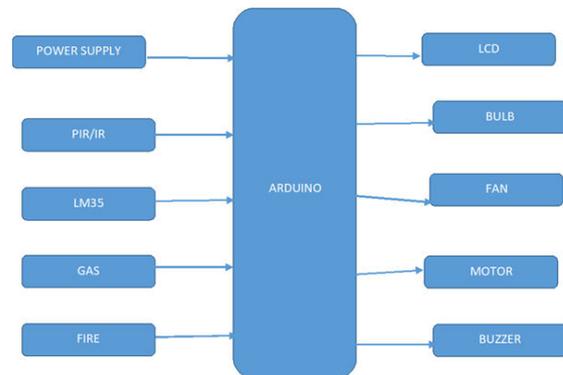
The **ESP8266** is a low-cost [Wi-Fi](#) microchip with full [TCP/IP stack](#) and [microcontroller](#) capability produced by Shanghai-based Chinese manufacturer, Espressif Systems.^[1]

The chip first came to the attention of western [makers](#) in August 2014 with the **ESP-01** module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using [Hayes-style](#) commands. However, at the time there was almost no English-language documentation on the chip and the commands it accepted.^[2] The very low price and the fact that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation.^[3]

IV. PROJECT DESCRIPTION

This chapter deals with working and circuits of “”. It can be simply understood by its block diagram & circuit diagram.

BLOCK DIAGRAM:



In this paper, It is important to note that the Arduino is the main control unit in the system. All the home applications will be suitably controlled by the Arduino link to different available facilities. In practice, various sensors like temperature, IR sensors and others are to be controlled by Arduino.

In this proposed system PIR , temperature, and GAS sensors are used, a relay is used to combine the system with electrical devices. The relay module is like a middle man which connects the desired circuit (high voltage) with the Arduino (low voltage). Combining all the sensors with Arduino forms a microcontroller for home automation. Different sensors sense the input and send it to the Arduino to process the input and provide outputs through output devices. The Arduino already contains a program that is coded by a coder. The PIR sensor senses the intensity of light and

provides input to Arduino accordingly if decrease in light level electric bulb connected to the board through the relay will turn on and when the intensity of light will increase the bulb will turn off. The temperature sensor will sense the room temperature and when the temperature of the room exceeds than set temperature fan will start and when the temperature decreases to the set temperature fan will stop. The GAS sensor continuously senses if there is any GAS inside the house, the buzzer will constantly beep until the sensors stops. All these state changes are informed with the help of a beep sound through the buzzer. The figure displays the flow of the inputs that are sensed through the sensor and works as the input for the system according to the input the output is processed and the action takes place.

V.CONCLUSION

The system as the name indicates, 'Home automation' makes the system more flexible and provides attractive user interface compared to other home automation systems. In this system we integrate mobile devices into home automation systems. A novel architecture for a home automation system is proposed using the relatively new communication technologies.

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