

HOME AUTOMATION OF LIGHTS & FANS USING IOT

¹T. Indeevar Reddy, ²Akhila Nalluri, ³Kishore Bhamidipati, ⁴M.Sri lakshmi
^{1,2,3,4} Department of Computer Science and Engineering. K L University, Guntur, Andhra Pradesh, India.
¹ indeevar.reddy9@gmail.com
² akhilanalluri95@gmail.com
³ bsssk9@gmail.com
⁴ manchala.srilakshmi@kluniversity.in

Abstract: In this paper, a design is proposed using IR and LDR sensor for automation of lights and fans using Arduino with Internet of Things for smart homes. Nowadays we're having automation of every little electrical device in our homes. Internet of Things is the concept of basically connecting any device with an on and off switch to the internet. IOT is more than smart homes and connected appliances; however, it scales up to include smart cities with connected sensors. Using IR sensors, the lights will automatically turn on and off according to the intensity of light. Temperature sensors will detect the room temperature and turn on and off fans.

Keywords: Arduino, Ethernet, Home Automation, Internet of Things, LAN, Router

1. Introduction

These days, the web need ended up a normal interface that a significant number of gadgets use in place will improve the everyday life about numerous individuals. Web aides us to get quick result for huge number of issues capable to interface starting with any of the remote spots which contributes with general expense decrease furthermore vitality utilization. Home mechanization might make portrayed as introduction for innovation organization in the home environment which provides straightforwardness which is more secure with its occupants. Towards utilizing the innovation of web for Things, those examinations Furthermore execution about home mechanization have got extra Normal. Different remote advances which has the capacity to help some sort of remote information transfer, sensing also management like Bluetooth, Wi-Fi and other cell division networks would be used to enter abundant levels for discernment inside the

home. It might provide an interface with home mechanization itself, by means of mobile phone or alternately the internet.

Internet of things

Internet of Things (IOT) includes the idea that those webs may be never again just a worldwide organize for individuals to convey with each other utilizing computers, anyway it may be likewise a stage to gadgets will impart electronically with those universe around them. Those web for things additionally known as those web about Objects, alludes all the on a remote organize between objects, generally those organize will make remote Furthermore self-configuring, for example, family appliances. The expression "Internet about Things" need arrive at depict an amount about advances Also Look into controls that empower those web on connect under this present reality about physical Questions. The haul web for things might have been main utilized Eventually Tom's perusing Kevin Ashton over 1999. It alludes all the on particularly recognizable proof Questions (things) and their virtual representations for an Internet-like structure. IOT permits Questions on be sensed and regulated remotely over existing organize infrastructure, making chances to more immediate joining the middle of the physical planet What's more machine based systems, what's more bringing about moved forward efficiency, correctness and investment profit. IOT is utilized within a totally assortment of units for example, such that heart screening implants, biochip transponders ahead ranch animals, electric mollusks in seaside waters, automobiles for built-it sensors, DNA Investigation gadgets to Ecological checking.

These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices.

IOT could see as a gigantic organize comprising about networks for units What's more machines associated through an arrangement for middle of the road innovations the place various advances in RFIDs, remote associations might go about as enablers about this connectivity.

The clue may be that not just in PC and your smartphone might converse with each other, as well as constantly on things around you. From joined homes What's more urban communities will associated autos Furthermore machines will gadgets that track an individual's conduct technique What's more utilize the information gathered to new sort of administrations.

Iot applications

Some of the applications include wearables such as the smart watch, traffic and water management in smart Cities, internet connected cars, smart medical devices in connected with health, grocery shopping in smart retail, etc.

2. Proposed system

The suggested framework may be a greater amount efficient, settled Also expense compelling. This is intended as it were that it is not that muddled will associate those gadgets for the client as it will be client cordial. Arduino is utilized likewise a web server and associations. Every one there may be to do will be on join the prompted Arduino What's more control it utilizing a standout amongst Arduino yield. That Arduino customer in the app sends an http appeal on Arduino that runs the web server. The thought will be that those smartphone sends an http of the Arduino. A little Furthermore straightforward web server runs for Arduino tolerating the http appeal. The outline of the suggested framework is indicated done in fig. 1. Those infrared sensor (IR) will be a low expense analyst sensor that camwood a chance to be connected toward homes utilizing LED's. Those PIR sensors will be utilized to identification of human body vicinity. As stated by the human body presence, those lights and fans will turn on/off. Those IR sensors what's more PIR sensor need aid associated with the Arduino Uno. By utilizing a versatile app which will be made What's

more controlled towards a web server, the lights Also fans might make controlled.

Raspberry can also be used for developing an application but the problem is an operating system have been loaded and when we compare the coding part of raspberry with the coding part of Arduino, it is very difficult in raspberry. User can easily program his Arduino and can use it based on his requirement. The frame work that is given below will make it simple to understand the basic concepts that is used in the paper to develop a reliable Home automation system.

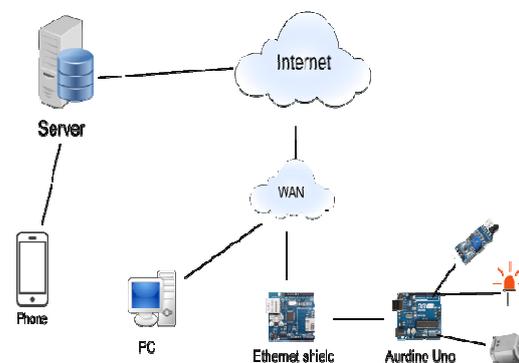


Figure 1. Framework of the proposed system

System design

The sensors that is used in the framework are:

IR Sensor

The IR Sensor detect infrared light, which is used for switching on/off lights. The feature of IR sensor is that it will bounce of the object into light sensor. The darker color the object is, the less IR light will be reflected. The lighter color the object is, the more IR light that is reflected.

LDR sensor

The principle of LDR-Light Dependent Resister is that the resistance of a photo resistor decreases with increase in the intensity of incident light and It helps to detect the intensity of light that is present in the room.

Arduino

Arduino Uno is a microcontroller board. It has 14 digital Input/output pins, 6 analog inputs, a 16 MHZ

quartz crystal used for oscillation, a USB connection, a power jack, an ICSP header which is used for in circuit serial programming and a reset button.

Ethernet

Arduino Ethernet shields 2 associates your Arduino of the web on minor minutes. Barely plug this module onto your Arduino Board, associate it on your system with a RJ45 link. Also, take after a couple straightforward steps to start regulating your reality Canada wild rye drug store through those webs.

Proposed IOT Architecture

The physical layer comprises of the gadgets which incorporate lights, fans that would with make regulated. The information join layer comprise from claiming gadget manager, and Different correspondence conventions. The gadget supervisor will make and only those Arduino. Arduino will be used to impart will individual check or advanced mobile telephone toward utilizing web in the transport layer. The requisition Also presentation layer comprises from claiming web server which will be utilized for outlining a web page to control our home appliances. Those appliances need aid controlled from the versatile app. The circuit diagram is shown in Fig.2.

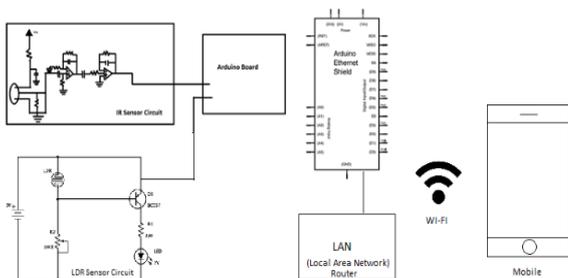


Figure 2. Circuit diagram of the system

Implementation details

Initially an Arduino relates to the IR sensor which helps to detect the presences of an object. In the following image connections, can be observed; an LED is connected to the 13 pin in the Arduino which is a digital pin. A DC motor is connected to the analog pin A1. In IR Sensor, we have 3 pins; one is the digital output pin where the remaining pins are ground and Vcc. The power we supply to the IR

sensor is 5v, so we connected Vcc to 5v slot present in the Arduino. The following set up works when an object is present in front of the IR sensor. When an object is detected in the range of IR it switches on the LED and the DC motor.

The Sensor interfaces are shown in Fig. 3.

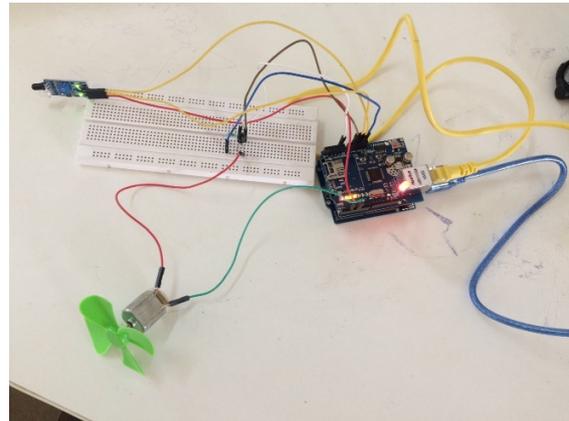


Figure 3.1. When no one is present

When no object is present in the range of IR sensor then LED and DC motor will remain switched off as shown in the above image.

When an object is present in the range of IR sensor the Arduino switches ON the LED and DC motor, we can clearly observe it in the image that is given below.

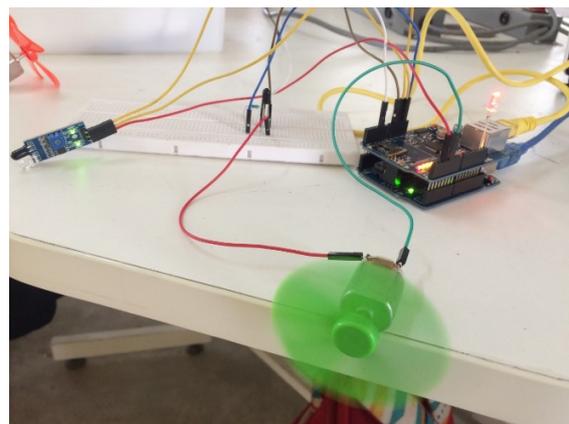


Figure 3.2 when an object is present in the range of the IR sensor

In continuation to this we have added photodiode as to get the intensity of the light. The concept of photodiode is to assure that the room is dark. In some

scenarios, we may get sufficient light that is required for the person in that room and he need not switch on the light and even the climate may be cool so that he need not switch on the FAN. For satisfying this condition we perfect photodiode which collects the intensity of the light and more over photodiode can reduce the overall cost of the product. We continued our project by connecting the photodiode to Arduino, it helps us to get the required output that satisfies the given conditions.

Data generated

It generates two outputs one from the IR sensor and other from the photodiode. IR sensor gives the digital outputs such as HIGH or LOW and Photodiode gives analog output. IR sensor take the High value when it detects the presence of human and Low when it does not detect any one in the room. Photodiode collects the intensity of Light that is present in the room and based on the algorithm it switch's the lights and fans by ON & OFF. For suppose if the minimum intensity in room is 260 then conditions that we considered are as follows.

Table 3.1 Conditions for LED and FAN

Intensity	IR Readings	LED	FAN
<260	HIGH	ON	ON
<260	LOW	OFF	OFF
>260	HIGH	OFF	ON
>260	LOW	OFF	OFF

In the above table, we have conditions for the LED & FAN based on the Intensity and IR sensor readings. If the intensity is HIGH and a person enters in to the room which means IR value is HIGH then lights will remain OFF and fans will be switched ON, lights remain OFF because we have sufficient light in the room and it helps us to save power.

3. Conclusion and future applications

The data that is uploaded to the server is not been stored; As the definition of IOT states that the data

that is generated should be stored on the cloud and it should be shared by another device. So, a work must be done on it to store the data that is generated by the sensors. The data that is generated can be viewed from any device which is connected to the same cloud server and we can retrieve the data from cloud to analyze it and to control the lights and fans by using a mobile device.

References

- [1] Atzori, Luigi, Antonio Iera, and Giacomo Morabito. "The internet of things: A survey." *Computer networks* 54.15 (2010): 2787-2805.
- [2] <https://www.arduino.cc/en/Reference/HomePage>
- [3] Brindha.c andmuraridevakannankamalesh."Smart alert for eb metering with enhanced security." *International Innovative Research Journal of Engineering and Technology*(2016): 70-75.
- [4] Getting Started with the Internet of Things: Connecting Sensors and Microcontrollers to the Cloud (Make: Projects) 1st Edition - CunoPfister (Author)
- [5] <https://www.rs-online.com/designspark/eleven-internet-of-things-iot-protocols-you-need-to-know-about>
- [6] <http://www.engpaper.com/home-automation-2015.html>
- [7] <https://arxiv.org/ftp/arxiv/papers/1504/1504.03564.pdf>
- [8] http://www.ijera.com/special_issue/VNCET_Mar_2012/35.pdf

