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A Real Time Light Monitoring System Using IoT

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ABSTRACT: Now a day's there are so many technologies are available to make our life more simple and comfort. Especially in mobile field so many application are being developed to give us more information and entertainment .this project is designed with combination of two latest and most demanding technologies that are Android and Embedded Systems. In this paper we will create an application to control electrical appliances in industry or home or office. Whenever we operate this controlling system ,it sends information to microcontroller, At controlling system side and at other side of this, we have load controlling system ,microcontroller and wi - fi module. Microcontroller will control the respective loads the command it received. This is very safe and secure and also we can control many loads without getting any error.

KEYWORDS: Internet Of Things (IOT), Embedded System, Wireless Communication.

I. INTRODUCTION

Now a day's lightning control system will play major role in the reduction of energy consumption without impeding comfort goals. As we know Energy is the most important parameter to consider, when considering the impacts of technical systems on the environment. Energy related emissions are responsible of 80% of air emissions and most serious global environmental impacts and hazards, including climate change, acid deposition, smog and particulates.As we compared with our personnel costs, the cost of the energy consumption of the light is low. Thus its energy saving potential is often neglected. According to global grid study, lightning consumption was about 2650 TW in 2005, which was an equivalent to 19% of the total electricity energy consumption. Indian offices buildings are dedicated, 50% of their electricity for the lighting consumption only, whereas the share of electricity for lighting is around 25-30% for hospitals, 15% for factories, 15% for residential schools and 10% in residential buildings. So, light controlling and energy management system is a best solution for energy saving, especially in public lighting management. So remote on/off of lights will reduce the total consumption by 50% and cost by 40%

These are having lot many similarities with the IOT(Internet Of Things), These provides the uninterrupted connection between the people an things, so, it is very simple for people to communicate with the things.

IOT is a network of Internet empowered things in a universe where physical objects are flawlessly combined into the information network and where the physical objects can become lively contributors in corporate developments (Carretero, 2014). The Internet of Things (Atzori L, 2010) brings together two key perceptions: Internet-connected devices ubiquitously in any time and any place and pervasive computing, where ''the utmost profound technologies are those that disappear'' (Weiser, 1999) in such a way that these devices made themselves indistinguishable from explicit technology that the humans use in their lives. The presented system holds sensor system that contains several applications based sensors, embedded network, information platform and satellite network that forms a huge network (Jagdale, 2016).

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II. EXISTING SYSTEM

All the existing systems are used GSM and GPRS technology for the controlling of different devices.
Here we are using the GSM technology in which the manual switching OFF/ON of the street light using GSM. Here the system controls the intensity of the street light by dimming and brightness the intensity on the detection of any object using PIR sensor.

Disadvantages of existing method

- Manual Switching off/on
- More Energy Consumption.
- High expense.
- More manpower

III. PROPOSED SYSTEM

A) System Description

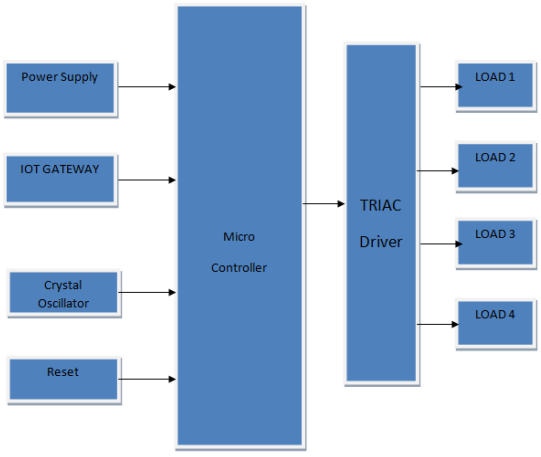

Fig 1: Block Diagram

In this project we will create an application to control electrical appliances in industry or home or office. Whenever we operate this application, it sends commands to our controlling system through App or internet.

B) Micro Controller

Description: The D1 mini is a mini wifi board based on ESP-8266EX.
Features:
•11 digital input/output pins, all pins have interrupt/pwm/I2C/one-wire supported(except D0)
- 1 analog input(3.2V max input)
- a Micro USB connection
- Compatible with Arduino
- Compatible with nodemcu

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Espressif's ESP8266EX delivers highly integrated Wi-Fi SoC solution to meet users' continuous demands for efficient power usage, compact design and reliable performance in the Internet of Things industry.

ESP8266EX integrates antenna switches, RF balun, power amplifier, low noise receive amplifier, filters and power management modules. This compact design minimizes the PC board size and also it requires minimal external circuitry.

Features:

- Fast switch between sleep and wakeup mode for energy-efficient purpose.
- Adaptive radio biasing for low-power operation.
- Advance signal processing.
- Spur cancellation and radio co-existence mechanisms for common cellular, Bluetooth, DDR, LVDS, LCD interference mitigation.

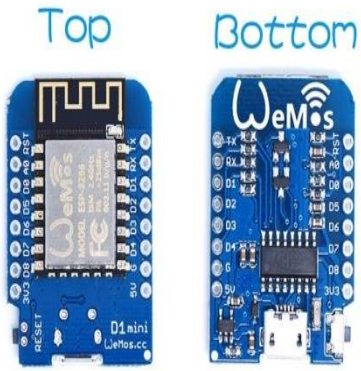

Fig2: D1mini

C) TRIAC:

TRIAC, from triode for alternating current, is a generic trademark for a three terminal electronic component that conducts current in either direction when triggered. Its formal name is bidirectional triode thyristor or bilateral triode thyristor. The Thyristor is a analogous to a relay in which a smaller current and voltage can control larger current and voltage in the circuit. In the TRIAC symbol, A1 is Anode 1 and A2 is Anode 2 and G is Gate. The A1 and A2 are termed as Main terminal 1 and Main terminal 2 respectively.

TRIACs are one type of thyristors and are related to the SCR's which are called Silicon Controller Rectifiers.The main difference between SCR and Triac is that the TRIAC can conduct both directions whereas SCR conduct in single direction only and another difference is the, The TRIAC can be Triggered by either positive or negative voltage but The SCR can be triggered by only positive volatage. Once the TRIAC and SCR triggered, SCRs and TRIACs are continue to conduct, even if the gate current crossed, until the current drops below a certain level called the holding current. Gate turn-off thyristors (GTOs) are similar to TRIACs but provide more controlling by ceases the signal.

TRIACs having bidirectionality, it makes them convenient switching for alternating-current (AC). In addition, applying a trigger at a controlled phase angle of the AC in the main circuit allows control of the average current flowing into a

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load (phase control). This is commonly used for controlling the speed of induction motors, dimming lamps, and controlling electric heaters.
Optically active SCR carries 230 volt AC. The SCR drops the 230 V AC to low volt AC and rectifies it into DC for driving the gate of external Triac. When the output from the DC circuit comes, the LED inside the MOC turns on. This triggers the SCR and MOC gives DC output to drive the Triac.MOC 3041 has 6 pins and pin 1 is the Anode of LED and pin 2 is its Cathode. Pin 6receives 230V AC while pin 4 gives output voltage to drive the Triac.

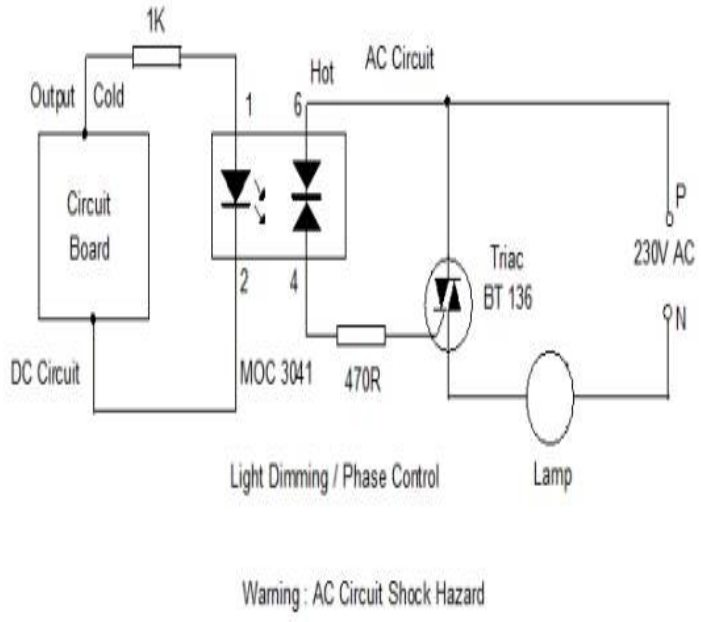

Fig3:Triac circuit

D) ThingSpeak :

"ThingSpeak is an open source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. The THIGSPEAK gives the sensor related information and social network of things with its status".[2]

ThingSpeak was originally launched by IO Bridge in 2010 to support IOT applications.[3]

By using this THIGSPEAK without having license for MATLAB, we can virtually analyze and visualize uploaded data using MATLAB.
ThingSpeak has a close relationship with Mathworks, Inc. In fact, all of the ThingSpeak documentation is incorporated into the Mathworks' Matlab documentation site and even enabling registered Mathworks user accounts as valid login credentials on the ThingSpeak website.[5] The terms of service[6] and privacy policy[7] of ThingSpeak.com are between the agreeing user and Mathworks, Inc.

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E) Flow Chart & Schematic:

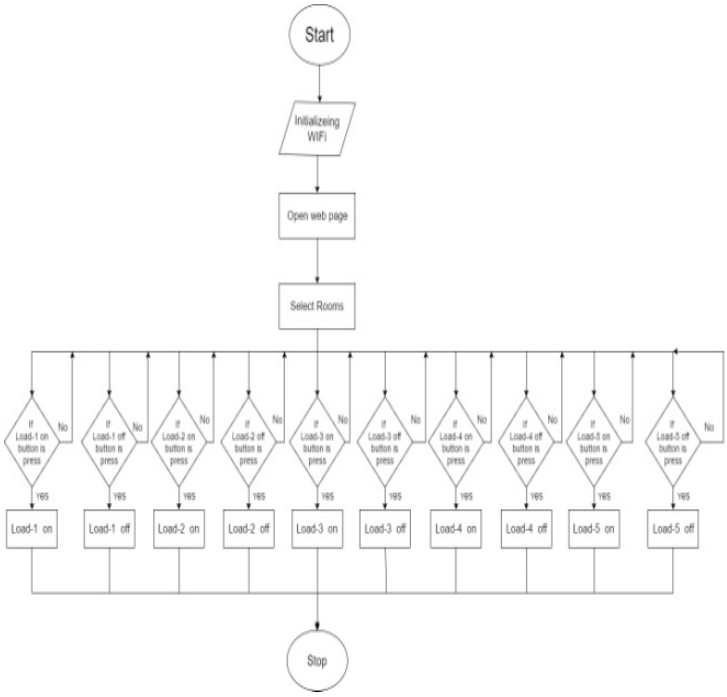

Fig4: Flow Chart

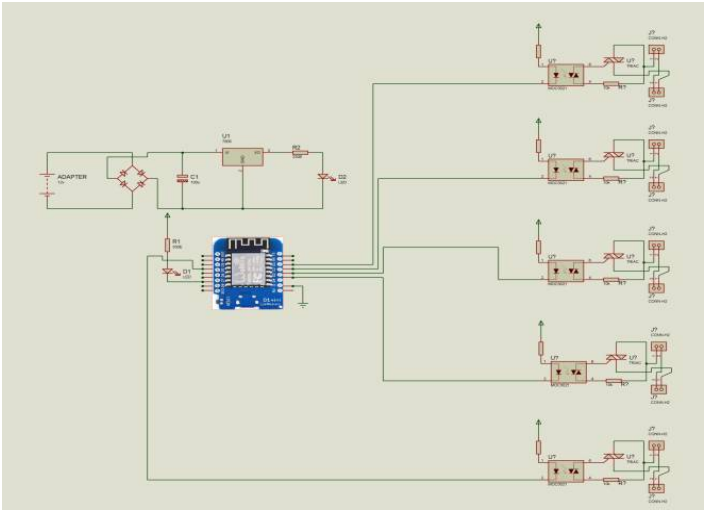

Fig5: Schematic

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IV. EXPERIMENTAL RESULTS

In this project we are creating the channels for each room to update the status of each light in the room. Whenever the status of light changed that information will updated in the thingspeak server. So that updated status will be accessed by the microcontroller. Channels store all the data that a ThingSpeak application collects. Each channel includes eight fields that can hold any type of data, plus three fields for location data and one for status data. Once you collect data in a channel, you can use ThingSpeak apps to analyze and visualize it.

Make “Thingspeak.com” as a host for our channel creation for each room.Make one user id and password for wifi connection, make sure that this user id and password is same as the hotspot/wi-fi user id and password.

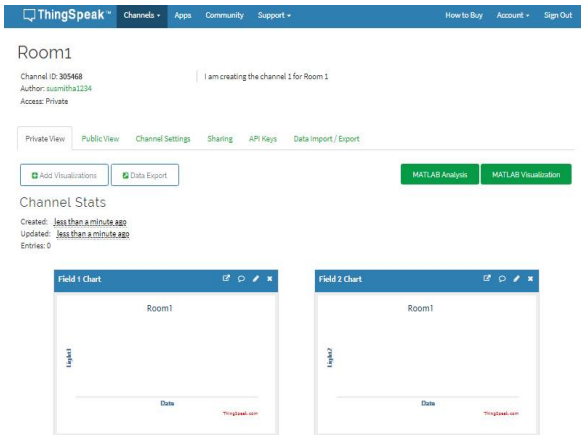

Fig6: Creating Fields in ThingSpeak

We collect the status of loads and keep it in thigspeak.com.As we control the fields in each channel, so for each field we require a output pin.So make some of pins of microcontroller as outputs.Make those outputs as logic “1” initially.For serial communication we maintain a baudrate of 9600mbps.Next we trying to connect to wi-fi. Make another pin of microcontroller as output for led (indication of wi-fi connection).After this the loads will be “ON” if the field contains the logic “0” , it will be “OFF” if it is logic “1”.The status of the load will be same as previous state if the field contains any dummy or null value.After that the connection will be closed.Like that for each load it will check the value stored in the field.

After creating fields, we have to create a web page where we control the loads. In the web page we create a login page , and some buttons to control the loads.

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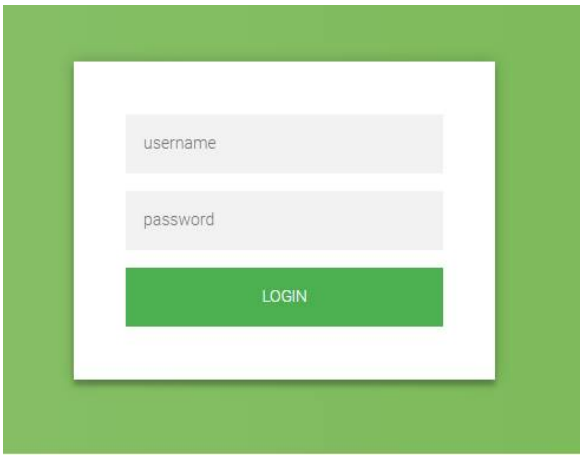

Fig7: Login Page

After entering in the login page we have to select the room. In this project we design a three device which can place in three different rooms. So, After Selecting the room we can control a set of five AC loads.

Fig8: Room Page

In the room page we can see a Set of five control buttons indicating there status i.e., ON/OFF. By seeing the status we can tell whether the load is in ON (or) OFF . By pressing those we can control respective loads.

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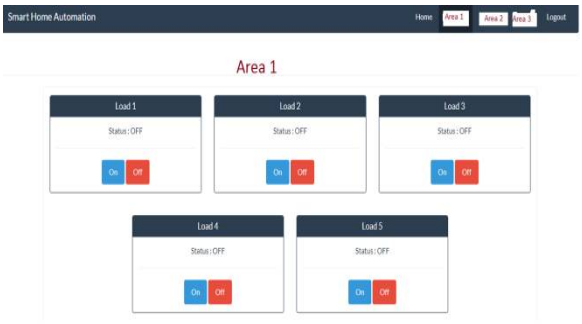

Fig8: Loads Controlling Page

V. CONCLUSION

In this paper the proposed system was used the better classifiers and effective techniques to controlling the electric loads from anywhere using IOT. In this project we are not only controlling the loads but we also showing what the previous state of the loads and we also providing security too only control the electric loads to a specific persons like (Admin), where he monitor and control the loads from sitting in a single position. By this project we can also reduce the electricity power.By considering all the comparisons we confirm that the system works well.

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