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AUTO INTENSITY CONTROL OF SOLAR STREET LIGHTS USING ARDUINO

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ABSTRACT --- In this fast moving world with new scientific era electricity such that electrical energy plays a very vital role. New developments and new inventions are made which focus on saving this non-renewable electrical energy. Presently street lights mounted uses “electrical energy” along with “compact fluorescent lamp” which has very high electricity consumption. In this paper the author is making an effort on saving electricity by using solar power, LED, and sensors for street lightening. This project is about switching of street lights in the evening when there is dark using solar energy stored but focuses on switching only when any object/vehicle/public passes by , by using sensors and then is automatically switched off when they are passed , which shows a perfect example of energy saving.

KEY WORD --- Light Dependent Resistor(LDR)

I. INTRODUCTION

Solar energy is nothing but the radiant energy emitted by sun. we may convert this solar energy into electricity either directly using photo voltaic (pv), or indirectly using concentrated solar power (csp) with the help of lenses or mirrors and tracking system to focus a large area of sun light. This solar energy is mainly useful in solar street lights,auto solar irrigation system,traffic junction signal lighting etc.

II. AUTOMATIC STREET LIGHT CONTROL SYSTEM USING MICROCONTROLLER

The inputs in the streets lighting system are LDR and photoelectric sensors, after dusk the light sensor will activate the system, to be ready to detect any object by photoelectric sensors, on the road to turn ON the streetlights. schematic circuit that has been designed in this paper to control the street lights using PIC microcontroller.

III. EXISTING SYSTEM

Photovoltaic(PV) is a method of generating electrical energy from solar radiation. Solar radiation is the most important and major renewable energy source .Energy conversion is

done by Pv (photo voltaic) panel solar street lights require higher initial investment compared to conventional street lights. To overcome this problem we are using PIR sensor for cost effective solar street lights.

IV. PROPOSED SYSTEM

PWM is required mainly for intensity controlling of led. LDR is a light dependent resistor which is having very high resistance. whose resistance decreases when light impinges on it. This kind of sensors is commonly used for light. Sensors circuit on open areas to control street lamps. The LDR is mainly used to difference between day and night light.

V. HARDWARE DISCRPTION

PIR SENSOR

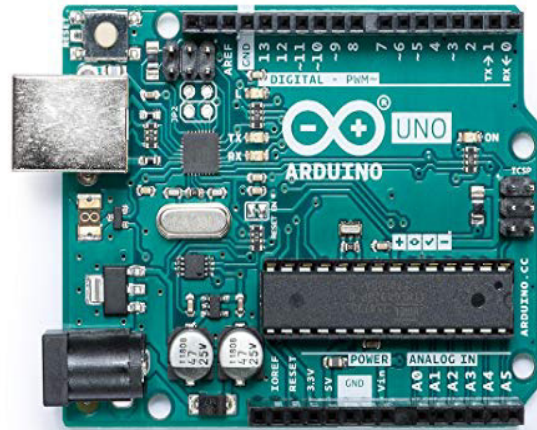
An individual PIR sensor detects changes in the amount of infrared radiation impinging upon it, which varies depending on the temperature and surface characteristics of the objects in front of the sensor. When an object, such as a human, passes in front of the background, such as a wall, the temperature at that point in the sensor's field of view will rise from room temperature to body temperature, and then back again.

The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection. Objects of similar temperature but different surface characteristics may also have a different infrared emission pattern, and thus moving them with respect to background may trigger the detector as well.



ARDUINO UNO

The arduino uno is an open source micro controller board based on the microchip ATmega328P microcontroller and developed. The board is equipped with sets of digital and analog input or output.



LIGHT DEPENDENT RESISTOR

A Light Dependent Resistor (LDR) is also called a photoresistor or a cadmium sulfide (CdS) cell. It is also called a photoconductor. It is basically a photocell that works on the principle of photoconductivity. The passive component is basically a resistor whose resistance value decreases when the intensity of light increases. This optoelectronic device is mostly used in light varying sensor circuit, and light and dark activated switching circuits. Some of its applications include camera light meters, street lights, clock radios, light beam



alarms, reflective smoke alarms, and outdoor clocks.

SOLAR PANEL

Photovoltaic solar panels absorb sunlight as a source of energy to generate electricity. A photovoltaic (PV) module is a packaged, connected assembly of typically 6x10 photovoltaic solar cells. Photovoltaic modules constitute the photovoltaic array of a photovoltaic system that generates and supplies solar electricity in commercial.



BATTERY 12 VOLT

Terminals (3/16" wide) Rechargeable, recyclable, and no memory effect. Sealed, maintenance free with a long service life. Built to last in the roughest situations.

LED STRIP

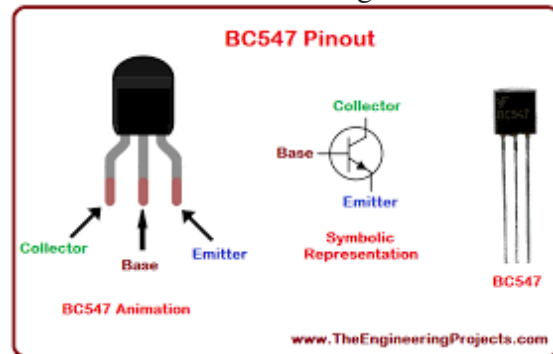
An LED Strip Light (also known as an LED tape or ribbon light) is a flexible circuit board populated by surface mounted light-emitting diodes (SMD LEDs) and other components that usually comes with an adhesive backing. Traditionally, strip lights had been used solely in accent lighting, backlighting, task lighting, and decorative lighting applications. Increased luminous efficacy and higher-power SMDs have allowed LED strip lights to be used in applications such as high brightness task lighting, fluorescent and halogen lighting fixture replacements, indirect lighting applications, Ultra Violet inspection during



manufacturing processes..

BC547 TRANSISTOR

BC547 is an NPN bi-polar junction transistor. A transistor, stands for transfer of resistance, is commonly used to amplify current. A small current at its base controls a larger current at



collector & emitter terminals. BC547 is mainly

VI. SOFTWARE DISCRPTION

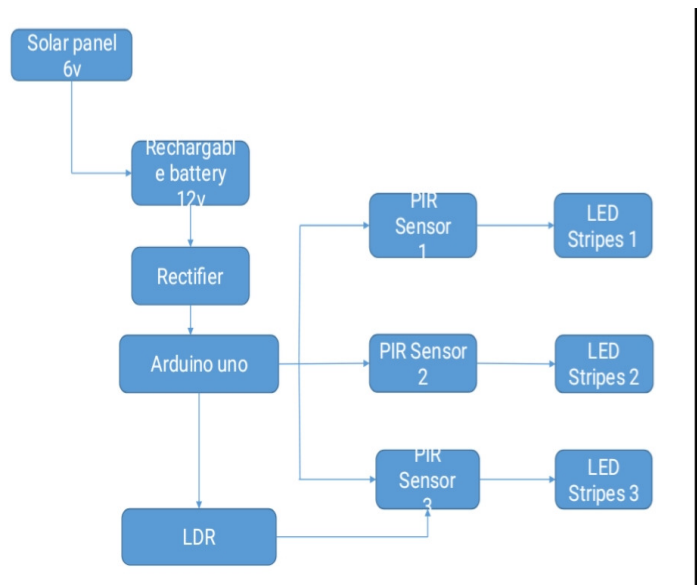
ARDUINO IDE

The Arduino integrated development environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino board. The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program

loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

VII. WORKING

The solar street light described has 3 led strips. it is powered by solar power under normal operation the light is powered by the battery.the rechargeable battery is used to store the solar energy from the sun and we use a Arduino nano board and it is connected to battery. Arduino ide program is used to control the street lights in system. PIR sensor detects infrared radiation of the human body. It has a single output that goes high when motion is detected. In the case of security when someone come closer to PIR sensor its monitoring circuit turn on the light and buzzer alarm.



VIII. CONCLUSION

There is an increasing demand for solar street light these days and for obvious reasons. One important reason is overall cost savings in the long run, and the other is efficient lighting. The solar LED light system as the name suggests converts energy from the sun into electricity and is easy to install and gives high intensity LED output. It is not necessary to switch on or

switch off the solar LED's light manually. These lights automatically operate from night until morning.

IX. REFERENCES:

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