Automatic Street Light Control

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Abstract:

This project aims at designing and executing the advanced development in embedded system for energy saving of street light with LDR .Nowadays   human has become too busy and he is unable to find time even to switch light whenever not necessary. This can be seen the more effectively in the case of street lights.

The present system is like the street light will be switched on in the evening before the sunset and they are switched off the next day morning after there is sufficient light on the roads. But the actual timings for   this street light to be switched on are when there is absolute darkness. With this, the power will be wasted up to some extent. This project gives the best solution for electrical power wastage. also the manual operation of the lighting system is completely eliminated.

In our project we are using LDR which varies according to the amount of light falling on it's surface, these gives an indication for us whether it is a day/ night time.

By using this as the basic principle we can design centralized intelligent system for the project usage of street lights in any place (viz village, town) can be developed.

Keywords: Light Dependent Resistor, Amplifier, Step down transformer, Light Emitting Diode, Single pole, single throw relay, Capacitor filter, NPN Transistor, Resistor, NAND gate Full wave rectifier Solar cell.

Introduction:

This project exploits the working of transistor in saturation region and cut-off region to switch ON and OFF the light at appropriate time with the help of an electromagnetically operated switch.

Automatic Street light needs no manual operation of switching ON and OFF. The system itself detects whether there is need for light or not. When darkness rises to a certain value then automatically street light is switched ON and when there is other source of light, the street lights OFF. The extent of darkness at which the street light to be switched on can also be tailored using the potentiometer provided in the circuit.

Literature review

Automatic street light control system is a simple and powerful concept, by using this system energy consumption is also reduced because now a days the manually operated street lights are not switched off properly even the sunlight comes and also not switched on earlier before sunset. In sunny and rainy days, ON and OFF time differ significantly which is one of the major disadvantage of using manual operation.

Moreover, the circuit is carefully designed to avoid common problems like overload, relay chattering and inductive kick back in relay.

Methodology

Insert first transistor Q1-BC547 (NPN) on breadboard (or general PCB) as shown in the circuit diagram 1.Connect another transistor Q2- BC547 (NPN) on breadboard as in step 1.Connect wires across emitter pin of both transistors and –ve terminal of battery (lowest/ bottom row of breadboard.)Connect a wire across Collector pin of transistor Q1 and Base pin of transistor Q2.Connect a resistor 1K across positive terminal of battery (topmost row of breadboard) and Collector pin of transistor Q1.Connect Light Dependent Resistor (LDR) across positive terminal of battery (topmost row of breadboard) and base terminal of transistor Q1.Insert a resistor- 330 Ohm across base pin of transistor Q1 and negative terminal of battery (lowest bottom row of breadboard).Connect a resistor 330R across positive terminal of battery (topmost row of breadboard) and anode terminal of LED (Light emitting diode) & Connect the cathode terminal of LED to Collector pin of transistor Q2.

Project Development
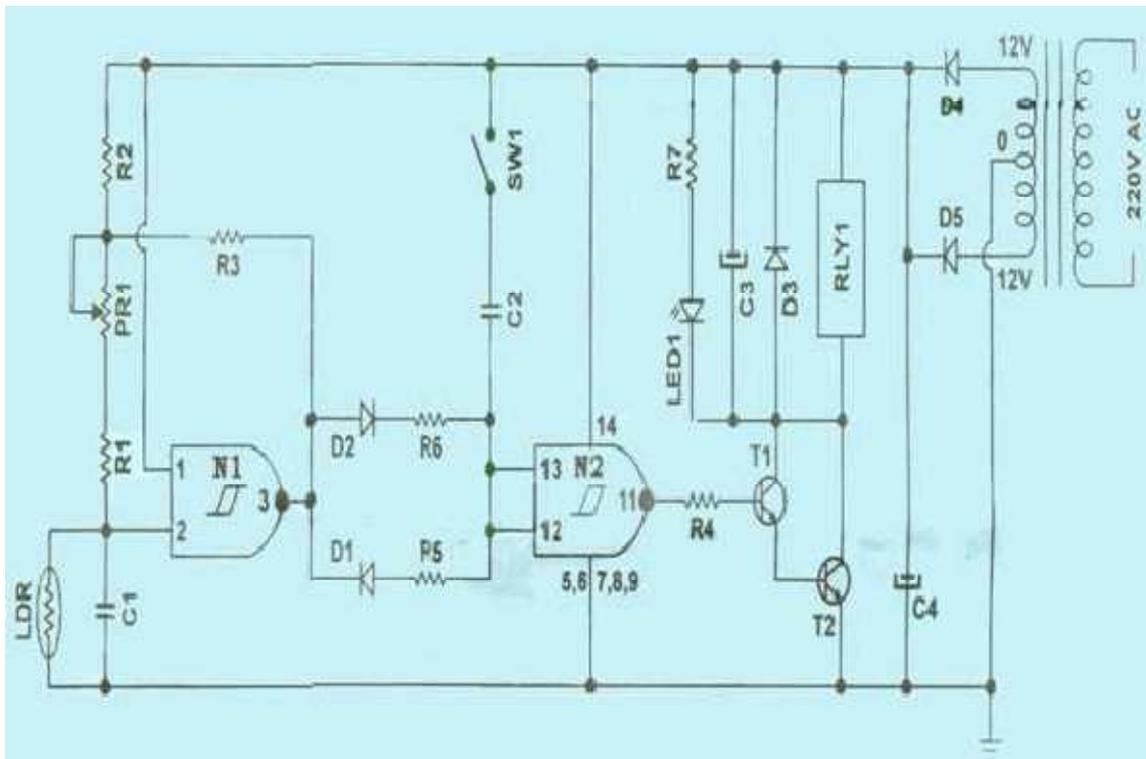
Observations:

By employing this circuit, energy consumption can be reduced considerably as light switches ON or OFF automatically in appropriate time. Moreover, errors which occur due to manual operation also can be eliminated completely. The automatic street light controller unit fabrication is cost-effective with good sensitivity and high reproducibility. Moreover, the construction of the circuit is also simple so that it can be done easily as it involves locally available components. It can be used for other purposes like garden lighting balcony lightning etc.

Conclusion

The AC voltage from the electric grid can be stepped down, rectified and used for powering the circuit. Meanwhile, the street light can also be powered by the AC voltage, which is controlled by a relay switch connected to the switching part of the circuit. The above mentioned strategy will enable us to harvest solar energy in an effective way for the operation of the circuit and for powering the street light also.