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AUTOMATIC ROOM LIGHT INTENSITY BASED WINDOW BLIND CONTROL SYSTEM

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ABSTRACT-
Typical mid income house-holds spend RS. 500-700 per month on electricity- 800 to 1000 kWh (kilo watts-hours). Most households could save 50 % to 70 % of this easily if we can use efficient equipment and even more we can save if we can utilize the outside sunlight for lightening. In this project we have planned to develop an automatic blind control system in accordance with outside sunlight to save the electricity. Whenever there is sunlight outside, blinds are opened to utilize that light avoiding need of electric lights. Opening of blinds is proportional to sunlight intensity. To control the blinds we planned to use stepper motor and intensity of sunlight is sensed using light dependent resistance interfaced to on -chip ADC of microcontroller. It takes input from sensor, decides the opening of blinds and activates the motor through motor driver. Keeping in mind the vast technical and document support and integrated on-chip peripherals available, high source and sink currents PIC microcontroller is chosen. Because of less development time, easy debugging and easy understandability compared to assembly language, firm ware (software for embedded system) is developed in Micro C.

KEY WARDS- LED , ADC , DC MOTOR , PCB Plate .

INTRODUCTION-
Embedded is the combination of both hardware and software. Hardware in this field is electronics hardware where as the software is the programming of the microcontroller.
To fulfill the requirements about comfort and energy efficiency, building managers have implemented programs to reduce lighting energy requirements by installing more efficient light sources and luminaires. However, this is not sufficient.Lighting energy management has to provide the optimal lighting level for the tasks being performed using the most efficient light source suitable for the application, and providing light only when and where it is needed. This can be achieved by using lighting control strategies and lighting control system. The main purpose of these systems is to reduce energy consumption while providing a productive visual environment. This includes:

- Providing the right amount of light.
- Providing that light when it's needed.

The aim of the project is to design such as sliding windows are used in house. There are two LDRs used to automate the house. First LDR used to control the window as open/close when sun lights falls on to the LDR. Second LDR used to control the intensity of light in the house according to the sun light intensity using PWM technique system. The basic concept of our automated system is that the position of the blinds is dependent on the intensity of light. A

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microcontroller receives the level of intensity from a photo resistor and sends an appropriate signal to the motor driver, which then steers the stepper motor to one of two desired states.The first state is referred to as our ground state. The ground state is achieved when ambient light is present at the face of the window. At this particular time, the blinds are turned to a fully open position as shown in figure 1-

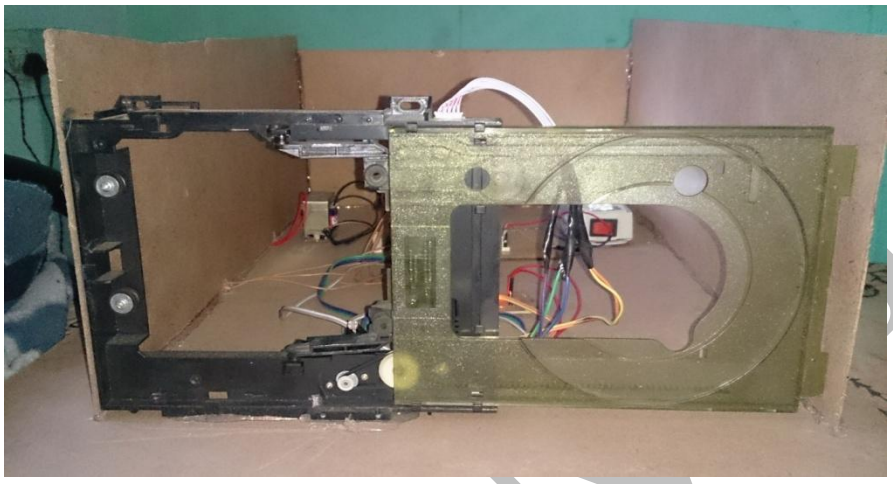

Figure-1 Open Position of Blind

The final state of our system takes place when the intensity of light drops below a certain value. This particular value is modeled to simulate darkness, and therefore the blinds rotate upward to a fully closed position (as shown in fig.2). This state is referred to as the night state.

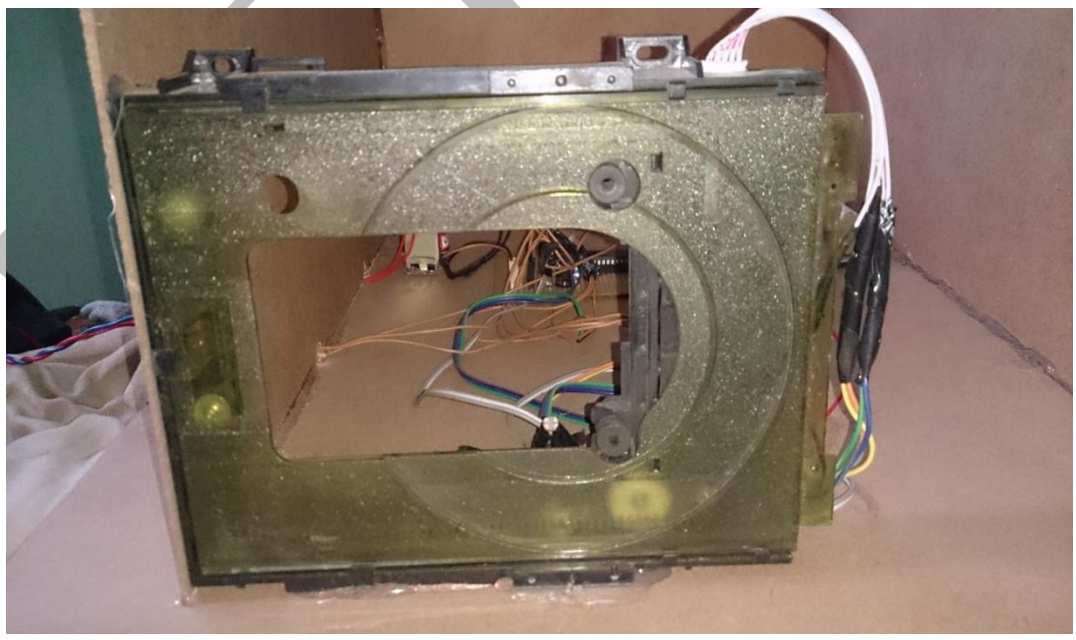

Figure 2 – close position of blind

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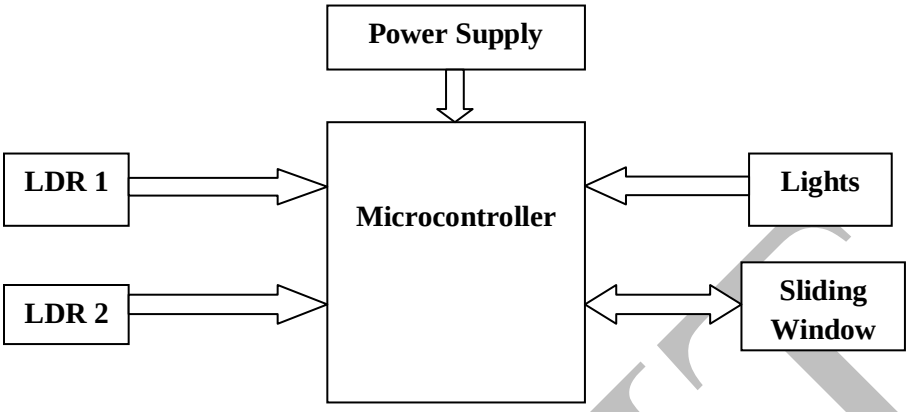
BLOCK DIAGRAM -



POWER SUPPLY-

In alternating current the electron flow is alternate, i.e. the electron flow increases to maximum in one direction, decreases back to zero. It then increases in the other direction and then decreases to zero again. Direct current flows in one direction only. Rectifier converts alternating current to flow in one direction only. When the anode of the diode is positive with respect to its cathode, it is forward biased, allowing current to flow. But when its anode is negative with respect to the cathode, it is reverse biased and does not allow current to flow. This unidirectional property of the diode is useful for rectification. A single diode arranged back-to-back might allow the electrons to flow during positive half cycles only and suppress the negative half cycles. Double diodes arranged back-to-back might act as full wave rectifiers as they may allow the electron flow during both positive and negative half cycles. Four diodes can be arranged to make a full wave bridge rectifier. Different types of filter circuits are used to smooth out the pulsations in amplitude of the output voltage from a rectifier. The property of capacitor to oppose any change in the voltage applied across them by storing energy in the electric field of the capacitor and of inductors to oppose any change in the current flowing through them by storing energy in the magnetic field of coil may be utilized. To remove pulsation of the direct current obtained from the rectifier, different types of combination of capacitor, inductors and resistors may be also be used to increase to action of filtering.

MICROCONTROLLER-

The PIC16F877A is a microcontroller with 8K x 14 words Flash and 368 x 8 bytes bytes of data RAM.

The Flash program memory supports both parallel programming and in serial in-System Programming (ISP). Parallel programming mode offers gang-programming at high speed, reducing programming costs and time to market. ISP allows a device to be reprogrammed in the end product under software control. The capability to field/update the application firmware makes a wide range of applications possible. The PIC16F877A is also In-Application Programmable (IAP), allowing the Flash program memory to be reconfigured even while the application is running

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LDR-

LDR is a resistor whose resistance decreases with increasing incident light intensity; in other words, it exhibits photoconductivity. It can also be referred to as a photoconductor or CdS device, from "cadmium sulfide," which is the material from which the device is made and that actually exhibits the variation in resistance with light level. Note that although CdS is a semiconductor, it is not doped silicon.A photo resistor is made of a high resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron (and its hole partner) conduct electricity, thereby lowering resistance.

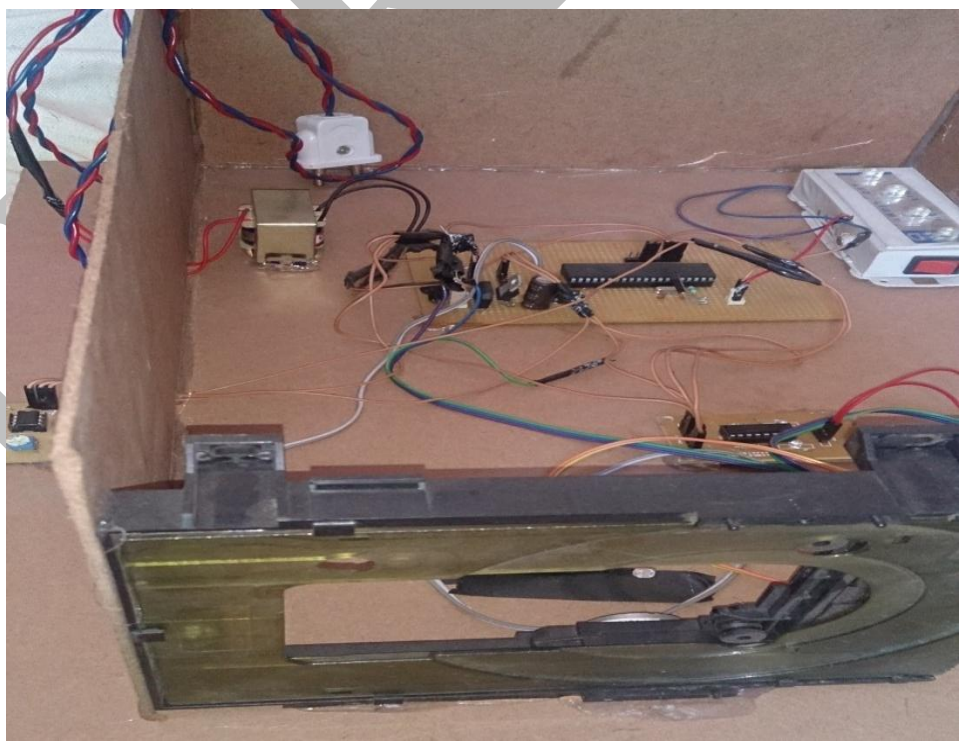
SLIDING WINDOW-

We have used a DVD driver as sliding window. This sliding window Is associated with a dc motor and that dc motor is controlled by a wheel motor control IC (L293d) . This sliding window is work according to the outside sunlight intensity. When there is sunlight outside a signal is sent to the microcontroller which controls the window. At the day time blinds remain open and they become close during night time. A LDR is made to sense the outside sunlight. After once when window will get open Or close the feedback is sent back to the microcontroller. The microcontroller then sends a signal to close the dc motor. Since if we do not provide a feedback then there is a power loss in circuit and it may damage the motor and wheel motor IC also.

LIGHTS-

We made a series of LED lights to see the intensity variations in our project. AS LED Lights are the cost effective and they are most effective to see the intensity variations.

PROTOTYPE DESIGN-



CONCLUSION-

Today we find most technology working for people in homes, industries, factories, warehouses, and laboratories. Automation designs are useful in many ways. For instance, it boosts economy because businesses need to be efficient to keep up with the industry competition. Therefore, having automation designs helps business owners to be more competitive. Finally, as the technology improves, there will be new ways to use automation which will bring new hopes and new potentials.

Finally We have successfully designed this project and is working perfectly.

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