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PIR Sensor using Arduino

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ABSTRACT: This paper proposes a PIR Motion Sensor Switch which can detect the Infrared Rays released by human body. The light or any other electrical appliance can be activated automatically by the active presence of a human body within the detection range / coverage area & when there is no presence the light will be deactivated automatically. PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. For that reason, they are commonly found in appliances and gadgets used in homes or businesses. They are often referred to as PIR, "Passive Infrared", "Pyro-electric" or "IR motion" sensors

I.INTRODUCTION TO PIR SENSOR

A **PIR sensor** detects the infrared light radiated by a warm object. It consists of pyro electric **sensors** which **introduce** changes in their temperature (due to incident infrared radiation) into electric signal. When infrared light strikes a crystal, it generates an electrical charge. The output of **PIR motion** detection **sensor** can be connected directly to one of the **Arduinos** (or any microcontroller) digital pins. If any **motion** is detected by the **sensor**, this pin value will be set to "1". The two potentiometers on the board allow you to adjust the sensitivity and delay time after detecting a movement.

PIR modules have a passive infrared sensor that detects the occupancy and movement from the infrared radiated from human body. You can use this module in security systems, smart lighting systems, automation, etc. There are different PIR modules available in the market, but all of them are basically the same. They all have at least a VCC pin, GND pin, and digital output. In some of these modules, there is a ball like a lens on the sensor that improves the viewing angle.
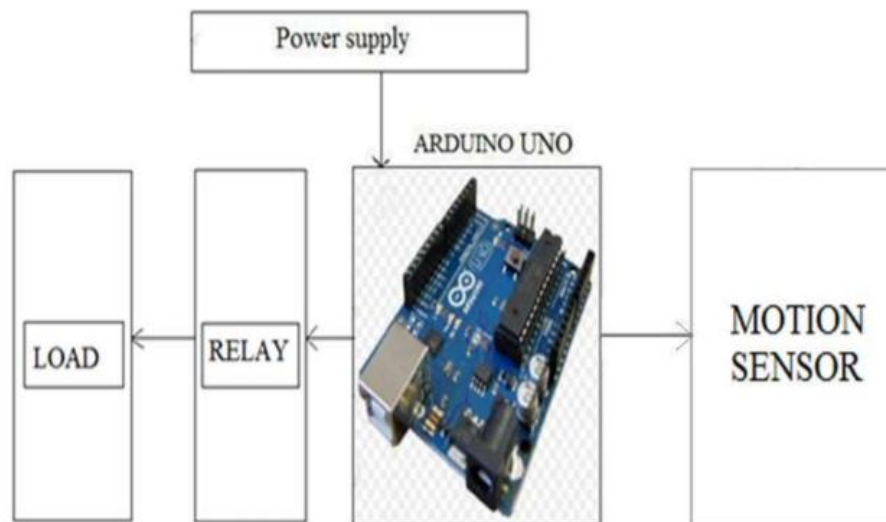
II.BLOCK DIAGRAM
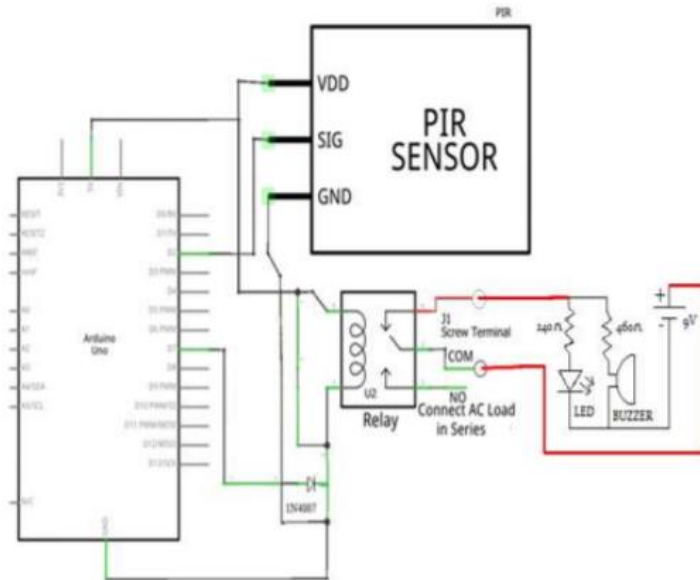

Figure 1.

III.CIRCUIT DIAGRAM
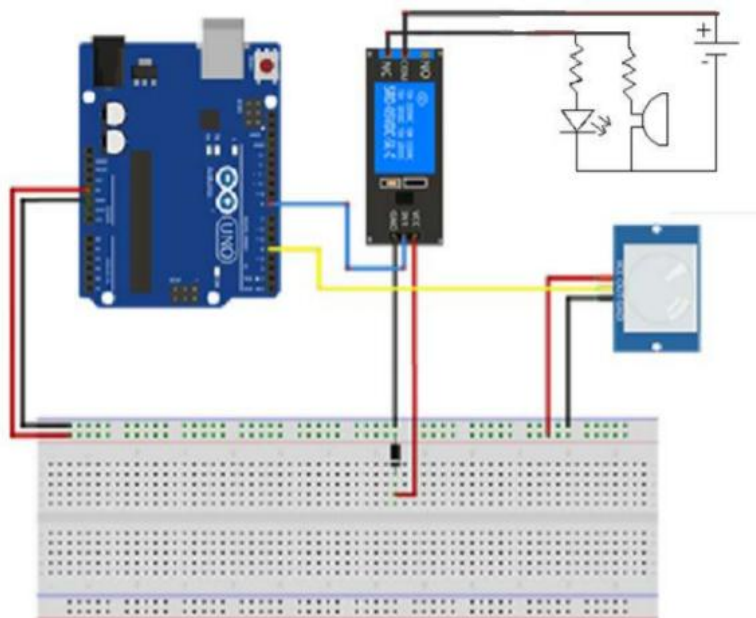

Figure 2

IV.SCHEMATIC DIAGRAM

Figure 3.

V.OPERATION

The proposed system can be used in situations where a house, hospitals that wherever the blind person are living in the place.

The PIR Motion Sensor Switch can detect the Infrared Rays released by human body. The light or any other electrical appliance can be activated automatically by the active presence of a human body within the detection range / coverage area & when there is no presence the light will be deactivated automatically.
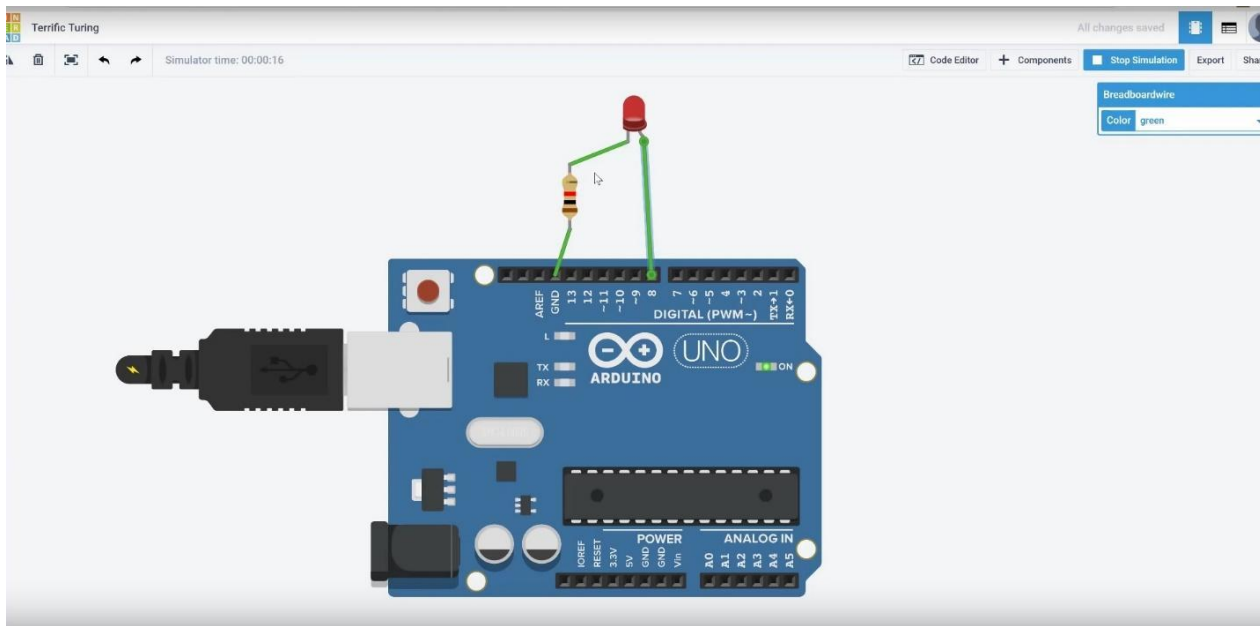
VI.RESULTS

Figure 4

Advantages Arduino - PIR Sensor:
    I. Small in size.
    II. Wide lens range.
    III. Easy to interface.
    IV. Inexpensive.
    V. Low-power.
    VI. Easy to use.
    VII. Do not wear out.

Disadvantages of Arduino – PIR Sensor:
    [1] They have lower sensitivity and less coverage compare to microwave sensors.
    [2] It does not operate greater than 35 degree C.
    [3] It works effectively in LOS (Line of Sight) and will have problems in the corner regions.
    [4] It is insensitive to very slow motion of the objects.

APPLICATIONS:
- Used in locker systems
- Used in Banks
- All outdoor Lights

- Lift Lobby
- Multi Apartment Complexes
- Common staircases
- For Basement or Covered Parking Area
- Shopping Malls
- For garden lights.

VII.USING PIR WITH ARDUINO

You can connect PIR output to any digital pin.

There is a jumper behind this module. If you move the jumper to L position, the sensor will 'toggle' (change state) whenever motion is detected. This is unlikely to be of much use in a practical application. This mode is called non-triggering or Single Triggering mode.

Moving the jumper to the H position will result in the more usual sensor logic. The sensor will turn on when motion is detected and turn off a while after the last motion is detected. This sensor will reset the timer (which would otherwise turn the output off) each time motion is detected; this would be applicable, for example, for room occupancy lighting control where you don't want the lights to blink off while the unit resets. This is called Retriggering mode. (or repeatable trigger mode).

There are also two potentiometers behind this module. By changing the SENSITIVITY potentiometer, you can reduce or increase the sensitivity of the sensor (clockwise increase), and also by changing TIME potentiometer the output delay after movement detection will be changed.

VIII.CONCLUSION

Hence this experiment "PIR MOTION SENSOR USING ARDUINO & RELAY MODULE" has been verified successfully. Now we can Successfully use this PIR Motion Sensor for security purpose as well as other uses . This PIR may be fully functional for 12hrs when fully charged / given battery supply .

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