OBJECT DETECTION ALARM SYSTEM

Submitted To

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Object Detection Alarm System

Description: Object detection is the action of sensing physical movement in a given area. Motion can be detected by measuring change in speed or vector of an object in the field of view.Object detection devices, such as motion detectors, have sensors that detect movement and send a signal to a sound device that produces an alarm.
The overall purpose of this project is to design and construct an object detector with an alarm system. In this project we use a PIR sensor which allows us to sense motion, almost always used to detect whether an object has moved in or out of the sensor range.

Components:

1. A breadboard is used to build and test circuits quickly before finalizing any circuit design. The breadboard has many holes into which circuit components like ICs and resistors can be inserted. The top and bottom rows of holes are connected horizontally while the remaining holes are connected vertically.

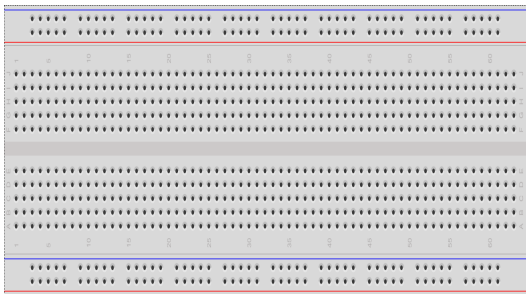


Fig: Breadboard

2. 

Fig: Resistor

A resistor is an electrical component that limits or regulates the flow of electrical current in an electronic circuit. Resistors can also be used to provide a specific voltage for an active device such as a transistor.

3. PIR refers to Passive InfraRed Sensor which is a device used to detect motion by receiving infrared radiation. When an object walks past the sensor, it detects a rapid change of infrared energy and sends a signal. PIR sensors are used for applications such as automatically turning on lights when someone enters.

Fig: PIR Sensor

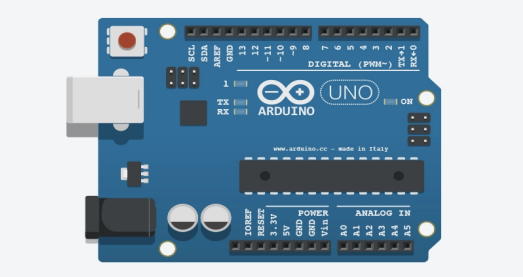
4. 

Fig: Arduino

Arduino is an open-source electronic prototyping platform that also sells microcontrollers.Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

5. A light-bulb produces light from electricity. In addition to lighting a dark space, they can be used to show an electronic device is on, to direct traffic, for heat, and for many other purposes.

Fig: Light bulb

6. 

Fig: Piezo

A piezoelectric microphone is used in these devices to detect pressure variations in sound waves, which can then be converted to an electrical signal for processing.

7. A wire is a flexible metallic conductor, especially one made of copper, usually insulated, and used to carry electric current in a circuit.

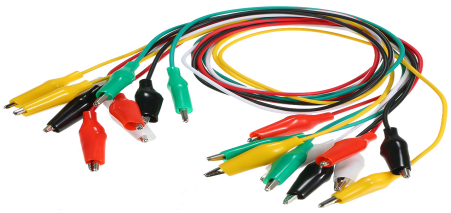


Fig: Connecting Wires

Circuit Diagram:

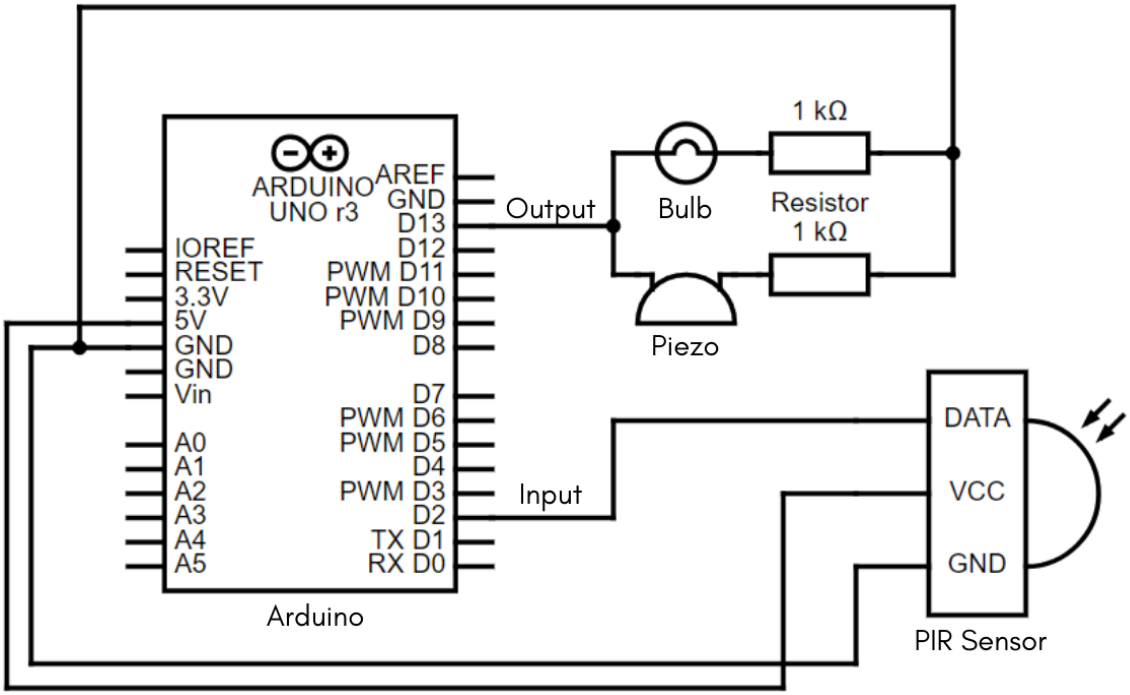


Fig: Object Detection Alarm System Circuit

Purpose: The purpose of designing this object detector is to limit the effect of criminology in the society. Inform us that our properties are in danger and the objective is to ascertain the usefulness of a detector. To identify threats that may accidentally or intentionally exploit vulnerability in its usage. Finally to see if it will be a good tool for security agents.

Advantage:

Using this system benefits everything from residential neighborhoods and commercial properties to industrial spaces and restricted military areas. In short, this detection systems provide the following advantage:

- It is easy to install the system.
- Keep homes and families safe from intrusions.
- Prevent burglary and theft on commercial properties.
- Activate room lights when humans enter into the room by detection.
- It helps in providing security by detecting suspicious movement.
- This can also alert instances where neighborhood dogs or other wild animals wander onto your property.

Disadvantages:

Using this system, there are advantages as well as disadvantages. This detection systems provide the following disadvantage:

- This detector is a bit costly, and cannot be afforded by a majority of people. It has lower sensitivity.
- It sometimes behaves abnormally during bad weather conditions.
- Sometimes it becomes incapable of detecting a very slow-moving object.
- Radio frequency emitted from this sensor, at high power, is harmful for humans.
- This can detect human beings within an approximate 10 meters range.
- Home security systems with these detectors sometimes trigger false alarms due to no reason.

Applications:

In places where safety is needed, an object detector with an alarm system will be of much importance.

- Offices, banks, shopping malls and intruder alarms in homes.
- Automatic light control and counting machines.
- Many systems like home-automation systems, energy-efficient systems and control systems and automatic door opening systems

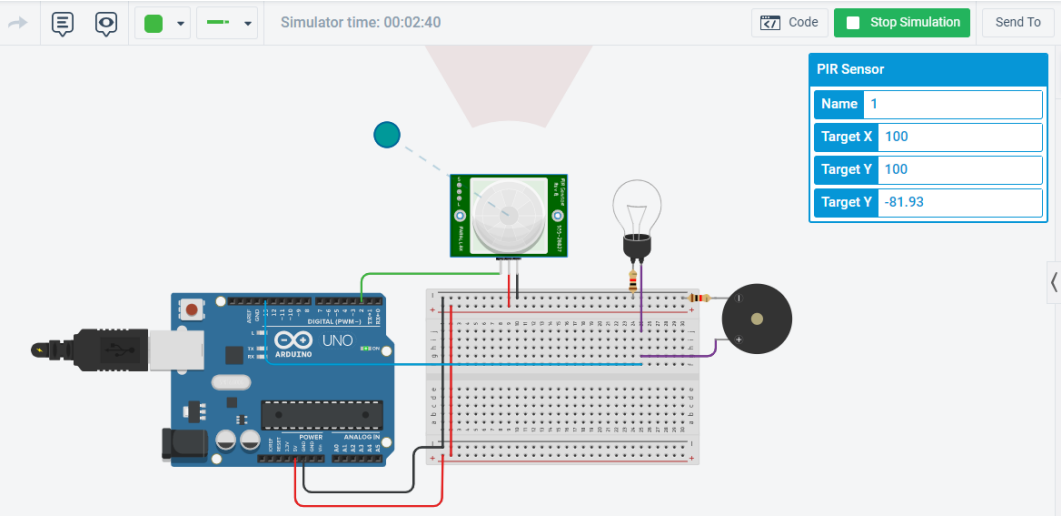
Cost & Time:

Components	**Price**
Breadboard	65 tk.
Resistor (1k-ohm)	5 tk.
Arduino Uno R3	900 tk
PIR sensor	100 tk
Bulb	30 tk
Piezo	50 tk
Connecting wire	20 tk
Total	**1170 tk**

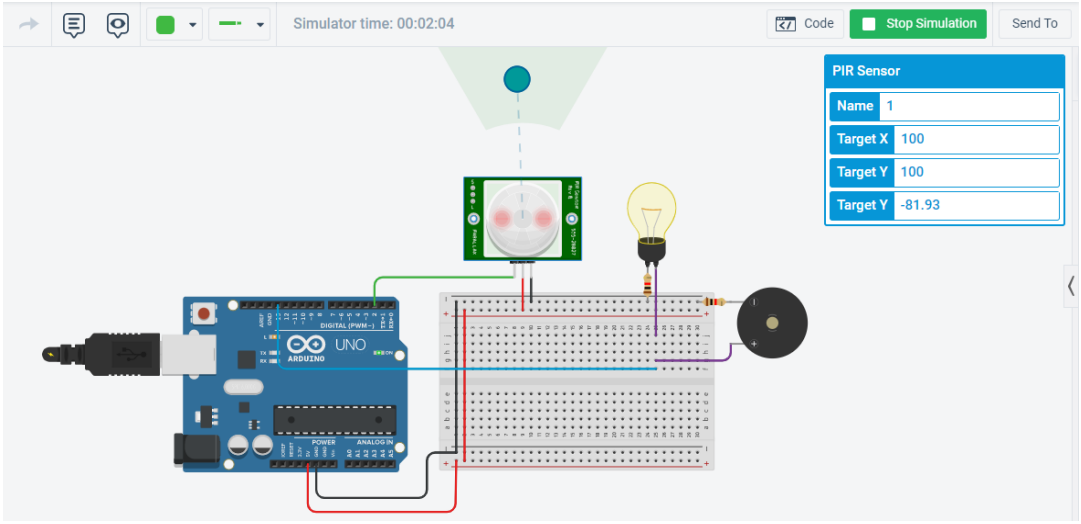
The total cost of the equipment required to build this project is around 1200 Tk.

With all the equipment at hand, it will not take much time to complete the project. Because the connection of the project is very easy, it does not require too many wires, that's why the wires do not need any patches. The project can be done by 30-40 minutes as the connection can be made very easily. However, must know about the equipment (such as Arduino, PIR sensor).

Tinkercad:



Object is away from the sensor's range.



Object is in the sensor's range.

Tinkercad Video Link:
https://drive.google.com/file/d/15IYB9CfcFr4_ccbw8Wkv_KmrtGh3OoaM/view?usp=sharing
Tinkercad Link:
https://www.tinkercad.com/things/5nbopCJULoS-project/editel?sharecode=dx0ydFpNQGxkU_JGwlbxVTkrhm93XQr3k9h-DafRmwQ

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