ABSTRACT

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TOPIC: Motion Controlled Camera Using Arduino

INTRODUCTION:

Home Automation is a vast field where many companies are constantly researching new ways to make living safe and smarter one such project is this motion controlled camera. The main aim of the project is to Capture the images of the people who enter the field of view of the camera this can be used to identify all the people who enter or leave the house and can provide a great deal in identification of the people involved in burglary or get information in real time about the person standing in front of your home without having to open the door

COMPONENTS:

- Arduino Uno
- Camera
- Ultrasonic sensor
- Memory drive

HARDWARE EXPLANATION:

Ultrasonic sensor:

Ultrasonic sensor converts sound wave into electrical signal, they do both transmitting and receiving the signal, It will act like as an Transducer.Ultrasonic generates high frequency sound waves so the echo is received back to the sensor in between the

transmit time and receiving time is calculated by the arduino and it will give the input to python.

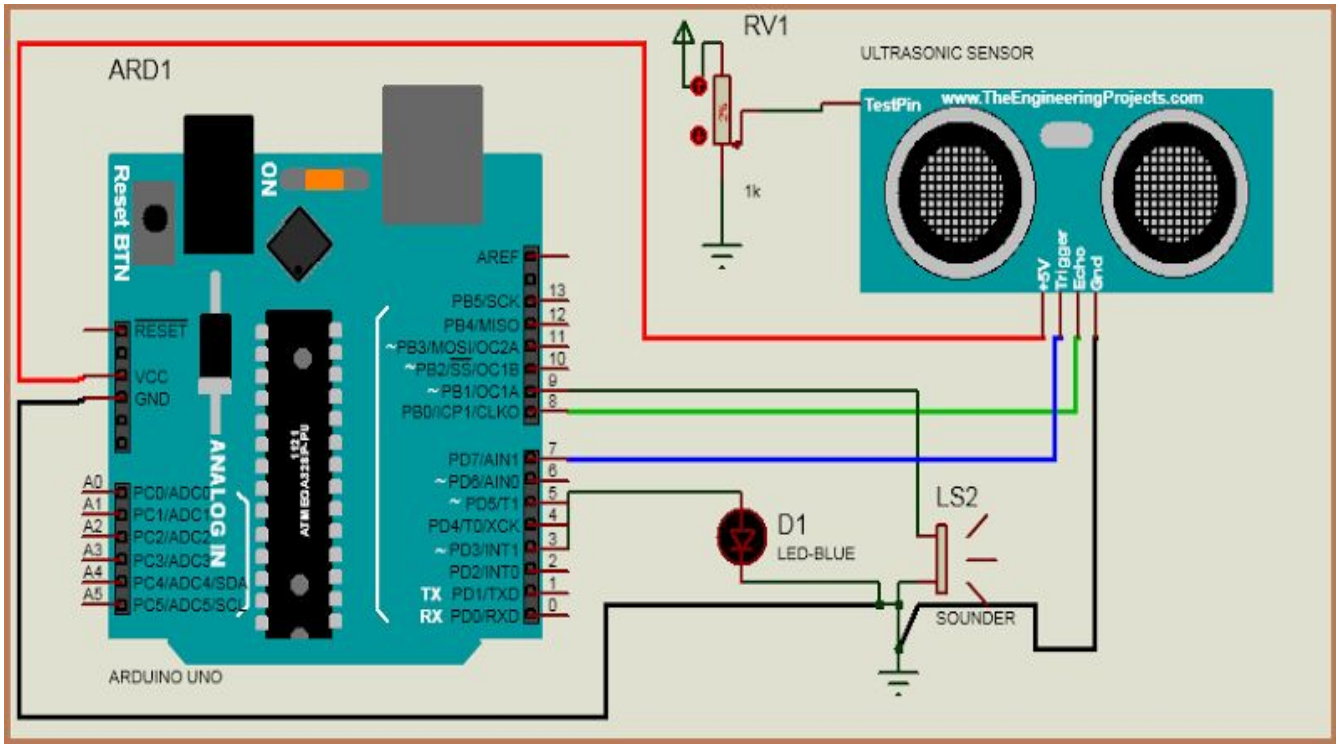
Arduino UNO:

Arduino is an open-source prototyping platform based on easy-to-use hardware and software.There are different types of arduino board available as per our requirements we select the boards in this project i am choosing the arduino UNO is a microcontroller board based on the ATmega328 (Datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button Arduino UNO.

CAMERA:

Any webcam or Arduino camera

<u>BLOCK DIAGRAM:</u>



ARDUINO CODE:

Arduino will receive the signal from Ultrasonic and given the signal input to python.

```
int trigger_pin = 13;
int echo_pin = 11;
float time_taken;


void setup() {
Serial.begin(9600);
pinMode(trigger_pin, OUTPUT);
pinMode(echo_pin, INPUT);
}

void loop() {

digitalWrite(trigger_pin, LOW);
delayMicroseconds(2000);
digitalWrite(trigger_pin, HIGH);
delayMicroseconds(10);
digitalWrite(trigger_pin, LOW);
time_taken = pulseIn(echo_pin, HIGH);
Serial.println(time_taken);
delay(50);

}
```

PYTHON CODE:

Python program is used for getting the input signal from sensor via arduino, so that it can capture the obstacle according to the sensor detection.

```
#! /usr/bin/env python
import sys

import serial
import pygame
import pygame.camera
from os import getenv
from pygame.locals import *
from datetime import datetime as dt

# Initializing the Camera device
pygame.camera.init()
cam = pygame.camera.Camera("/dev/video0", (640, 480))
// Here declare the arduino port
home_dir = getenv('HOME')

'''
Adjust the value of this variable to set the distance for the sensor to detect intruders
'''
RANGE = 300
```

```
def capture_image(): ''' Starts the camera, Captures the image, saves it &amp;amp;amp;amp;amp; stops '''

file_name = home_dir + '/image_captured/image_' + str(dt.now()) + '.jpg'

cam.start() image = cam.get_image()
pygame.image.save(image, file_name)
cam.stop()

'''
Establishes a connection to Arduino board through serial interface
'''
arduino_board = serial.Serial(sys.argv[1], 9600)

'''
Enters an infite loop that runs until it receives Keyboard Interrupt
'''
while True:
if arduino_board.inWaiting() > 0:
data = arduino_board.readline().strip()

try:
'''
```

The value received through serial interface would be string, in order to process futher, it is converted to numeric datatype.

```
'''
data = int(float(data))
if data <= RANGE:
capture_image()
print data
except BaseException, be:
'''
```

initially the board might send some strings that are not the numeric value, to handle such exception it is catched and ignored by printing an exception message.

```
'''
print be.message
```

RUNNING THE PROGRAM:

Declare the arduino port in Python program the above image shows the arduino UNO port connection.

For running the program save the python code, open terminal type => python "Your python project name"/arduino port name (example : python self.py /dev/ttys0). Arduino port name is shown in arduino ide choose Tools => Port => Port name is shown in ide.

Once all these settings are done, When you run the program Ultrasonic sensor will find the obstacles in an interval and capture the images using the camera.Hope this will give you some idea about using ultrasonic sensor with arduino using Python.