

# Multiple Applications Robot

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**Abstract:** Embedded System is a section of a integrated device often including hardware, software and mechanical parts. This project presents multiple manual robot that has PIR sensor for Human Detection, which get activated based on extrinsic stimulation. The system transmits simultaneous monitoring through the wired camera attached to the Bot and sends simultaneous information to the CPU. The object in front of camera is placed and directed. A gun hooked up to the Bot is used for pointing the object and hit the object for target object locating and shooting applications. Disputed to most common access, in which detection and capturing are done by an integrated procedure, the approach preferred here relies on a modular architecture, in which detection and locating are moved out individually, and the latter might acquire input data from various detection algorithms. The key to the overall issues is based on the use of a Image altering for detection of object and target tracking accomplished with help of gun movement. The robot also senses gas detection, depth detection ,night vision and appropriately takes steps. Gas Detection is done through MQ6 Gas sensor. Depth detection and night vision functions is done through IR Sensor.

**Keywords:** Human detection, Target Tracking, Shooting Applications, Gas Detection, Depth detection.

## I. INTRODUCTION

In this paper, we start with a multiple applications robot which includes human detection, target tracking system(TTS), shooting applications, Gas Detection system(GDS), Depth detection system(DDS). This structure is excepted for intrusion detection systems(IDS), tracking intruding object and destroying it. The system will be sealed at some useful place, from which entire and clear view of the area under surveillance can be seized with camera. The system is implemented with a high resolution camera(HRC), image processing hardware,  $\mu$ C, motors and other additional hardware and components. Image Processing Hardware will obtain video seized by camera. Then it will process the seized data. System will record that target to calculate its acceleration of motion. This acceleration information is necessary to choose the angle and time instant at which projectile is to be proceeding at intruding object to wreck it. Position of the target in the form of x-y coordinate is established and sent to  $\mu$ C.  $\mu$ C will control the angle of rotation of motors to mark the cannon focusing at the target. At last target will get shot. Camera can also be used for surveillance when object is not to be followed. The robot also senses ground surface and warns. The proposed multiple applications robot is clean to design and implement both in hardware and software conditions. It uses ARM 7(LPC 2148)  $\mu$ C, high sensitivity gas sensor (MQ6) and Passive Infrared(PIR) sensors, equipped camera and Zigbee modem to support reliable network.

## II. RELATED WORK

Various studies have been done based on people counting using computer vision, [1] in this paper they present an explanation to all people counting based on information provided by an overhead stereo system, fundamental conditions are classified:

1. The detection and recording of human motion using an extended particle filter.

2. Modified K-means algorithm is used to add a deterministic output
3. People trajectories are generated in order to perform people estimating.

[2] in this paper we are presenting a solution for monitoring ground-level ozone, particulates, SO<sub>2</sub>, CO and NO<sub>2</sub> and calculate air quality ratios for these pollutants.

Also [3] in this we are providing a explanation for C language code alternate of that we are using a matlab programming for image tracking.

## III. SYSTEM DESCRIPTION

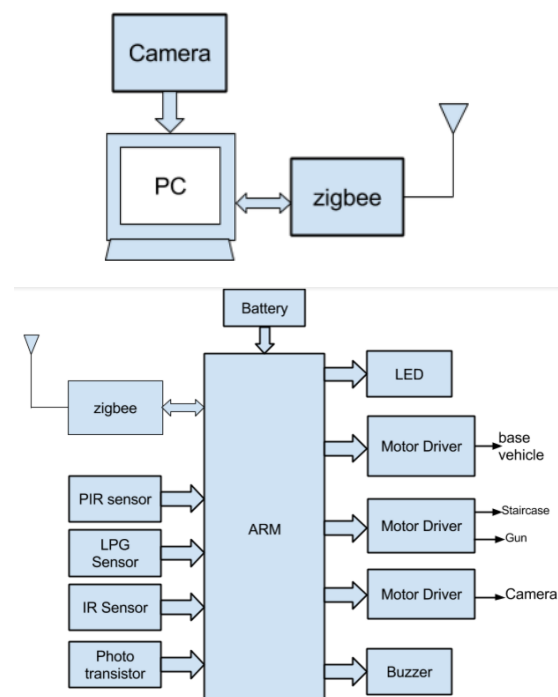


Fig.1: Block Diagram of Multiple Applications Robot

The vital part of this project is the hardware model composed of sufficient sensor with embedded system. Embedded systems are computer in the vast sense.

A. PIR Sensor:



Fig.2 : PIR Sensor

PIR sensor is used to sense motion, almost always used to detect whether a human's movement is in or out of the sensors range. The Sensing range of PIR sensor is up to 20 feet (6 meters) 110° x 70° detection range. They are small, low-priced, low-power, easy to use and don't wear out. They are often known as PIR, Passive Infrared sensor or IR motion sensors.

B. LPG Sensor:

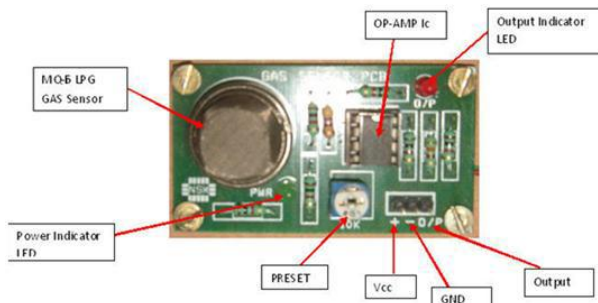


Fig. 3 : LPG Sensor

MQ-6 LPG semiconductor sensor is Combustible Gas Sensitive. The MQ-6 sensor can identify gas concentrations everywhere from 200 to 10000ppm. MQ-6 semiconductor sensor is Combustible Gas Sensitive. The MQ-6 lpg gas sensor is made up of SnO<sub>2</sub> which has lower conductivity in clean air. This MQ6 sensor is used to sense the leakage of LPG(Liquefied Petroleum Gas). In normal circumstances the output of this sensor is „high“ and it goes „low“, when the LP gas is sensed. Both Methane(CH<sub>4</sub>) and Propane(C<sub>3</sub>H<sub>8</sub>) can be detected easily by MQ-6 sensor because it has high sensitivity towards the gases like Methane (CH<sub>4</sub>), Propane(C<sub>3</sub>H<sub>8</sub>) and Butane(C<sub>4</sub>H<sub>10</sub>). It is a low cost sensor suitable for different application.

C. IR Sensor:



Fig. 4 : IR Sensor

The infrared sensor (IR Sensor) is an electronic device that transmits and/or detects infrared radiation in order to sense some circumstances of its surroundings. IR Sensors measure the heat of an object, as well as identify motion. This sensor works by using a specific light sensor to detect a selected light wavelength in the Infrared (IR) spectrum. By applying an Light Emitting Diode (LED) which produces light at the identical wavelength as what the sensor is considering for, you can look at the power of the received light. When an object is near to the sensor, the light from the LED returns off the target and into the light sensor. This concludes in a large jump in the depth, which we already know can be identified using a threshold.

D. Photo Transistor:



Fig.5 : Photo transistor

A phototransistor is disparate from a simple transistor in the way that in the contemporary, voltage used to the base is interchanged by light striking it. L14G2 is an NPN phototransistor used here. It operates as a photo detector in the sense that it can change the incident light into electric response. They are commonly used as sensors commonly paired with a light source like Light Emitting Diode(LED). These are the bipolar transistors(BJT) having a translucent case. This translucent case exposes the base collector region of transistor to extrinsic light. When light incidents on this junction, electrons(e<sup>-</sup>) are composed by the photons( $\gamma$ ). These electrons are inserted in the base of phototransistor. The current gain( $\beta$ ) of the transistor surges the resulting photocurrent at the base collector junction. The maximum dark current is 100nA; while in light its current is 500 $\mu$ A. The required light source is a gallium arsenide(GaAs) LED with peak wavelength( $\lambda$ ) is 940 nm.

IV.RESULT AND DISCUSSION

A. Human Detection

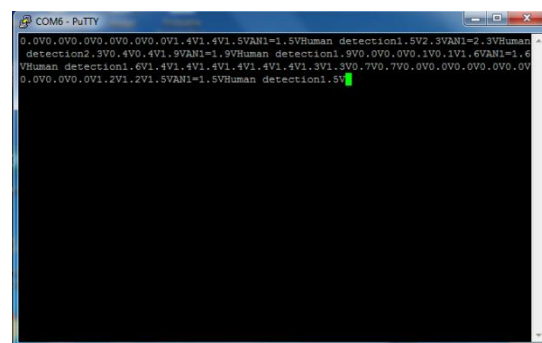


Fig 6. Snapshot of Human Detection using PIR Sensor

Fig 6. Represents snapshot of human detection using PIR Sensor. The sensing Range is of 1.5V.

B. LPG Gas Detection

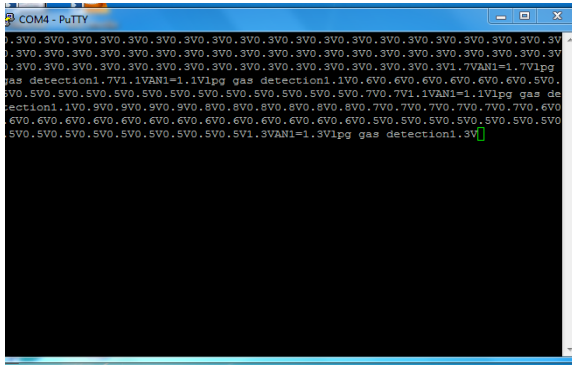


Fig 7 . Snapshot of LPG Gas Detection using MQ6 Sensor  
Fig 7 Represents snapshot of LPG Gas Detection using MQ6 Sensor. The Sensing Range is of 1.3V.

C. Depth Detection

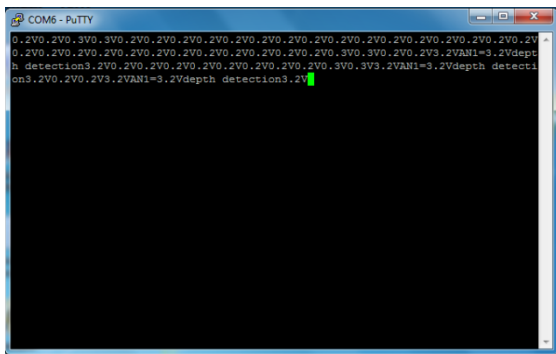


Fig 8. Snapshot of Depth Detection using IR Sensor  
Fig 8 Represents snapshot of Depth Detection using IR sensor. The Sensing Range is of 3.2V.

D. Serially Motor ON/OFF

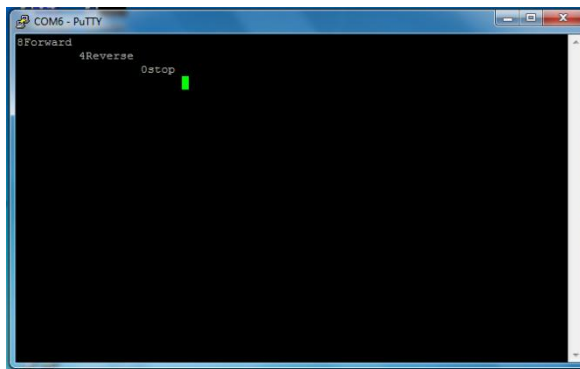


Fig 9. Snapshot of Serially Motor ON/OFF Using Different Logics

Fig 9 Represents snapshot of Serially Motor ON/OFF Using Different Logics. Logic 8 will forward the motor. Logic 4 will reverse the motor. Logic 0 will stop the motor.

E. Hardware Part of Multiple Application Robot

Fig 10. Represents Hardware Part of Multiple Applications Robot. It shows various applications like Human detection, Gas detection, Depth detection, Target Tracking, night vision and shooting applications using

different sensors like PIR Sensor, MQ6 Sensor, and IR sensor. DC motor L293D is used here.



Fig 10. Hardware part of Multiple Applications Robot

V. CONCLUSION

In this paper, The proposed Multiple applications robot has wide range of industrial, defense and domestic applications. In field research or fieldwork, this Bot can be used to find the depth of a particular location. Various benefits of this system are its range of operation up to 100-meter, secure data transmission and easy to establish. The pointer gun has various advantages over conventional weapons. Therefore, this robot has great militaristic and industrial use that will revolutionize the future.

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