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Palm Size Human and Gas Detection ROBOT

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ABSTRACT: The aim of this project is to give a practical knowledge about the robots which can be used in destructive and disaster areas like collapsed building where rescue team cannot operate due to alot of technical problem. By this project we have build the first simplified version of the rescue robot. Normally in the wireless robot the operation is done manually using Bluetooth connection. In this kind of wireless technology we have used sensor which have the expansion of 120 degree. Anybody that is found in this range will be detected by the sensor (i.e. PIR SENSOR).

I. INTRODUCTION

In our project we have used different types of sensors, components , switches and keys. Here we have given a short description about the above discussed :-

- **PIR SENSOR-** The full form of PIR sensor is Passive Infrared Sensor. It is an electronic sensor which is used to measure infrared light radiating which is emitted from the object. They use the term passive which refers to the fact that PIR device do not generate or radiate energy for detection purpose . The main fact with PIR is that it do not detect and measure heat.
- **BLUETOOTH HC05-** It is this type of module which is an easy to use Bluetooth SPP(serial port protocol). It is designed for transparent wireless serial connection which can also be used in master and slave configuration. The hardware and software features of module are listed below:-
 - a. Upto +4dBm RF transmit power.
 - b. UART interface with programmable baud rate.
 - c. Slave default Baud rate:9600, data bits : 8, stop bit: 1, parity : no parity
 - d. Auto paring PINCODE: "1234" as default.
- **ARDUINO-** It is an open source electronics platform based on easy to use hardware and software. The input that read by the arduino are light or sensor , a finger on a button etc. the output that we get from the input it is activating a motor, turning on an LED. The contribution of the worldwide community has added upto an incredible amount of accessible knowledge about arduino that can be great help to novices and expert alike.
- **GAS SENSOR-** The sensors are typically divided into many types which are MQ2, MQ3,MQ6,MQ9 & so on. Out of this many types we have used MQ6 sensor module as it have high intensity in detecting some suitable gas like H2, LPG, CH4 and many other harmful gases. The potentiometer is normally used to adjust the sensitivity of the sensor. It is normally stable and have long lifetime.



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- APP INVENTOR- It is an open source web application which is originally provided by Google but now it has been maintained by the Massachusetts Institute of Technology(MIT). For creating application that can be run on android devices that allow the user to drag and drop the visual objects.

II. LITERATURE SURVEY

The main aim of this paper is to give the small brief about the authors who have already prepared the paper on the base of this topic that is robot which can detect gas leaking in disaster areas through gas sensor

- HYO JOONG KIM AND GROUP :- High performing gas sensors are normally prepared using p-type semiconductor such as CO₃O₄, MN₃O₄ etc. This type of sensor semiconductor are excellent materials not only for fabrication but also for valuable additives gases.
- EDUARD LLOBET :- He uses carbon mono material in the gas sensor which have been attracting a great deal of research. In case of gas sensing carbon nano materials like nanofibres ,nanotubes, and grapheme create a dominance position in the well established nano materials
- GOPAL CHANDRA, RAJEN BISWA & GROUP :- They have used PIR sensor for power consumption saving and memory space recorder. In this the software was developed and install in the computer. When any intruder comes in the detection range of PIR sensor it activates the lighting system. This also repeat its software and now & then continuously. This is how we are able to save power consumption. The system start recording when the sensor is in ON condition hence due to which memory space is also saved.
- JAESEOK YUN & SANG SIN LEE :- They are using pyroelectric infrared sensor which is also commonly known as PIR sensor. They are using this PIR sensor for human movement detection and identification. This type of PIR sensor are widely use as presence trigger. Through this sensor we have develop a data collection module which is having 2 pairs of PIR sensor that is orthogonally aligned and the other is modified Fresnel lenses. In this they have used two types of features set:
 - a. Raw Data Set
 - b. Reduced Feature SetThese two feature set consists of compared amplitude and peak time system. According to their research they found that Raw data set capture 92% accuracy in detecting human movement and capture it whereas Reduced feature set capture more than 94% accuracy in detection human movement, speed, direction & distance. This Reduced feature set extracted from PIR sensor that are having 2 pairs of 3 module each.
- V.HERS , D. CORBUGY & GROUP :- They are using PIR sensor for contactless detection of breathing movement. In this research they have conducted a new concept of PIR technology that is Breath Motion Detecting System (BMDS). As we know that PIR sensor is very sensitive to the exemplification of rib cage and they did not detect obstructive apnea. As this concept is very new & also safe for the patient who are unable to know whether they are having any breathing problem or not.

III. PROBLEM IDENTIFICATION

As we have made a palm size robot which is normally very small in size the problem that we face during making this project is that when we try to interface the gas sensor with localization. This problem occur because previously we have only PIR sensor which help in detecting human bodies in disaster areas but as we extend our project in which we have added gas sensor which will now detect the harmful gases also that where while detecting harmful gases it will also give us the feedback where our robot is localized .

So when we interface Gas sensor, PIR sensor and localization we face a interfacing problem because as we need all the information in a particular app which is normally not possible. So for coming out from this problem we have invented our own app through the help of app inventor through which we get all the feedback information in a particular time and place .

IV. METHODOLOGY

As in our previous project we have made a robot which is palm in size normally it have been used to detect human bodies in disaster areas where rescue team could not able to reach there all these things happen with the help of PIR sensor. It works in its range which is calculated in degree that is 120. Now further we extended by adding some new components that are gas sensor and localization.

Now our palm in size robot consists of following components which are discussed below:-

1. PIR SENSOR
2. GAS SENSOR
3. BLUETOOTH HC05
4. AURDINO
5. SERVOMOTOR
6. LOCALIZATION

In this project we have normally used such type of components which are used in battery connected robot. The above discussed components are just the hardware components are assemble in such a way due to which we don't face any kind of complication. Our robot is so simple that it can give all the feedback information in a particular app which we have build using app inventor. We have used 2 different type that are PIR and Gas sensors which plays an important role in our robot.

For rotating the robot we have used servomotors which is not a class of motors , the word servo is used for the closed path feedback system. These types of motors are normally used in the application that are robotics, machinery and automated manufacturing places. As servomotors rotate only 180degree but we need to move our robot in 360 degree that is to and for movement so we take out the pin that is attached in the motors.

Now comes the software part in which we have PIR and Gas sensors. The main work of these two sensors are totally different from each other as PIR sensor detects the change in infrared radiation of warm blooded moving objects in its detection range. and the gas sensor detects the harmful gases that are normally very harmful for our health as well as for our environment also that are H₂,CO, LPG etc.

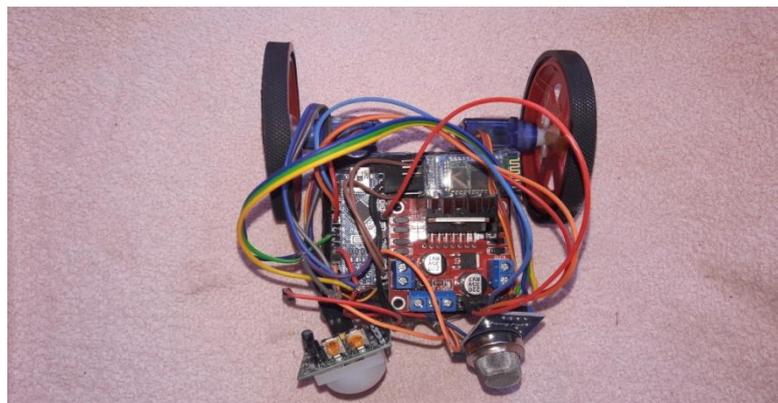


FIG: TOP VIEW OF THE ROBOT

V. RESULT

We have successfully achieve the aim by preparing this type of robot. Which we can send to the destructives and disaster areas.

VI. CONCLUSION AND FUTURE SCOPE

We have prepared such type of robot which can be send to any of destructive area or disaster place. After sending the robot we get live feedback in our phone through Bluetooth module. after getting the feedback the rescue team can take quick action.



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The future scope of our robot is that we can use flying wings like drone so that no obstacles can stop its survey by the help of flying wings. It can move through the broken building, huge rocks, wall etc.

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