International Journal of Research in Engineering, Science and Management
Volume-2, Issue-4, April-2019
www.ijresm.com | ISSN (Online): 2581-5792

Hazardous Detecting Robot

H. S. Bindu[1], T. C. Darshan[2], N. Chandan[3], G. T. Goutham[4], Mohammed Raziq[5], S. H. Manjunatha[6], B. S. Sharath Kumar[7]

[1]*Lecturer, Department of EEE, PES Polytechnic, Shivamogga, India*

[2,3,4,5,6,7]*Diploma Student, Department of EEE, PES Polytechnic, Shivamogga, India*

***Abstract*: In this day and age mechanical technology is a quickly developing and an interesting field. Presently, days correspondence is a piece of headway of innovation, so we chose to take a shot at this field, and structure something which will make human life less complex on day today perspective. This robot has adequate insight to cover the most extreme region of gave space. The mechanical vehicle has an insight worked in it with the end goal that it guides itself at whatever point a deterrent comes in its way. This mechanical vehicle is constructed, utilizing a smaller scale controller of ATmega 8 family. An ultrasonic sensor is utilized to distinguish any hindrance in front of it and sends an order to the microcontroller.**

***Keywords*: Obstacle detection, US sensor, temperature Sensor, Arduino controller, vehicle, Arduino software, camera, motor driver, Gas sensor.**

1. Introduction

Mechanical technology is the part of innovation that manages the structure, development, task, and use of robots. A machine fit for completing a mind boggling arrangement of activities naturally, particularly one programmable by a PC is characterized as a robot. Deterrent evasion is an essential prerequisite of any self-sufficient portable robot. Hindrance evasion Robot is configuration to enable robot to explore in obscure condition by maintaining a strategic distance from collisions. Obstacle staying away from robot detects obstructions in the way, dodge it and resumes its running. There are some acclaimed strategies for robot route like divider following, edge discovery, line following. Impediment shirking in robots can acquire greater adaptability moving in changing conditions and would be significantly more effective as ceaseless human observing isn't required. This venture built up a deterrent maintaining a strategic distance from robot which can move with no crash by detecting hindrances on its course with the assistance of ultrasonic separation sensors and the temperature and dampness with DHT11.

To date, there have been various effective endeavors in structuring deterrent keeping away from robots. These works contrast by choice of sensors, way mapping procedure and the calculations connected to set the operational parameters. There have been various undertakings in this field utilizing laser scanner, infrared sensor, GPS and different sensors to achieve deterrent location and shirking. Scientists are tenaciously endeavoring to discover increasingly exact approaches to create self-ruling robot or vehicle development innovation.

2. Proposed framework

The undertaking proposes a self-governing mechanical vehicle, in which remote is utilized for controlling the automated activities. It insightfully identifies snags present on its way through the sensors, maintain a strategic distance from it and take choice based on inside code that we set for it. The detail data is given in the accompanying subtopics which will assist you with understanding the entire framework and its structure. The document is a template for Microsoft *Word* versions 6.0 or later.

3. Block diagram

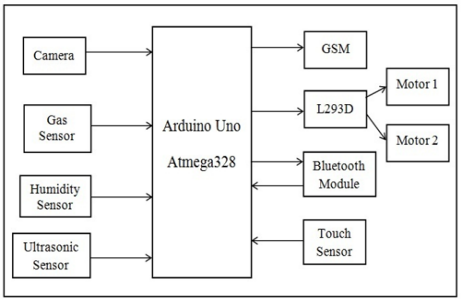

Fig. 1. Block diagram

The main working module of this robot consists of Arduino microcontroller. It is interfaced with temperature, leakage of gases, humidity sensor and bomb detector sensor. The device framework of the robot works with L293D device drivers. Location of the robot is traced with camera. Not only detecting, tracing on to a screen can be easily done by wireless camera attached on the robot. Metal detectors are useful for finding metal inclusions hidden within objects, or metal objects buried underground. They often consist of a handheld unit with a sensor probe which can be swept over the ground or other objects. If the sensor comes near a piece of metal this is indicated by a changing tone in earphones, or a needle moving on an indicator. Metal sensor will detect the attacks and sends the authentication message to the authorized person. The control circuit includes sensors which are capable of detecting various gases, humidity, temperature, as well as mines. The wireless communication used is Bluetooth which helps in

transferring the data and messages. A wireless camera, which helps in the live streaming of the nearby incidents, is included along with the other sensors. If an obstacle is present, it gives an alert message to its operator. The motor helps in moving the robot which implemented with the help of driver IC. Bluetooth is used for sending videos, and pictures. Although Wi-Fi is a good transmission media they are not used in this robot because the rays are very explosive in nature. So we are using Bluetooth module.MQ-3-SEN-O8880 is the sensor used for detecting the hazardous gas details of the environment. GSM module is used to send the alert messages to user when sense any hazardous condition or when any sensor becomes active.

4. Description

A. Basic structure of robot

This robot was assembled an Arduino improvement board on which microcontroller is put. Arduino board is associated with DC Engine through Engine driver board (pin 2, stick 3, stick 4, stick 5).The development of robot will be stop at whatever point there is a snag is available on its way which can be identified by ultrasonic sensors. Ultrasonic sensors give time long to the microcontroller as a contribution for further activities. The temperature identifying sensor is associated with the Arduino also.

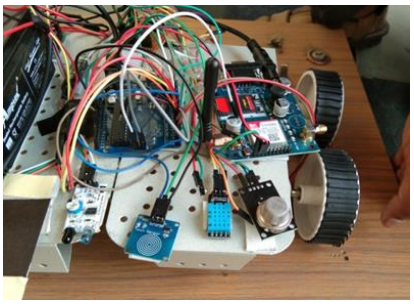

Fig. 2. Front view of hazardous detecting robot

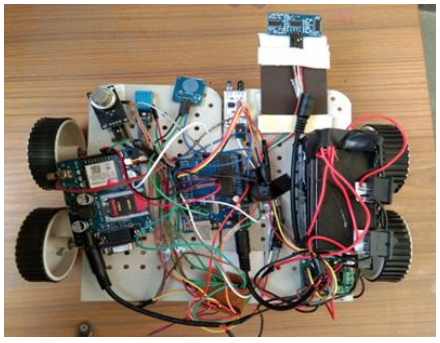

Fig. 3. Top view of hazardous detecting robot

B. Gas sensor (MQ-6)

Touchy material of MQ-6gas sensor is SnO2, which with lower conductivity in clean air. At the point when the objective combustible gas exist, the sensor's conductivity gets higher alongside the gas fixation rising. Clients can change over the difference in conductivity to compare yield flag of gas concentration through a basic circuit.

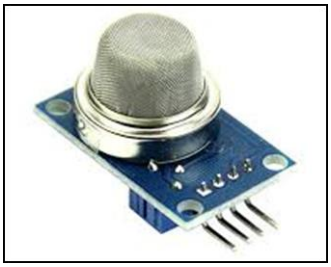

Fig. 4. MQ-6 Gas Sensor

MQ-6gas sensor can distinguish sorts of combustible gases, particularly has high sensitivity to LPG (propane). It is a sort of minimal effort sensor for some applications.

C. Sensor for deterrent evasion

Assortments of sensors are accessible which can be utilized for the discovery of impediments. A portion of the prevalent sensors are: Infrared sensors (IR), Ultrasonic sensors, Cameras, which can be utilized as a piece of PC Vision, Sonar. It can quantify the separation in its field of perspective on around thousands to hundreds point. In the plan of robot, we are utilizing ultrasonic sensors for snag identification and evasion. The ultrasonic sensors persistently radiate the recurrence signals, when impediment is distinguished these signs are reflected back which at that point considered as contribution to the sensor.

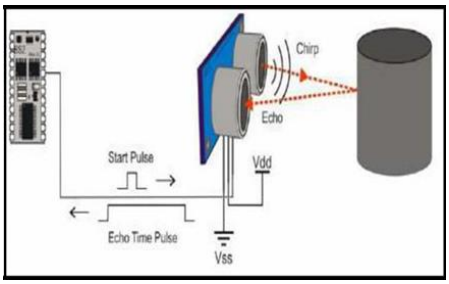

Fig. 5. Schematic Diagram with HC-SRO4 Sensor

Details

- Power Supply: +5V DC
- Working Current: 0.015A
- Measuring Angle: 30 degree
- Ranging Distance: 0.02m – 4m
- Effectual Angle: <15degree
- Resolution: 3mm

D. IR Sensor

Fig. 6. IR Sensor

A Sensor is utilized to detect the landing and takeoff of the train. An IR sensor by and large contain two segments: an IR

Transmitter and IR Receiver. An IR Transmitter is a gadget that discharges IR beams. Additionally, an IR Receiver is a gadget that recognizes the IR beams.

An infrared sensor is an electronic gadget that emanates so as to detect a few parts of the environment. An IR sensor can quantify the warmth of an article just as distinguishes the movement. These kinds of sensors estimate just infrared radiation, instead of discharging it that is called as an uninvolved IR sensor. Typically, in the infrared range, every one of the articles transmit some type of warm radiations. These kinds of radiations are undetectable to our eyes that can be identified by an infrared sensor.

E. Stickiness and temperature sensor

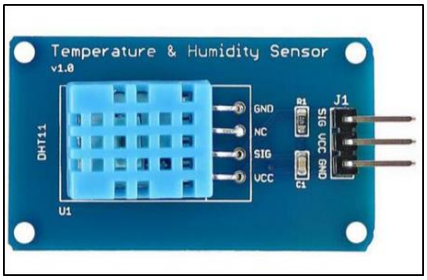

Fig. 7. Temperature and Humidity measuring sensor

The DHT11 sensors are made of two sections, a capacitive stickiness sensor and a thermistor. There is likewise an essential chip inside that does some simple to advanced transformation and releases a computerized flag with the temperature and moistness. The computerized flag is genuinely simple to peruse utilizing any microcontroller.

Particular:

- Ultra-minimal effort
- 3V to 5V power & I/O
- 0.0025A max current use amid change (while mentioning information)
- Better for 20%-80% moistness readings with 5% precision.
- Better for 0-50°C temperature readings ±2°C exactness.
- No more than 1 Hz examining rate (when consistently).
- Body size 1.55cm x 1.2cm x 0.55cm
- 4 pins with 0.254cm separating.

F. Wireless camera

Fig. 8. Wireless camera

Remote surveillance cameras are shut circuit TV (CCTV) cameras that transmit a video and sound flag to a remote collector through a radio band.

Numerous remote surveillance cameras require somewhere around one link or wire for power; "remote" alludes to the transmission of video/sound. Nonetheless, some remote surveillance cameras are battery-fueled, making the cameras really remote through and through.

G. GSM Module

Fig. 9. GSM Module

It is generally utilized versatile correspondence framework on organizations works at the 1900MHz, 1800MHz, 900MHz and the planet. GSM is an open and mechanized cell development used for transmitting versatile voice and data 850MHz repeat gatherings. A GSM digitizes and diminishes the information, at that point sends it down through a channel with two unique surges of customer information, each in its own specific availability. The advanced framework has a capacity to convey 64 kbps to 120 Mbps of information rates.

H. IR Sensors

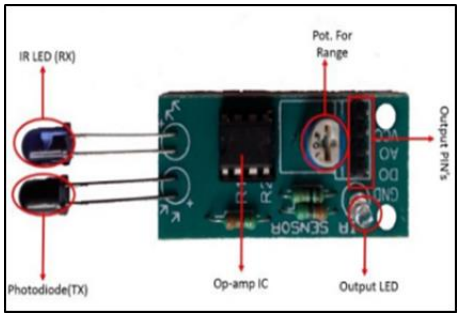

Fig. 10. Infrared sensor

A Sensor is used to sense the arrival and departure of the train. An IR sensor generally comprise of two components: an IR Transmitter and IR Receiver. An IR Transmitter is a device that emits IR rays. Similarly, an IR Receiver is a device that detects the IR rays. An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.

I. Bluetooth module

Bluetooth module HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, expected for direct remote consecutive affiliation setup.

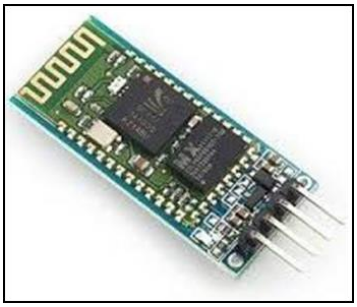

Fig. 11. Bluetooth module

Successive port Bluetooth module is totally qualified Bluetooth V 2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio handset and baseband. It uses CSR Blue core 04-External single chip Bluetooth structure with CMOS development and with AFH (Adaptive Frequency Hopping Feature).It has the impression as little as 12.7mmx27mm. Expectation it will disentangle your general plan/advancement cycle.

J. Arduino UNO R3

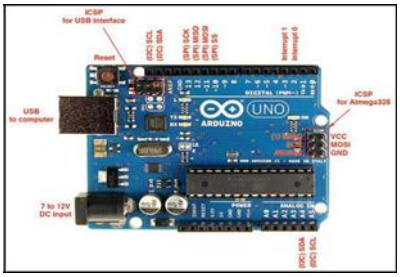

Fig. 12. Arduino Uno R3 board

The microcontroller Arduino Uno R3 is a board reliant on a removable, dual-inline-package (DIP) ATmega328 AVR microcontroller. It has 20 digital input/output pins (of which 6 can be utilized as PWM outputs and 6 can be utilized as analog inputs or simple information sources). Projects can be stacked on to it from the simple to-utilize Arduino PC program. The Arduino has a broad help network, which makes it an exceptionally simple approach to begin working with implanted hardware. The R3 is the third, and latest, update of the Arduino Uno.

Specifications:

- Microcontroller: ATmega328P
- I/p Voltage (suggested): 7V-12V
- Input Voltage (limit): 6-20V
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- PWM Digital I/O Pins: 6
- Analog Input Pins: 6
- DC Current per I/O Pin: 0.02 A
- DC Current for 3.3V Pin: 0.05A
- Flash Memory: 32000B (ATmega328P) of which 500B used by boot loader
- SRAM: 2000B (ATmega328P)
- EEPROM: 1000B (ATmega328P)
- Clock Speed: 16 MHz

K. Motor driver L293D

L293D is a double H-Extension engine driver incorporated circuit (IC). Engine drivers go about as ebb and flow speakers since they take a low-ebb and flow control flag and give a higher-momentum flag. This higher current flag is utilized to drive the engines.

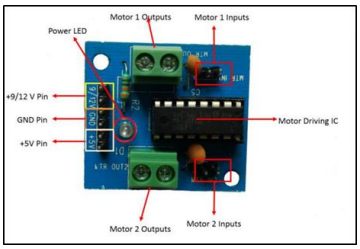

Fig. 13. Motor driver L293D

L293D consists two inbuilt H-connect driver circuits. In its basic method of activity, two DC engines can be driven at the same time, both in forward and invert bearing. The engine tasks of two engines can be constrained by information rationale at pins 2 and 7 and 10 and 15. Information rationale 00 or 11 will stop the comparing engine. Rationale 01 and 10 will pivot it in clockwise and anticlockwise bearings, individually. Equipped DC engines were combined with back wheels of vehicle. It was utilized to drive vehicle. Interfacing of DC engine done through H-Scaffold IC (L293D).

L. Specifications

- Output Voltage Range 4.5V to 36V
- 0.6A Output current capability per driver
- Separate Input- rationale supply
- It can control little DC equipped motors, bipolar stepper motor.
- Pulsed Current 1.2A Per Driver.
- Thermal Shutdown
- Internal ESD Protection

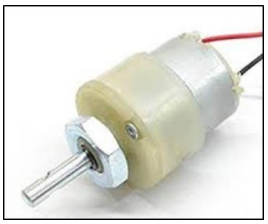

Fig. 14. DC Motor

Geared DC motors were combined with back wheels of vehicle. It was used to drive car. Interfacing of DC motor done through H-Bridge IC (L293D).

M. Specifications

- 5 RPS.
- I/p DC voltage-12V.

5. Conclusion

A self-governing temperature observing robot for risky condition is a clever robot, which can consequently detect the temperature and beat obstructions on its way. It contains of a Microcontroller to process the information, and Ultrasonic sensors to recognize the obstructions on its way. Deterrent evasion is a standout amongst the most vital parts of versatile mechanical technology Without it robot development would be prohibitive and delicate. This task likewise exhibits a dynamic guiding calculation which guarantees that the robot doesn't have to stop before a deterrent which enables robot to explore easily in an obscure situation, maintaining a strategic distance from crashes.

It has a huge field of use. They can be utilized as administrations robots. Similarly, they have incredible significance in logical investigation and crisis salvage, there might be places that are risky for people or even unimaginable for people to reach straightforwardly, at that point we should utilize robots to support us. In those testing situations, the robots need to accumulate data about their surroundings to keep away from snags. These days, even in normal situations, individuals necessitate that robots to identify and keep away from obstructions.

Acknowledgment

This research is supported by Department of Technical Education University, Karnataka, India.

References

[1] Obstacle avoidance robotic vehicle using ultrasonic sensors for obstacle detection, https://www.elprocus.com/obstacle-avoidancerobotic-vehicle/
[2] Faiza Tabassum, Susmita Lopa, Muhammad Masud Tarek, and Bilkis Jamal Ferdosi, "Obstacle Avoiding Robot," in Global Journal of Researches in Engineering: Robotics & Nano-Tech, vol. 7, no. 1, pp. 18-23, 2017.
[3] Push-Pull Four Channel Driver with Diodes http://www.electroschematics.com/wp-content/uploads/2013/01/L293D-datasheet.pdf
[4] https://www.Arduino.cc/
[5] http://www.instructables.com/id/Arduino-Obstacle-Avoiding-Robot-2/
[6] https://components101.com/dht11-temperature-sensor
[7] https://www.pantechsolutions.net/robotics-projects/obstacle-avoidance-robot
[8] Ahasan, M. A., Hossain, S. A., Siddiquee, A. U., & Rahman, M. M. (2012) Obstacle Avoiding Robot Navigation of An Autonomous Robot based on GPS. Khulna University.
[9] Arduino. (2015). Arduino Software (IDE). (Arduino) https://www.Arduino.cc/en/Guide/Environment.