

Wireless Controlled Rough Terrain Vehicle to Detect Alive Human in Earth Quake Areas using Rocker Bogie Suspension

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Abstract - Right now of innovation, still ordinary techniques (human and prepared canines) are being utilized to discover and save the exploited people who are covered under the rubble after normal or human-made devastation. Such activity is risky for the salvage laborers and exploited people too, particularly for the situation, if the destruction is separated. These customary techniques increment the odds of casualties due to their unsafe and time adopting strategies. This is considerably more hazardous activity to include salvage group right now. Since after that seismic tremor the divider conditions are not steady and conceivable outcomes of perilous gases had spread over the zone. Detecting people in earth shake territories is such troublesome thing. Our robot will locate the alive human inside a little ways from dynamic. This has been finished by spotting live people remotely with no physical contact with exploited people by detecting their body's temperature. In this venture, another methodology for identifying alive people in destructed situations utilizing a versatile robot is proposed. Alive human body location framework proposed an observing framework utilizing PIR sensor and camera to record, transmit and break down states of human body. This work portrays a robot for salvage tasks. The proposed framework utilizes a PIR sensor so as to identify the presence of living people and a minimal effort camera so as to obtain a video of the scene. while, different sensors incorporate temperature and gas locator to break down the encompassing condition.

Key Words: Camera module, PIR sensor, Rocker bogie suspension, Victim, Temperature sensor.

1. INTRODUCTION

Over the previous decade Intelligent salvage frameworks with high data and robot innovation have been relied upon to alleviate calamity harms, particularly in Japan after the 1995 Hanshin-Awaji quake. Being developed of robots for search and salvage assignments it is imperative to build up a robot which can really work in a genuine debacle site. A few robots were utilized for the pursuit and location activity in the crumbled World Trade Center structure in September 2001 [1]. In request to condense the status of salvage apply autonomy, this will cover the fundamental qualities of fiascos and their effect on automated plan, depict the robots really utilized in a debacles to date, promising robot plans

(e.g., snakes, legged velocity) The utilization of robots in the anticipation and readiness periods of catastrophe the executives [2]. The robot is built by associating different crawler vehicles sequentially, coming about a long and thin structure with the goal that it can enter restricted space. The units are associated by 2-DOF dynamic joints and 3-DOF latent joints, so the robot can have both the ability to move over hindrances just as adjustment to unpredictable surfaces[3]. In this advanced period of innovation, still traditional techniques (human and prepared canines) are being utilized to discover and protect the unfortunate casualties who are covered under the rubble after regular or human-made obliteration. Such activity is exceptionally risky for the salvage laborers and exploited people too, particularly for the situation, if the destruction is separated. These customary techniques increment the odds of casualties due to their dangerous and time adopting strategies. Thus, to make the salvage activity more secure and compelling, a little ground robot for compassionate pursuit have been proposed which recognize alive individuals. This robot gives the earth shattering assistance and wellbeing to the salvage laborers during the pursuit and salvage tasks. This has been finished by spotting live people remotely with no physical contact with exploited people by detecting their body's temperature[4-5].

Enhanced Pheromone Heuristic Control (EPHC) is a capacity made out of heuristic capacity I, heuristic capacity II and the pheromone focus. These determined likelihood capacities are utilized for discharging the course from dormant path[6]. The rocker-bogie design has no springs or stub axles for each wheel, allowing the wanderer to move over impediments, comprising of rocks, that are up to multiple times the wheel's distance across long while keeping every one of the six wheels at the ground. Similarly as with any suspension machine, the tilt balance is confined by method for the pinnacle of the focal point of gravity.

2. BLOCK DIAGRAM

The Proposed System uses a wireless controlled rough terrain robot that can travel irregular surface without interrupt. This robot can control by Bluetooth module. This Robot has a passive infrared sensor to detect the presence of the human beings.

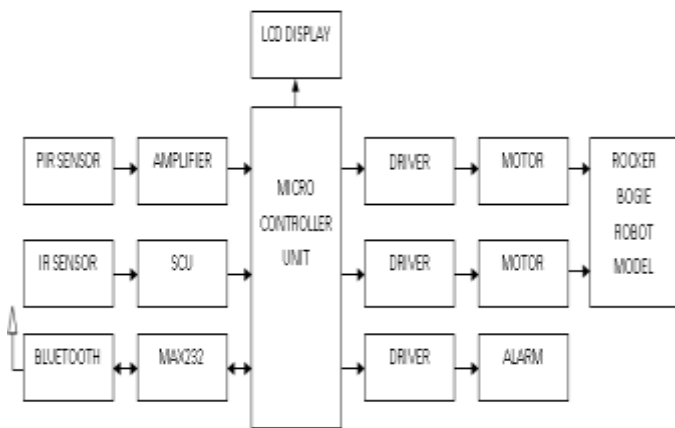


Fig -1: Overall Block Diagram

This system also used an object sensor which is used to avoid object while executing a rescue operation. The proposed system focused to rescue alive humans using rocker bogie suspension. The suspension system is used to travel irregular surfaces. The robot model is controlled by user through smart phone. Whenever human motion detected at that time controller will stop the robot model and send the information to the user.

3. COMPONENTS DESCRIPTION

3.1 PIR sensor

Passive InfraRed sensors(PIR sensors) are electronic gadgets which degree infrared mild radiating from objects in the subject of view. PIRs are frequently used inside the creation of PIR-primarily based motion detectors, see beneath. Apparent movement is detected while an infrared emitting source with one temperature, consisting of a human frame, passes in the front of a supply with every other temperature, along with a wall.



Fig -2: PIR Sensor model diagram

3.2 DC motor

In any electric powered powered motor, operation is based on easy electromagnetism. A modern-sporting conductor generates a magnetic field; even as that is then placed in an external magnetic location, it's going to enjoy a force proportional to the present day in the conductor, and to the power of the external magnetic subject. As you are nicely aware about from playing with magnets as a kid, opposite (North and South) polarities entice, while like polarities (North and North, South and South) repel. The

internal setup of a DC engine is intended to outfit the attractive interaction between a contemporary-donning conductor and an outside attractive zone to create rotational movement.

3.3 Motor Driver

The Device is a monolithic integrated high voltage, excessive modern 4 channel driving force designed to simply accept fashionable DTL or TTL good judgment degrees and drive inductive loads and switching energy transistors .To simplify use as two bridges every pair of channels is prepared with an allow enter. A separate deliver enter is supplied for the common sense, allowing operation at a decrease voltage and inner clamp diodes are blanketed .This tool is suitable for use in switching programs at frequencies up to five kHz.

3.4 Microcontroller

The microcontroller that has been utilized for this undertaking is from PIC arrangement.PIC microcontroller is the essential RISC fundamentally based microcontroller created in CMOS (complimentary steel oxide semiconductor) that utilizations separate transport for instruction and records permitting concurrent get right of section to of use and data memory.

The foremost gain of CMOS and RISC aggregate is low strength consumption ensuing in a very small chip size with a small pin count. The principal advantage of CMOS is that it has immunity to noise than different fabrication strategies.Various microcontrollers offer special kinds of reminiscences. EEPROM, EPROM, FLASH etc. Are a number of the recollections of which FLASH is the maximum these days developed. Technology this is used in pic16F877 is flash technology, so that facts is retained even when the power is switched off. Easy Programming and Erasing are different functions of PIC 16f877.

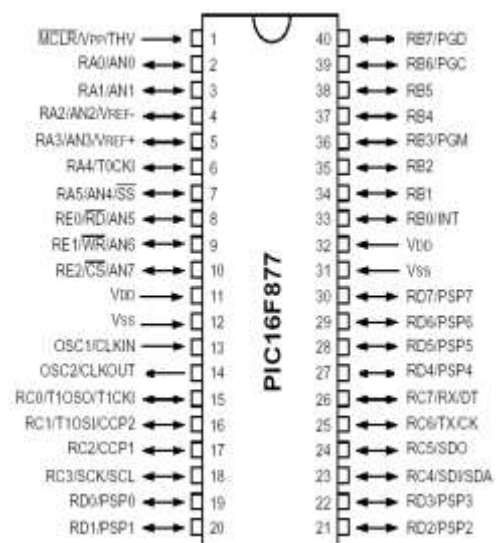


Fig 3: PIC16f877a Pin details

3.5 Alarm

An alarm gives an audible or visible caution approximately a hassle or situation.. It most customarily includes some of switches or sensors linked to a manage unit that determines if and which button grow to be pushed or a preset time has lapsed, and commonly illuminates a moderate on the best button or manipulate panel, and sounds a caution inside the form of a continuous or intermittent humming or beeping sound. Initially this device emerge as based totally mostly on an electromechanical device which modified into equal to an electric powered bell without the metal gong (which makes the ringing noise).



Fig 4: Alarm model

Often these gadgets were anchored to a wall or ceiling and used the ceiling or wall as a sounding board. Another implementation with a few AC-linked devices come to be to put in force a circuit to make the AC modern right into a noise loud sufficient to strength a loudspeaker and hook this circuit as a lot as a reasonably-priced eight-ohm speaker. Nowadays, it's miles extra famous to apply a ceramic-based totally piezoelectric sounder like a Sonalert which makes a excessive-pitched tone. Usually those were established to "motive force" circuits which numerous the pitch of the sound or pulsed the sound on and off.

3.6 Battery



Fig 5: Battery model

A rechargeable battery (also known as a storage battery) is a set of 1 or extra secondary cells Rechargeable batteries use electrochemical reactions which can be electrically reversible. Rechargeable batteries come in many exceptional sizes and use exclusive combos of chemical compounds.

Commonly used secondary cellular ("rechargeable battery") chemistries are lead acid, nickel cadmium (NiCd), nickel metallic hydride (NiMH), lithium ion (Li-ion), and lithium ion polymer (Li-ion polymer).

3.7 MS metal

Carbon metal is metallic in which the principle interstitial alloying constituent is carbon in the range of zero.12–2.Zero%.

The American Iron and Steel Institute(AISI) defines carbon metallic as the subsequent: "Steel is considered to be carbon metal while no minimum content material is certain or required for chromium, cobalt, vanadium or zirconium, or every other detail to be brought to gain a desired alloying impact; whilst the specified minimum for copper does no longer exceed zero. Forty percent; or while the most content distinctive for any of the following elements does no longer exceed the percentages stated: manganese 1.Sixty five, silicon zero.60, copper zero.60.

As the carbon percent content material rises, metallic has the ability to grow to be more difficult and stronger thru heat treating; but it turns into less ductile. Regardless of the heat remedy, a better carbon content reduces weldability. In carbon steels, the higher carbon content lowers the melting factor.

4. METHODOLOGY

Alive human detection the usage of rocker bogie suspension device is consisting with microcontroller, Bluetooth module, motor driving force, PIR sensor and robotic model. Here, microcontroller is the number one unit of this approach the pleasant tool can show and manage the complete system what we proposed. The microcontroller unit has pretty competencies at the same time as evaluating with the number one controller referred to as 8051. The PIC microcontroller has internal analog to virtual converter module, pulse width generation and electrically erasable programmable study only reminiscence. The unit additionally control the Liquid crystal display module.

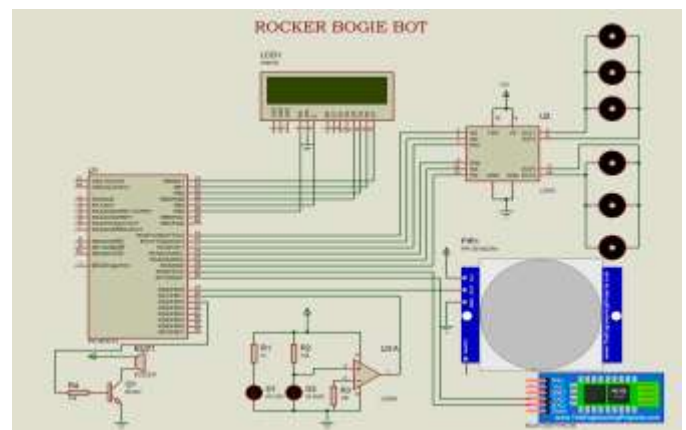


Fig -6: Circuit diagram

Normally, controller exams the person commands. Controller takes the command line from Bluetooth module. So, patron need to configure the cell with the Bluetooth module. Once the module is configured it's prepared to talk. Bluetooth SPP is the particular app this is available free of fee in playstore. The utility is used to deliver Bluetooth command. Here, many packages are to be had within the android playstore. But, No one app permit to modify the button popularity and instructions but Bluetooth SPP will do. The software program application already designed with suitable command set. When the button is pressed on the same time as Bluetooth paired it's communicate records with the microcontroller.

Microcontroller assumes the facts and activate motor driving force. The controller running voltage is not sufficient to govern heavy loads like motor. This is the purpose why the motor motive force is carried out. Controller activates the motor at the same time as appropriate command received. Then robot version go along with the float on. Passive Infrared sensor which is likewise called PIR is the sensor used to locate human beings. In case the robotic model discover the any human radiation then controller save you the robot version and prompt the alarm. Earthquake and landslide regions are not safe to rescue human beings. The robotic model wills store the various human lives.

5. HARDWARE DEVELOPMENT

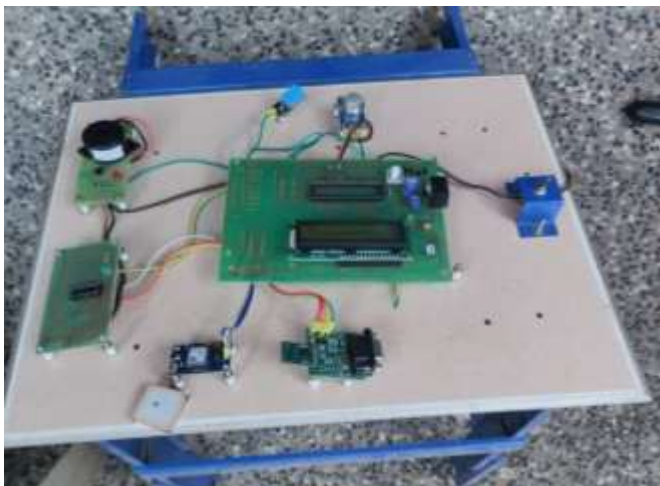


Fig -7: Working Model

The hardware developed can be further covered with thick metal sheets for further protection and looks. The six wheel technology used in it makes the robot more flexible in operation which helps in avoiding slips and difficulties while climbing rubble areas.

6. ADVANTAGES

- ❖ Speed – High speed conversation for BLE module 1us according to coaching execution for controller.

- ❖ Accuracy - Automation systems are extra accurate and steady than their human opposite numbers.
- ❖ Production - Work cells create greater because they perform packages with more accuracy, speed and tirelessness.
- ❖ Reliability – The system can paintings 24 hours an afternoon, seven days a week with out stopping or tiring.
- ❖ Flexibility – The machine can be reprogrammable and possible to apply extra sensor parameters.

7. DISADVANTAGES

- ❖ Need proper preservation
- ❖ Short circuit.
- ❖ Electrical shocks.
- ❖ Continuous statistics might also cling controller module.
- ❖ Bluetooth communication is restriction range.

8. CONCLUSIONS

The task work has been completed efficaciously. The project hardware capabilities satisfactorily as in keeping with the design. The task paintings turned into advanced after conducting some of experiments before finalizing the layout work, this decreased the bottle necks and we did now not face a good deal difficulty inside the final integration process. In popular the entire development of the assignment work become educative and we ought to advantage loads of enjoy by way of doing the undertaking almost. We could understand the realistic constraints of developing such structures approximately which we've studied by using manner of lectures within the theory instructions. It become pleasant to peer such a lot of theoretical elements work earlier than us in real existence practice of which we've got heard via lectures and of which we've got studied inside the books.

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