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A Novel Method of Saving Life of Human from Different Disaster Activities Using Controller

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ABSTRACT

Nowadays there are different things happening across the world which like any natural disaster or any manmade activity which could damage the life of a human. So Technology is changing so much rapidly. We all have to take the advantage of this rapidly changing technology for making the life of a human being safe and secure. So one can make use of ARM controller, Raspberry Pi, VLSI technology for saving a human being from these disaster activities. Generally, in our day today life we came to know the different disaster activities like Land Sliding, Building Collapse, and LPG explosion, Tsunami etc.[1] So there would be the chances that many human being buried under earth surface because of the above any activity. Here we are using Arduino based system for checking the victims under the earth surface. In the market, Arduino modules are easily available with the much cheaper rate. Arduino is an easily available in electronics platform based on easy of hardware and software. Arduino boards are able to read inputs from different sensor and transducers to produces the required output to control the specific application. [5]

Keyword: ARM controller, Raspberry Pi, VLSI technology, Arduino etc.

1. INTRODUCTION

Arduino has been used in different projects and applications. The Arduino software is easy for beginners and flexible enough for advanced users also. It compatible with Mac, Windows, and Linux operating systems. We can use it to build low-cost instruments and that can be used to control different applications.

The Arduino based design mainly consists the PIR sensor for detection of a human being who is buried under the earth surface. Along with this, we are using a temperature sensor to measure the temperature of victim location also we are using the Hall-Effect sensor for measuring the distance of the vehicle from the launch site. We have to use the wireless camera module for getting the visuals of victim's location. The ZigBee Trans's receiver module is used for controlling the vehicle movement. At Observer site we are using the laptop for viewing the victim's details over the screen. For viewing those details over screen we required interfacing wireless receiver module to PC/laptop.

2. SYSTEM DESIGN

The Design involves a navigating vehicle and one remote unit. The Navigating unit has to launch into the suspected area in search of live human being. For the detection purpose, it is equipped with different sensors like Passive-IR, Hall-Effect, and temperature sensor LM 35 etc. The PIR Sensor is a passive infrared sensor which is basically used to detect the infrared human body radiation. Mostly we are using the PIR sensor for the purpose of detecting motion or switching the devices based on human presence. It has wider sensing angle and detection range up to 2-3 meter. Next on we are having a temperature sensor for detecting the temperature of the suspected area, a Hall-effect sensor for detecting distance of human being from the launch area. So all these parameters are sent to the remote area for observation. In the same way, wireless camera module is use to send a video of suspected location to remote area.

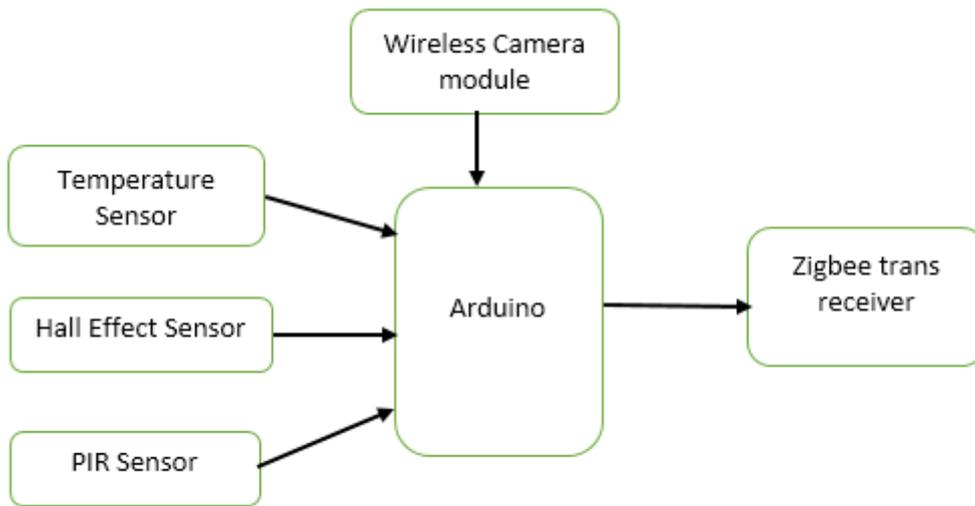


Fig.1 Navigating Model

2.1 Working

The Navigating Model is required to launch in suspected area in search of the person and this model will go to send the location data to the observer for taking the corrective action. For this purpose, the observer requires the PC/Laptop with wireless receiver module. So thereon he will go to take the corresponding action to save the persons which are trapped under earth surface or in an area where we cannot reach immediately. The Observing model consists of PC/Laptop with wireless interfaced model and ZigBee receiver.

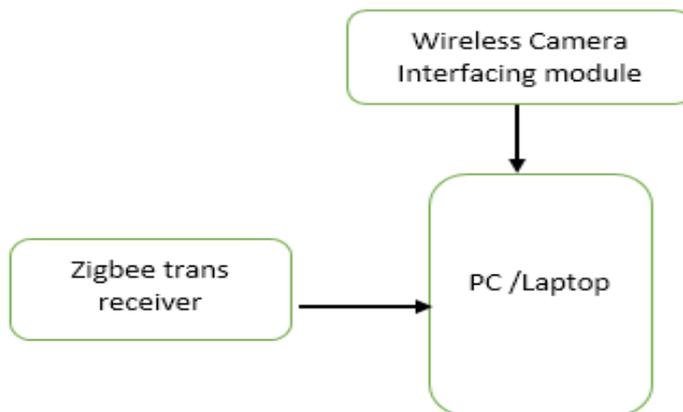


Fig.2 Observing Model

3. SYSTEM COMPONENTS

3.1. PIR Sensor

PIR Passive Infrared (PIR), also known as thermal infrared detector the natural radiation emitted by warm objects. Also extremities moving bodies emit infrared radiation more passive than the background that is. People living beings in general and cars with hot engines emit thermal radiation that a PIR detector senses both day and night. A PIR sensor comprises an optical system and a Fresnel lens made of semiconductor crystal that generates electrical charges on their surface when subjected to heat caused by the infrared radiation with a wavelength specific warm-blooded bodies.[6]



Fig.3 PIR Sensor

3.2. Temperature Sensor

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration.



Fig.4 LM 35 Temperature Sensor

3.3 Hall Effect Sensor

A Hall Effect sensor is a transducer that varies its output voltage in response to a magnetic field. Hall Effect sensors are used for proximity switching, positioning, speed detection, and current sensing applications. In a Hall Effect sensor a thin strip of metal has a current applied along it, in the presence of a magnetic field the electrons are deflected towards one edge of the metal strip, producing a voltage gradient across the short-side of the strip (perpendicular to the feed current). Inductive sensors are just a coil of wire, in the presence of a changing magnetic field a current will be induced in the coil, producing a voltage at its output. Hall Effect sensors have the advantage that they can detect static (non-changing) magnetic fields. In its simplest form, the sensor operates as an analog transducer, directly returning a voltage. With a known magnetic field, its distance from the Hall plate can be determined. Using groups of sensors, the relative position of the magnet can be deduced. Frequently, a Hall sensor is combined with threshold detection so that it acts as and is called a switch also they are used for speed detection in tachometer.[7]

3.4 Zigbee Module

Zigbee is an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area network with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power low-bandwidth needs, designed for small-scale projects which need wireless connection. Hence, Zigbee is a low-power, low data rate, and close proximity (i.e., personal area) wireless ad-hoc network. The technology defined by the Zigbee specification is intended to be simpler and less expensive than other wireless personal area networks (WPANs), such as Bluetooth or more general wireless networking such as Wi-Fi. Applications include wireless light switches, home energy monitors, traffic management systems, and other consumer and industrial equipment that requires short-range low-rate wireless data transfer.[3]

3.5 Arduino

Arduino is an open-source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License or the GNU General Public License , permitting the manufacture of Arduino boards and software distribution by anyone.[8]

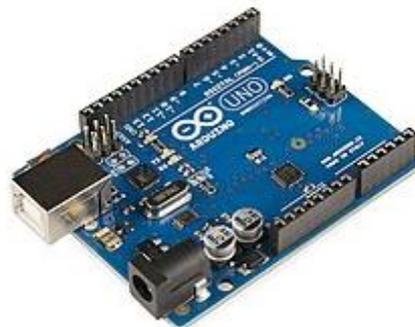


Fig. 5 Arduino Module

4. CONCLUSIONS

This system is use in those area where it is impossible for human being to do the search. This also can be used at some remote places for the purpose of security. By use of SMD electronics components we can reduce the size of developed model. In all these way using Arduino we can save human life from different disaster which could be Natural or manmade. The use of Arduino makes the system cheaper and compatible with different transducers.

5. REFERENCES

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