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DESIGNING OF SMART RESCUE ROBOTICS SYSTEM

Mukesh kumar, Ratnesh kumar Gupta , Priyanand pritam Abhishek Anand , Mohd. Shahbaz Alam

Department of Electronics & Tele-communication Engineering
Priyadarshini College of Engineering, Nagpur, Maharashtra

Dr. (Mrs.) A.R. Kondelwar

Department of Electronics & Tele-communication Engineering
Priyadarshini College of Engineering, Nagpur, Maharashtra

Abstract: *Rescue Robotics are designed to provide robotic control of rescue robot in disaster environment by allowing a human operator to cooperate an using rescue robot as navigation victim identification in this paper we present a learning base semi autonomous control for rescue robot .The controller is provided in rescue robot to continuously learn from its experiences in an environment in order to improve its overall performance in dealing with unknown disaster scene .A direction biased technique is also provide in controller to expand the search area.*

I. Introduction:

As we know disaster can occur anywhere and any places however in some cases thetask of rescuingvictims form disaster scene can be extremely hazardous due to the instability of damage structure and present of toxic radiations and chemicals which can make them worse .In such cases the rescue robot can be used as a substitute. The application of rescue robot requires a team of human operators. Robots can enter in places which are difficult to be accessed by person and can also begin surveying larger voids that people are not permitted to enter until fire has been put out or the structure has beenreinforced . The robot carry Co2 sensor which sense the Co2 level around the debris to check whether the person is alive .Rescue robots has been identified by the Nationalresearch council study making the nation safer.

II BLOCK DIAGRAM

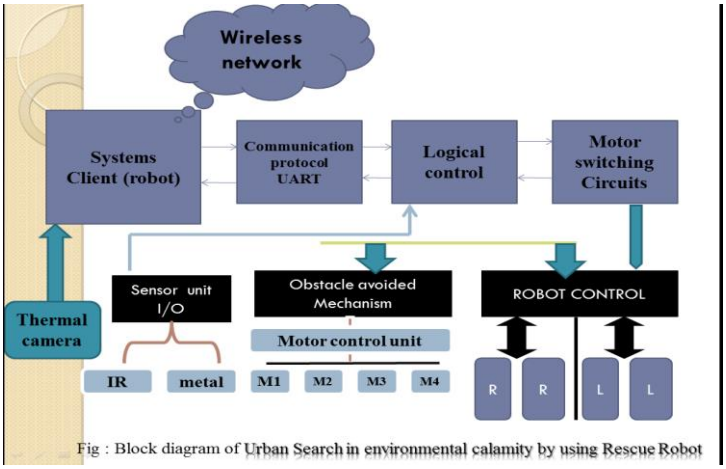


Fig : Block diagram of Urban Search in environmental calamity by using Rescue Robot

The basic block diagram of smart rescue robotics system consist of system client ,communication protocol, for serial communication ,the microcontroller as the logical control unit .The microcontroller also controls the motor control unit. It has the Co2 sensor which senses the level of Co2 around the area of inspection.

2.Working principles

Working of system is as follows :

1.Surveying of area:

- analysing the location and creating a map
- sensing living and dead people around
- sending the details of the map to the operator
- Then the operator will get the overview and then take decision accordingly.

Technical details

Component details are as follows :

1.microcontroller 89C51

2.MAX232IC

3.Relay driver

4.ADC
5.MC2TEIC

6.Timeric

7.Motor

II.SYSTEM HARDWARE DESIGN :

A)Microcontroller:

AT89C51 is an 8-bit microcontroller and belongs to Atmel's 8051 family.In 40 pin AT89C51,there are four ports designated as P1,P2,P3,P4.Except P0 which needs external pull-ups,rest of the ports have external pull-ups. Ports P0 and P2 are also used to provide low byte and high byte address respectively when connected to external memory. Port 3 has multiplexed pins for special function like serial communication, hardware interrupt, timer inputs and read /write operation from external memory. Port 2 is high order address bits when interfacing with external memory. PSEN pin is program store enable and it is used to read data from external program memory.

B) WSN:

A wireless sensor network (WSN) is a wireless network consisting of spatially distributed autonomous device using sensors to monitor physical or environmental condition . A WSN system incorporates a gateway that provides connectivity back to the wired world. The wireless protocol depends on the requirement of application .The available standard include 2.4 Ghz radios biased on IEEE 802.11(Wi-Fi) standards

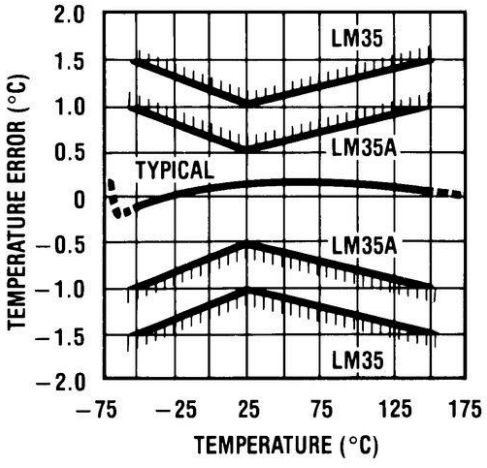
C) Sensors:

a)Temperature sensor :

The LM35 series are precision integrated circuit temperature device with an output voltage linearly proportional to the centigrade temperature . The LM35 device does not require any external calibration or trimming to provide typical accuracy at room temperate at room temperature .The low output impedance linear output precise inherent calibration of the LM35 device make interfacing to read out and make controlling circuit easy.

Features:

- Calibrated directly in Celsius .
- Suitable for remote application .
- Operates from 4v to 30v .
- Low impedance output ,0.1 ohm for 1-mA load.



b) Co2 sensor:

A Carbon dioxide sensor or Co2 sensor is an instrument for the measurement of carbon dioxide gas .The most common sensors are infrared gas sensor (NDIR) and chemical gas sensors .

III). SOFTWARE TOOL USED:

- **.NET**:
  .NET frame work is a software development platform. Like any platform ,it provides a run time defines functionality in some libraries and support a set .of programming languages.

  The .NET frame consit of
  . Common language runtime
  . Class liberies
  .Support for multile programming language

  .NET provides a common set of class libraries, which can be accessed from any .NET based programming language. There will not be separate set of classes and libraries for each language.

IV. Methodology:

The system design is developed by following software tools :

1.Circut diagrams and PCB layout is designed by using pcb designer

2.The logic applied to decision making and inferential statics that deals with the help of "basian logic algorithm "

3.The "multi sensor fusion based detection approach's used for detecting alive humans .This investigation focuses on the synergistic fusion of multiple sensor .

4. "Map management system "is used for simultaneouslocalisation and mapping the objects and victims

V. Result

The realization of "Smart Rescue Robot" is done successfully. The communication between the server and client is successfully done. The sensors like co2 and temperature are working properly and their values keep on updating their values with change in the surrounding conditions. Hence the project is successful in the detection of alive humans as expected. Thus it is quite efficient in situations where rescuing the people is the first priority by decreasing energy and time consumption and to find as many victims as possible .

VI. Conclusion

It is without a doubt that the development and studies for rescue robotics is of great importance to the modern society. Natural and human disasters occurs regularly and it is important that help can arrive fast enough .

Rescue robot are the increasing level of technical parts involve in our today life. one the other side it is always good that the rescue robot increase in development with better performance and it can handle all the situation as needed.

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