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Application of Robotics in Disaster Management in Land Slides

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Abstract:

In recent years, robots have been applied at different domains to co-ordinate collaborative behavior in distributed systems and providing a powerful basis for proactive applications of complex nature, especially in large scale disasters requiring complex tasks to be performed by groups under extreme time and resource constraints. Now a day's robotics technology is became very popular in all fields of human life. That's why Robotics was chosen as a focal point of this paper of its potentially transformative role both in a positive and negative way in addressing a wide range of development challenges, from climate change, healthcare, and agriculture to housing, transportation, and education. Yet while there is little doubt that technology will continue to be a driver of change across the developing world in the future, the precise trajectory along which technological innovation will travel is highly uncertain. A robot is a machine designed to execute one or more tasks repeatedly, with speed and precision. An important aspect of robotics security systems is surveillance of specified area. All of these tasks are performed mostly by human and trained dogs, often in very dangerous and risky situations. This is why since some years mobile robots have been proposed to help them and to perform tasks that neither humans, dogs nor existing tools can do.

Finally, the paper provides new avenues for effective utilization of automation and robotics through mapping of best practices ,through we try to introduce the fuzzy based interesting application of robotics in disaster management and as well as for security purpose. The robot is controlled by pc or mobile phone. These works mainly focus on target perception and identification and robot localization.

Index Terms: Flying Robot, Wheeled Robot, GPS Communication, ZIGBEE, Automation and Robotics, Post disaster

I. INTRODUCTION

Natural disasters and conflicts continue to devastate communities around the world. It is important to prepare measures for both pre and post disasters to ensure safety and peace of mind to public as well as the environment. In recent years, automation and robots have been applied at different domains to coordinate collaborative behavior in distributed systems and providing a powerful basis for proactive applications of complex nature, especially in large scale disasters requiring complex tasks to be performed by groups under extreme time and resource constraints. A robot is a machine designed to execute one or more tasks repeatedly, with speed and precision. An important aspect of robotic security systems is surveillance of specified area. Interesting application can be seen in robot scanning areas to find explosive devices. Asset and location protection systems using robots allow hands-free operation via pre-operational programming to response to external stimuli. Over the long haul, it is easy to see that security robots can provide significant cost savings, while they may never replace a human security professional. Others may need to approach an armed barricaded suspect or enemy combatant. Still others need to go into a nuclear reactor to check if all is well. Increasingly, security managers are turning to robots to help get the job done. These works mainly focus on target perception and identification and robot localization. It is very essential to have a robot during disaster conditions like Earthquake or Bomb blast, where we have to identify

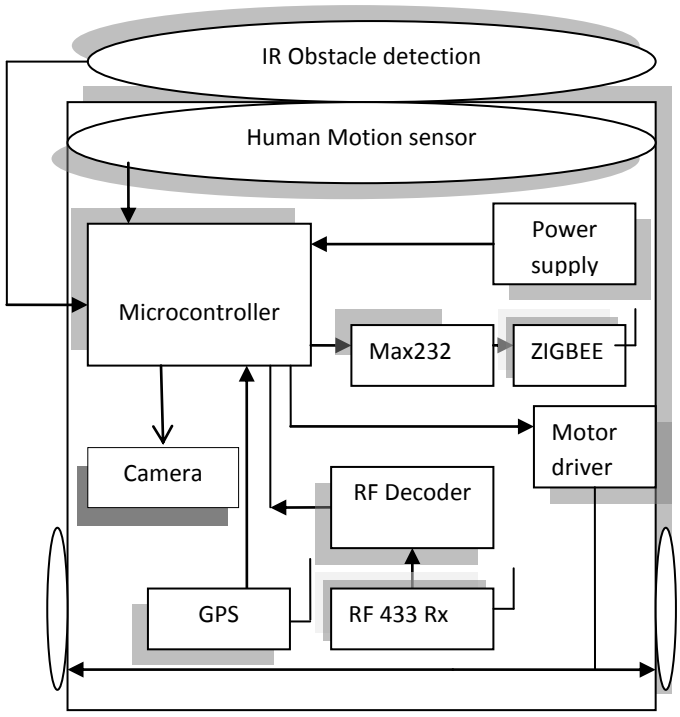
live human beings as quickly as possible to save life. In these situations, human rescuers must make quick decisions under stress, and try to get victimsto safety often at their own risk. They must gather the location information and status of victims and the stability of the structures as quickly as possible so that medics and firefighters can enter the disaster area and save victims. All of these tasks are performed mostly by human and trained dogs, often in very dangerous and risky situations. This is why since some years; mobile robots have been proposed to help them and to perform tasks that neither human's dogs nor existing tools can do.To most people, embedded systems are not recognizable as computers. Instead, they are hidden inside everyday objects that surround us and help us in our lives. Embedded Technology predominates as it overcomes the drawbacks of all the existing mechanical and electronic systems. An embedded system is housed on a single microcontroller board with the programs stored in ROM. Embedded systems typically do not interface with the outside world through familiar personal computer interface devices such as a mouse, keyboard and graphic user interface. Instead, they interface with the outside world through unusual interfaces such as sensors, actuators and specialized communication links.The novel idea of this paper is to locate the human presence using the robot which is controlled through RF communication. If it detects any human presence or obstacle, it will trace the longitude and latitude position and will send to the central control unit which is controlled by computer mobile using ZIGBEE communication.

This paper can find its application in military and security where without our presence we can get to know the status of the other side. This project can also be used to navigate around the disaster areas and try to find humans who need help. After finding the humans it transmits the location to the static section. The second part is the static section and the controller. Specially designed pyro electric sensor is used for human detection.IR proximity sensor is used for obstacle detection. The data obtained by the sensors in the dynamic section are displayed in the static section using ZIGBEE and GPS technologies.

II. SYSTEM DESIGN REQUIREMENT

Microcontroller(AT89c51), GPS Communication, LCD, IR sensor, Motor Driver L293D, PIR Sensor, RF with Encoder and Decoder, ZIGBEE, Capacitor, Inductor, Transformer, MAX232, RF 433 Rx, HT12D Receiver, RS232, Timer, Wi-Fi Camera, Personal computer, Stepper motor, NOT gate, EMBEDDED C program with KeilµVision3 IDE, Window XP, Flash magic .

III. BLOCK DIAGRAM



IV. WORKING METHODOLOGY

Different methodologies are adopted for different parts of this study. Applications of automation and robotics were analyzed based on existing papers and documents, aided by interviews with selective practitioners and experts of the field.The work environment for a rescue robot differs from the rough terrain caused by the debris. This rescue robots to negotiate complex and collapsed structures, find simulated victims, and generate human readable maps of the environment. The movement of this robot is controlled by using the ZIGBEE Communication. The human present are observed by sensor and display the indoor personal computer.

V. CONCLUSION

In recent years, exploration of applications of automation and robotics to minimize the risk of disasters are becoming an interested area as the disasters, are occurring with increased frequency around the world and their impact in terms of human, structural and economic losses has increased considerably.Although most robots in use today are designed for specific tasks, the goal is to make universal robots, robots flexible enough to do justabout anything a human can do.The goal of this paper was to provide a sensor suite for human detection in the urban disaster environment. The detection of human body shapes from visual input data was chosen as the recognition method, a decision mainly due to the available sensor equipment on board of the victim detection robot.

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