

Research on Detection Robotic Visual Signal Remote Transmission and Control

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Abstract. with the development of robotics, robots will play a great role in the complicated conditions and extreme environments. Robots are used in data collection and complete the task of detecting robot developed for disaster relief in the future, in particular, guarantee the security of aid workers is of great significance. Through the robot's remote transmission of visual signals and control to ensure that their completed mission, is the main content of this article. Object to detect robots for this paper, analysis of robotic remote tasks, and on the basis of functional requirements, combining robot visual signal remote transmission and control technology, design of the Detection robot system, I believe that can be widely used in various environmental conditions.

Introduction

With the automation technology, computer technology, network communication technology and the rapid development of the various disciplines such as bionics, robot is also heading more and more multidisciplinary direction, robot control technology is also in progress, consists of a single control to the coordination of multi-robot control, controlled by a close to the remote control, from simple action control to autonomous control with a certain degree of intelligence [1, 2]. It can be said that along with the progress of science and technology, intelligent robots closer and closer to people, their ability to work more and more. Modern life in the, for some special or dangerous environment task, as battlefield mine, and space detection, and marine adventure, and human cannot arrived or in on human has against of job environment in the, on need robot instead of artificial to completed, through remote control robot in site job, and real-time monitoring its work status, processing various burst situation, eventually reached completed task of purpose, also are because so, detection robot of remote visual signal transmission and control became today robot learn of hot problem [3].

Detection robot is confronted with a complex three dimensional unstructured environments, and must have a complex environment traffic capacity, reliable drivers and their adaptation to the environment, such as obstacle avoidance, obstacle crossing, crossing ditches, climbing and fast maneuvering capability. In response to the underground flammable gases, dust, puddles and other harsh environment, the robot should also be explosion-proof, dust-proof, water-resistant properties. In addition, the robot also has the advantages of compact and easy to transport. Furthermore, in such a complex environment, rely entirely on direct remote control will make the low efficiency of movement of the robot or even impossible, therefore, for robotic remote Visual signal transmission and control technology research is essential for development and application of robot.

Detection robot basic overview

Robot crawler-type mobile robot and its structure as shown in Figure 1. The robot uses a segmented track, driven by a stepper motor, and bidirectional variable track shape, the robot has a strong ability to adapt to the complex environment, with good mobility and reliability, for the completion of environmental detection, remote control provides a good maneuverability, reliability, high mechanical mobile platform. Remote control system main completed of function has: achieved

remote client on well robot of real-time monitoring, user can through video monitoring real-time observation robot in well of work status, through robot various sensor feedback of information, determine environment information and the robot movement situation; according to robot sensor feedback of information, transmission system to and robot issued control instruction, while can set robot of some parameter, completed state of detection and transform, achieved remote client and robot end of human-computer interaction Complete communication with the robot [4].

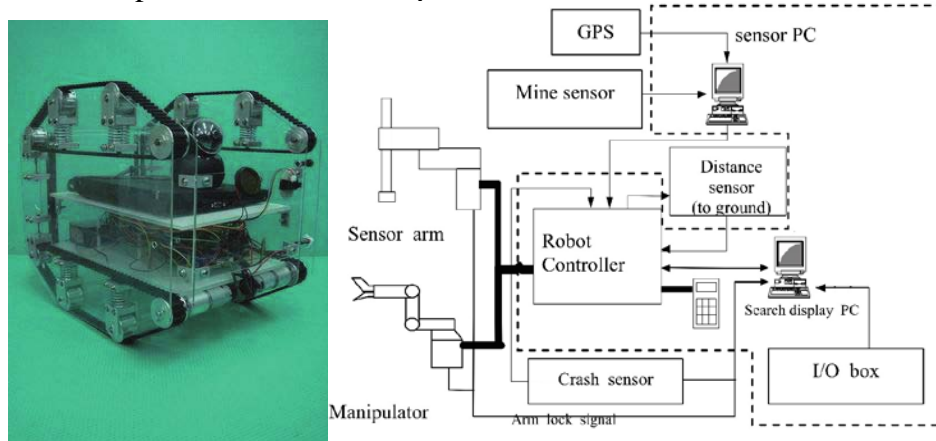


Figure 1. System structure of the detection robot

Local control subsystem as shown in Figure 1. Include the robot, car PC, Visual signals server and Visual capture devices. Local control of the main robot, receives control commands from clients through the middle tier, as well as information about the robot feedback through the middle tier to the client, enabling remote users to grasp the current state of the robot at any time. Video capture device uses cameras on the scene and the State of motion of the robot camera, after processing and compression, the video image is sent to the remote client, complete the client update video image on your page, enable remote control to monitor status and environment of the robot. Middle-tier subsystem is an intermediary system for the video transmission subsystem, mainly interact with local client subsystem and robot control system, and implementation of video real-time transmission. Remote core client subsystem for the remote control of your computer, is part of user directly interacts with, it receives input from the user, from a middle-tier video subsystem access sensor data and other information, and robotics, and scene information representation.

The key techniques for detecting robot

Remote Control. The present sensor-network for the visual signal, as shown in Figure 2, includes one Coordinator, two Routers and two End devices. The robot is the End device, while the other Router and End device are the sensor nodes for detecting the environment. The main task for the Coordinator is to communicate with PC to transmit remote-controlled commands from the PC user interface [5]. The remote-controlled commands include robot motion control for speed, sensor information from robot including the IR ranging sensor, the electronic compass, the ultrasonic ranging sensor, the light sensor, and the human sensor. Moreover, the environment monitor sensor nodes include the temperature sensor and the light sensor. With the network topology in a cluster tree, the remote host could control robot through the Routers even the robot is far away from remote host.

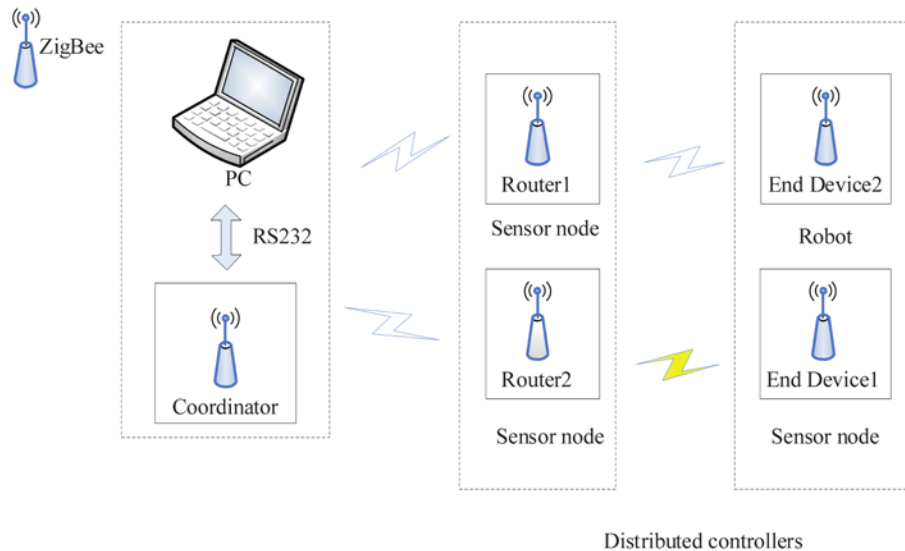


Figure 2. The sensor-network for the visual signal

Visual signal remote communication and transmission. Communication structure of the detection robot and the remote transmission is shown in Figure 3. Wireless communication the main form of power line carrier communication, leakage of wireless communication and sensor communications. Application on power line carrier communication in the motor car, but due to transmission difficulties and anti-jamming performance of impedance matching, so far has not been perfect [6]. Leakage communication using leaky cable play a role in long lines in the roadway, between mobile stations or reversible coupled with the base station, has received better communication quality; the downside is the system is expensive, and laying a dedicated transmission line, erection and maintenance of transmission lines takes a certain cost, and leave its coverage area will not work. Inductive communication is communication based on the principle of electromagnetic induction, speaker magnetic antennas for mobile communication are very close to the induction line and antenna size, due to instability and noise transmission parameters, domestic usage is not high.

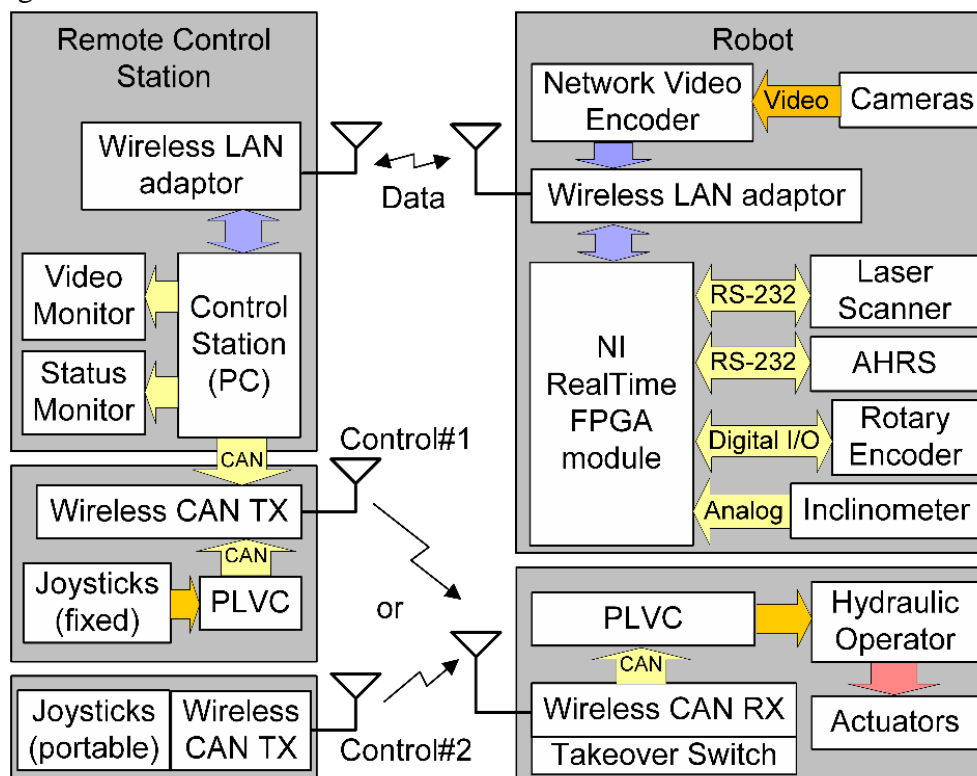


Figure 3. Communication structure of the detection robot and the remote transmission

Robotic communication system is responsible for the complete robot and information transfer between the monitoring centers, this information includes instructions, sensor status information and live video images. In accordance with the flow of information is divided into two types of data: one is the environmental data and parameters of the robot and the environmental video, this kind of data is loaded by the robot's various sensors via on-board PC then spread to the monitoring center, PC, known as data flow. Another type of data the control command is sent to the robot in the monitoring center. This kind of data from the monitoring Center PC streaming to in-car PC to each actuator controller, called the flow of control. Robotic communication system is to solve the data flow and control flow of accurate and reliable transmission.

Conclusion

Along with the progress of science and technology, intelligent robots closer and closer to people, their ability to work more and more. In modern life, for some tasks under special or hazardous environments, robots will play a huge role. Robots are used in data collection and complete the task of detecting robot developed for disaster relief in the future, in particular, guarantee the security of aid workers is of great significance. Detection robot remote visual signaling and control have become hot issues in robotics. Object to detect robots for this paper, analysis of robotic remote tasks, and on the basis of functional requirements, combining robot visual signal remote transmission and control technology, design of the Detection robot system, I believe that can be widely used in various environmental conditions, extension and development for promoting the application of robots is of great practical significance.

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