Dynamics of Continuous, Discrete and Impulsive Systems
Series **B:** *Algorithms and Applications* **11 (2004)** 651-664

Remote Control of On-line Mobile Robots over IP Networks

Peter Xiaoping Liu[1], Max Q-H Meng[2] and Simon X. Yang[3]

[1]Department of Systems and Computer Engineering
Carleton University, Ottawa, ON, CANADA
[2]Department of Electronic Engineering
Chinese University of Hong Kong, Hong Kong
[3]Advanced Robotics and Intelligent Systems (ARIS) Lab
School of Engineering,University of Guelph,Guelph, ON, Canada

Abstract. In this paper, we introduce a new scheme for the remote control of mobile robots over IP networks such as the Internet. The hardware configuration of the platform consists mainly of a *Pioneer 2 PeopleBot* mobile robot. On the head of the robot, there is a Sony PTZ video camera which is used to provide live visual feedback on robot's immediate environment. There are two sonar arrays for range measurement. The P2PB mobile robot is connected to the Internet through a pair of wireless LAN adaptors. The system is integrated by a client-server software architecture for robot control and feedback display. In this software architecture, there are two servers, a video server and a control server, and two corresponding clients, a video applet and a control applet. The web server is a Linux Apache web server. Human operators control the mobile robot by using a Java-enabled web browser on an ordinary PC. With this platform, advanced remote control algorithms, interface designs and transmission protocols can be easily tested without large programming efforts.

Keywords: IP networks, mobile robots, remote control, teleoperation

AMS (MOS) subject classification:

1 Introduction

Current applications of computer and communications networks are primarily dominated by information and data transmissions, exchanges and publications. Continuing exponentially increasing advances in microelectronics, photonics and wireless technology are making wired and wireless networks more powerful, accessible and affordable. Consequently, network based applications are rapidly expanding into new areas.

The Internet robot is one of these pioneering areas with great potentials. By means of remote operation of a robotic device or a tool via the Internet, human perceptional and motor capabilities can be extended beyond physical distance limit. The first Internet telerobot appeared in 1994 [1]. By 2001, more than forty such systems had been put online around the world, allowing