

Telerobotics

Credits: 4 Semester 3 (UJI) Compulsory: No

Format	Lectures 20 h	Tutorials 5 h, Lab.10h	Private study 80 h
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Lectures: R. Marin (UJI)

Objectives: The overall goal of this course is to study the processes and tools to design systems of remote control for electromechanical devices.

The evolution of information technologies and communications research opens new possibilities with interesting applications in improving the methods and industrial and civil processes. Device control through communication networks, and more specifically the Internet public network, is currently an emerging and very productive line of research, which also has a great interest in the industry. Still there are very few via Web robotic systems that allow remote control of electro - mechanical devices in industrial scopes and / or research. As an illustrative example, the first Internet robot (The Mercury Project) was designed and implemented in late 1995 at the University of Berkeley. Since then, the interest of the international scientific community in these systems has grown exponentially thanks in part to the very rapid evolution of features that are experiencing telecommunication and also the benefits of these remote control systems in terms of the possibility of the operator to be located anywhere in the terrestrial globe.

Contents:

The following subjects will be discussed:

- Networked Robots.
- Telerobotics.
- Tools for remote control.
- Multi-Device Network Architectures.
- User Interfaces for remote control.
- The communication network and its influence on the remote control.
- Applications of remote control in the social and industrial domains.

Abilities: After completing this course the students will be able to

- Learn the concept of Networked Robot and its characteristics.
- Know the facilities provided by the telerobotic systems applied in the history.
- To introduce the latest software and tools for the design of remote control systems.
- Study the network architectures, both hardware and software, to facilitate the design of the remote control.
- Know how the user interface can help to improve interaction with a remote device.
- Study the impact of bandwidth and latency own a public communications network (ie Internet) in the reliable control of remote systems.
- Study examples of remote control applications and how they have solved the network effects of communication and user control.

Assessment: 20% continuous assessment, 80% from end of semester examination.

Practical Work: Laboratory exercises with the KnowHouse simulator.

Recommended texts:

T. Sherindan, *Telerobotics, Automation, and Human Supervisory Control*. Cambridge: MIT Press, 1992.

K. Goldberg, Roland Siegward, *Beyond Web Cams: An introduction to Online Robots*, MIT Press, Massachusetts, 2001.

Further readings:

will be provided during the course