Physical and virtual avatars for telepresence and remote collaboration
Master-level internship

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Summary:
The goal of this internship is to explore how telepresence robots can be used in the context of remote collaboration across large and interconnected wall-sized display. In such systems, telepresence capabilities should improve the social presence of remote users without disturbing them during interactions. This internship will take place in the context of the DIGISCOPE project (http://www.digiscope.fr/).

Description:
In this internship the student will explore how different types of representations of a remote person affect remote collaboration in large interactive spaces. The setup where the internship will take place is composed by two large interactive spaces, each one equipped with a wall-sized display (around 5 meters large and 2.5 meters high), a marker-based tracking system and several mobile devices such as tablets and phones. The nature of this environment, in contrast with a fixed desktop setup, allows participants to move freely in front of the display as they work collaboratively on tasks.

One of the problems that arises in this context is that one participant has difficulties determining what the remote participant is doing: where is he standing, where is he looking at or how is he moving. This internship will explore different types of avatar representations for a remote participant under different tasks, and how this shapes remote collaboration.

One of such avatars will be a physical telepresence robot equipped with an iPad that can display the remote person's face, among other information, and can be moved remotely. The position and orientation of the telepresence robot will convey other information of the remote participant such as position, direction and movement. Another type of avatars which will be explored in the internship could be a moving shape projected on the floor of the large interactive space, or an on-screen character. Further possibilities for avatars could also be explored during the internship.

The intern’s tasks will consist on:
- Exploring the state-of-the-art telepresence systems,
- Developing a solution where the telepresence robot represents the position and orientation of a remote person
- Developing other solutions for avatar representations (to be determined)
- Running user studies to how each avatar representation affects remote communication and collaboration in particular ways

Required skills
- Basic background in Human-Computer Interaction,
- Strong programming skills
- Interest on complex architecture (wall-sized displays, cluster, tracking system, etc.)
- Interest on Telepresence robots

Desired skills
- iOS programming
- Experience with video processing and camera (as webcam or Kinect camera) is a plus.

Gratification: around 500€ per month.
Master-level Internships 2015-2016

“ExSitu” Inria team, LRI

Context

Large interactive spaces
- Wall-sized display (2D/tactile)
- 3D immersive room

Large data sets
- Scientific data,
- CAD models, etc.

Remote collaboration

[Digiscope project / www.digiscope.fr]

Telepresence for interactive spaces

Awareness of the remote users
- Not only see the others
- Understand their activities
- Convey non-verbal cues

Shared the same interaction space

[Avellino et al., CHI 2015]
Internship: physical and virtual avatars

How to represent a remote user?
- Where is he standing?
- Where is he looking at?
- On which content is he working?
- How is he moving?

Explore different avatar representations
- Physical telepresence robots
- Shape projected on the floor
- Video feed on the screen
- Study the perception of the remote person