Stage pour le M2R "Sciences Cognitives"
Master's Thesis Internship Proposal
Academic Year 2009-2010

Title:
    Design of a Human-Aware Navigation Scheme for a Robotic System

Internship description:
Robotic systems come in a great variety of types and shapes (mobile platforms, humanoids, vehicles, etc.). In all cases, they have to move to perform whatever tasks have been assigned to them (pick an object, move to this location, monitor that area, etc.). Motion is therefore a key issue for robotic systems and it has been largely addressed in the past forty years. Until recently, the focus was primarily to avoid collision with the objects of the environment and to optimize a motion-related criterion (travel distance, travel time, energy consumption, etc.).

Nowadays, robotic systems are increasingly moving among and interacting with human beings. The presence of people has an impact on the way robots should move: you do not move around a person the way you would around a piece of furniture. In general, when one interacts with a human being (to avoid him, to salute him, to pass him an object, etc.), one obeys a number of rules that has to do with the notion of Personal Space.

These rules that fall under what anthropologists refer to as Proxemics [1] must be identified and integrated in the navigation scheme of robotic systems so that their behaviour resemble that of a person thus facilitating the integration of robots in human-populated environments and their acceptance.

The purpose of this internship is to design such a human-aware navigation scheme. First, it will be necessary to identify the rules that should be obeyed by the robotic system in a number of selected situations. Second, these rules will be implemented into a given navigation scheme. The navigation scheme proposed will be evaluated in simulation or, time permitting, on a robotic wheelchair.

References:
[1] Edward T. Hall (1963). "A System for the Notation of Proxemic Behaviour". American Anthropologist 65: 1003-1026

[2] Steve Lavalle (2006). "Planning Algorithms". Cambridge University Press. http://planning.cs.uiuc.edu.

http://emotion.inrialpes.fr/fraichard/internships/10-master-proxemics

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Note to applicants:
As a general rule, I am looking for highly motivated candidates with a good educational record, the ability to think independently and work autonomously. If you are interested in this internship, please send me a complete Curriculum Vitae (featuring your academic background with the courses attended, the grades and the rankings obtained - very important), plus any additional information you might find useful.