Ph.D. Readings & Research Course: Surface Patch Modeling, Perception, and Mapping

January 18, 2011

Syllabus

This course will focus on the study of mathematical models of surfaces as used in robot perception.

There will be weekly readings selected from the research literature. Both classic seminal papers as well as recent papers of interest will be included. At least one conference paper, journal paper, or book chapter will be read per week. The student will present the paper(s) to the professor in at least a 1h weekly meeting, giving a verbal summary of the content of the paper, and also discussing any questions about the paper.

Topics to be covered include

- surface parameterization including quantified uncertainty
- 3D sensing hardware and perception algorithms
- real-time computer vision for locomotion and manipulation
- geometric map-building including Simultaneous Localisation and Mapping (SLAM).

There will also be a writing component where the student will contribute significantly to a conference paper.

Grading

70% of the student’s grade will be based on attendance and performance at weekly meetings. A meeting will be considered satisfactory (full credit) if the
student demonstrates understanding or asks questions on the content of all assigned reading.

The remaining 30% of the grade will be assigned based on performance on the writing requirement.