Department of Cognitive Robotics

Learning and Autonomous Control

Javier Alonso-Mora

THEME

The goal of the Autonomous Multi-Robots Laboratory, led by J. Alonso-Mora, is to develop novel methods for navigation, motion planning, learning and control of autonomous mobile robots, with a special emphasis on multi-robot systems, on-demand transportation and robots that interact with other robots and humans in dynamic and uncertain environments. Building towards the smart cities of the future, our applications include self-driving vehicles, mobile manipulators, micro-aerial vehicles, last-mile logistics and ride-sharing.

POSSIBLE MSc THESIS PROJECTS

Most MSc projects are embedded in one of our research projects:

- Learning coordination policies for multi-robot motion planning.
- Reinforcement learning and optimal control for mobile robots.
- Multi-robot motion planning and task assignment among humans.
- Social autonomous navigation for self-driving vehicles and vessels.
- Human-in-the-loop multi-robot exploration with MAVs
- Routing and fleet sizing for on-demand logistics or ridesharing.
- Mobile manipulation for retail.
- Motion planning under uncertainty for urban autonomous vehicles.

We advise interested students to contact us some months before the intended start date. In the following link you can find a list of available MSc projects – you may write to me if you do not find any suitable project: https://www.autonomousrobots.nl/education_projects.html

We can also supervise a small number of projects in our industrial partners or partner universities abroad. You may also propose your own research project within our field of expertise. These requests will be considered in an individual basis. Please contact me if you have questions.

All MSc thesis projects can be combined with a Research Assignment, or an internship. Research Assignments are offered within the context of an MSc thesis project.

RECOMMENDED COURSES

Depends on the individual MSc thesis project. Some relevant courses are:

- Control and optimization: SC42110, SC42125, SC42100, SC42056
- Learning: CS4220, CS4230, CS4240, *RO47019*
- Autonomy: AE4317, RO47005
- Transportation: ME44206, ME44312, CIE4835

STUDENT PROFILE

- Motivated and independent
- Very good mathematical and problem-solving skills
- Programming experience (C++/ROS for projects with robots)
- Experience in optimization, controls, machine learning or perception depending on the individual project

CONTACT

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For announced MSc projects, please contact the daily supervisor first. For other requests, contact J. Alonso-Mora by email. Please include a short motivation, a description of your background (e.g., relevant courses taken) and/or prior experience (e.g., project work that might be relevant).