

Design and implementation of a planning agent on a Toyota Robot

Université de Technologie de Belfort-Montbéliard



NICOLAS BAUDIN
INTERNSHIPS IN FRANCE INITIATIVE

Name of the hosting institution in France Université de Technologie de Belfort-Montbéliard

Name of the host laboratory / research team Laboratoire Connaissance et Intelligence Artificielle Distribuées

Address 13 rue Ernest Thierry-Mieg 90010 Belfort cedex, France

Web site <http://www.ciad-lab.fr>

Name of the supervisor Nicolas Gaud

Function Associate Professor / Maître de conférences

Email nicolas.gaud@utbm.fr

Internship offer

Topic of the internship (title) Design and implementation of a planning agent on a Toyota Robot

Proposed dates of the internship* **Start** 2020-04-06 **End** 2020-09-30

* The supervisors have indicated the dates proposed are flexible and are able to be postponed subject to COVID-19 border closures.

Scientific and academic objectives of the internship (detailed description of the internship content, work expected from the intern and expected outcomes):

As part of the [World Robot Summit](#), research teams from the [CIAD laboratory](#) are developing the control algorithm and planning models to allow a Toyota robot to store a room. The project was already started regarding the low-level software components, i.e. the control algorithms are implemented in a collection of "Robotic Operating System" (ROS) modules which represent the basic actions of the robot (move to, grab an object, etc.). The action plan to be executed by the robot is currently hard-coded and cannot be adapted to dynamic changes in the robot's environment. Based on the experience of the CIAD laboratory on the design and implementation of multi-agent systems, the final objective of this project is to design and implement an agent-based model for the dynamic planning of robot actions. In addition to the CIAD researchers, this project also involves researchers of the Royal Melbourne Institute of Technology (RMIT). The student candidate will have to handle three complementary tasks during the internship:

- 1) Set up a software bridge between ROS and [SARL](#), which provides the agent framework to be used,
- 2) Design and implement a reactive behaviour which makes it possible to recover faulty actions,
- 3) Support the CIAD and RMIT researchers regarding the design and implementation of a planning model that allows the robot to plan the sequence of actions, and to update this sequence according to unforeseen events, and finally to arrange the room according to its plan. At the end of the internship, if the quality of the student candidate's deliverables reaches a minimum level, the student's contributions will be included into the software framework that will be used during the next occurrence of the World Robot Summit. The candidate must at least have experience in Java development.

Name of the Australian partner institution Royal Melbourne Institute of Technology

Name of lab/department/team involved in the collaboration at the Australian partner institution Computer Science and Software Engineering

Main contact in the Australian partner institution Sebastian Rodriguez

Function Senior Lecturer

Email sebastian.rodriguez@rmit.edu.au

Outside of this ongoing collaboration, will applications coming from students of other eligible Australian universities be considered by the hosting institution in France? Yes

Expected profile of applicant

Level of study Master or PhD

Discipline Computer Science

Required qualities, knowledge and skills Artificial Intelligence, Java programming, Multiagent systems, Planning