

FICHE NAVETTE: DOCTORANTS IDEX

SECTOR : Higher Education Institution

LOCATION: France, Grenoble

RESEARCH FIELD:

RESEARCHER PROFILE:

□ *First stage researcher,*

INSTITUTION: Univ. Grenoble Alpes, University of Innovation

One of the major research-intensive French universities, Univ. Grenoble Alpes**1 enjoys an international reputation in many scientific fields, as confirmed by international rankings. It benefits from the implementation of major European instruments (ESRF, ILL, EMBL, IRAM, EMFL*2). The vibrant ecosystem, grounded on a close interaction between research, education and companies, has earned Grenoble to be ranked as the 5th most innovative city in the world. Surrounded by mountains, the campus benefits from a natural environment and a high quality of life and work environment. With 7000 foreign students and the annual visit of more than 8000 researchers from all over the world, Univ. Grenoble Alpes is an internationally engaged university.

A personalized Welcome Center for international students, PhDs and researchers facilitates your arrival and installation.

In 2016, Univ. Grenoble Alpes was labeled «Initiative of Excellence ». This label aims at the emergence of around ten French world class research universities. By joining Univ. Grenoble Alpes, you have the opportunity to conduct world-class research, and to contribute to the social and economic challenges of the 21st century ("sustainable planet and society", "health, well-being and technology", "understanding and supporting innovation: culture, technology, organizations" "Digital technology").

* ESRF (European Synchrotron Radiation Facility), ILL (Institut Laue-Langevin), IRAM (International Institute for Radio Astronomy), EMBL (European Molecular Biology Laboratory), EMFL (European Magnetic Field Laboratory)

Key figures:

- + 50,000 students including 7,000 international students
- 3,700 PhD students, 45% international
- 5,500 faculty members
- 180 different nationalities
- 1st city in France where it feels good to study and 5th city where it feels good to work
- ISSO: International Students & Scholars Office affiliated to EURAXESS

¹ Univ. Grenoble Alpes

MANDATORY REFERENCES:

CDP TITLE: CIRCULAR

SUBJECT TITLE: Learning by Demonstration of Action Models for Cobot Programming

SCIENTIFIC DEPARTMENT (LABORATORY'S NAME): Laboratoire d'Informatique de Grenoble (LIG) – UMR 5217

DOCTORAL SCHOOL'S: Mathématiques, Sciences et Technologies de l'Information, Informatique – ED 217

SUPPORTER'S NAME: Damien Pellier <Damien.Pellier@imag.fr>

SUBJECT DESCRIPTION:

Since their emergence, industrial robots are traditionally programmed off-line by experts in robotics using computer-based coding interfaces. Robots are then placed in working plants to be used by human operators in order to execute repetitive tasks complying with code instructions. When the tasks assigned to the robot have to change, this robot needs to be completely recoded by the robotics experts, which is challenging, takes a lot of human efforts and time, and does not meet nowadays industry needs in supply-chain reconfigurations and flexibility.

To address this challenge, the PhD. Student recruited **will have to devise a new human-friendly approach for industrial robot programming through on-site Human-Robot Interactions**. The approach consists of three processes: human teaching, robot learning and robot execution (see figure 1): 1. The human operator

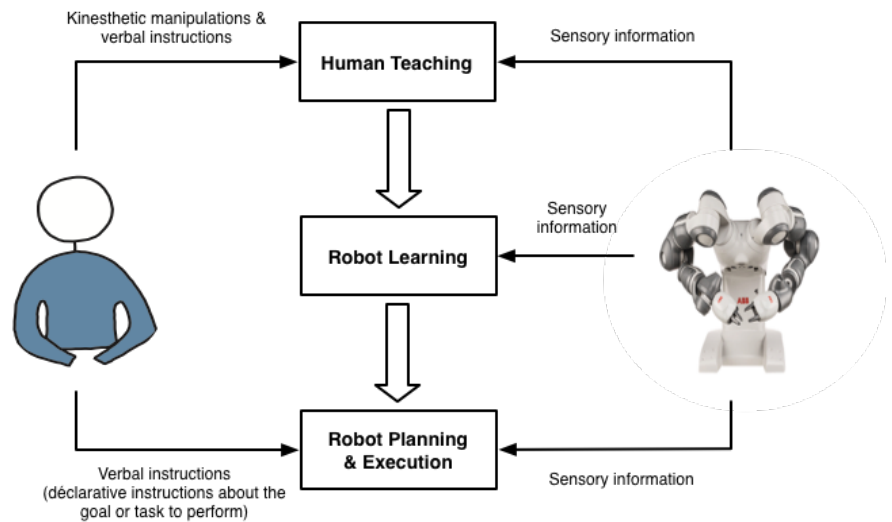


Figure 1: An human-friendly approach for industrial robot programming through human-robot interactions

that will use the robot teaches it a task by providing verbal instructions and by manipulating the robot's effectors. 2. The robot learning process is based on learning by demonstration techniques [1]. In this process, the human operator and the robot build a common symbolic representation of the task: this symbolic representation is a planning domain description language¹. This language uses preconditions and effects to describe changes in the robot's context. 3. The robot task execution is controlled by human verbal instructions that express the objectives of the task that the robot has to achieve. Then, the robot automatically computes a sequence of gestures achieving these objectives: the human operator does not provide the "recipe", i.e., a sequence of gestures to achieve the objectives; the "recipe" is computed by Automated Planning techniques [2]. For this project, we will use the PDDL4J library (pddl4j.imag.fr). The development will be implemented on the Baxter robotic platforms

REFERENCES

[1] B. Argall, S. Chernova, M. Veloso, B. Browning. A survey of robot learning from demonstration. *Robotics and Autonomous Systems*. Volume 57, Issue 5, 31 May 2009, Pages 469–483.
 [2] M. Ghallab, D. Nau and P. Traverso, "Automated Planning", Morgan-Kaufman, 2004.

ELIGIBILITY CRITERIA

Applicants:

- must hold a Master's degree (or be about to earn one) or have a university degree equivalent to a European Master's (5-year duration),

Applicants will have to send an application letter in English and attach:

- Their last diploma
- Their CV
- A short presentation of their scientific project (2 to 3 pages max)
- Letters of recommendation are welcome.

Address to send their application: Damien.Pellier@imag.fr

SELECTION PROCESS

Application deadline: **06/07/2018** at 17:00 (CET)

Applications will be evaluated through a three-step process:

1. Eligibility check of applications in 04/07/2018
2. 1st round of selection: the applications will be evaluated by a Review Board in 04/07.2018. Results will be given in 06/07/2018.
3. 2nd round of selection: shortlisted candidates will be invited for an interview session in Grenoble on 09/07/2018. (if necessary)

TYPE of CONTRACT: temporary-3 years of doctoral contract

JOB STATUS: Full time

HOURS PER WEEK: 35

OFFER STARTING DATE: 1st October 2018

APPLICATION DEADLINE: **06/07/2018**

Salary: between 1768.55 € and 2100 € brut per month (depending on complementary activity or not)