



# Opening of a R&D engineer position on robotics and robot software development

@Imagine Team of LIRIS lab, Ecole Centrale de Lyon

A R&D engineer position of 12 months duration, extensible into a tenured position, is opened on robotics and robot software development and maintenance in support of the <u>Al4Robot</u> platform within the Imagine team, <u>LIRIS lab</u> at <u>Ecole Centrale de Lyon</u>, under the supervision of Ass.Prof.Emmanuel Dellandréa and Prof. <u>Liming Chen</u>. He or She is also expected to take part in research work in close interaction with Postdocs, PhD students and interns.

### **Keywords**:

Software, system development and administration of IT infrastructures within the Robotics platforms, Ros, Gazebo, PyTorch, AI, Robotics

#### Background

Ecole Centrale de Lyon (ECL) is a reputed grande élite engineering école, which, with its more than 160 years history, has developed an excellence of research in the domain of engineering. The Imagine team at ECL has been developing cutting edge research in AI and Robotics with the aim to endow robots with human-like vision, learning intelligence and dexterity.

Over the last 5 years, the Imagine team at ECL has been a key player within a number of large scale R&D projects in the field of AI & robotics at national, european and international wide, including in particular:

- The FUI Pikaflex project, in partnership with <u>Siléane</u>, and Renault, to developing autonomous, adaptable and flexible grasping robots for the Picking and Kitting task;
- a joint R&D research lab <u>Arès</u> in collaboration with <u>Siléane</u>, in order to provide robots with a vision and learning intelligence, able to perform bin-picking for both rigid and deformable objects;
- The EU <u>LEARN-REAL</u> project in partnership with the Idiap Research Institute (<u>Dr.</u> <u>Sylvain Calinon</u> and Dr. André Anjos) and Italian Institute of Technology (<u>Prof. Darwin</u> <u>Caldwell</u>), to develop simulation environments

to enable data effective robotic manipulation skill learning;

The <u>PSPC FAIR WASTES</u> project in partnership with <u>EXCOFFIER FRERES</u>, <u>MTB</u> and <u>SILEANE</u>, three French companies specialized in waste recycling and industrial robots, which aims to better recycle wastes through AI enhanced robotised sorting within the national programme "<u>Projets Structurants</u> <u>Pour la Compétitivité (PSPC)</u>" For a better



understanding of the project, please watch the video here;

• the <u>CHIRON</u> project within the <u>trilateral French-German-Japanese call on AI</u>, which teams up the Imagine team at ECL with Prof.Jan Peters' group at Technische





Universität Darmstadt in Germany and Prof.Yasuhisa Hasegwa's group at Nagoya University in Japan, to develop an AI empowered general purpose assistive robotic system for dexterous object manipulation through embodied teleoperation and shared control; This research project is further reinforced and complemented by a novel Aristotle project within the <u>first specific Franco-German call for proposals</u> on AI for hierarchical and reinforcement learning on bimanual robotic dexterity;

The team owns a number of robots, including UR3 by Universal Robots, Panda by Franka Emika, Tiago+, Fanuc, *etc.* Furthermore, they have released strong impact simulation

datasets for robot manipulation learning, including the <u>Mikado</u> dataset, a large scale dataset of homogeneous and dense synthetic objects in bulk, and the <u>Jacquard</u> dataset, the largest public synthetic dataset (50 K images of 11K objects and 1 M grasp locations) so far known for grasp prediction (see the figure opposite). Various toolsets for simulation and robot manipulation learning are developed under way, in particular the <u>Al4Robot</u> platform (See Figure opposite), composed of multiple robots and tactile sensors, to enable seamless sim2real deep robotic manipulation learning.



### Missions of the position

The candidate will take part in exciting AI and robotics research projects, in close interaction with Postdocs, PhD students, engineer students and interns. He (She) will be responsible for maintaining the technologies used within the platforms and adapting them to the needs related to research projects in order to maintain a high level of performance and quality of use for optimal research conditions.

In particular, this will involve implementing the code within Dockers containers and / or Kurbenetes architecture using ROS to ensure sustainability, reproducibility, scalability and dissemination of research work. These tools and their deployment are indeed essential to ensure that the platforms and their components are both unified and modular allowing the codes developed over time by the various users (students, doctoral students, post-docs and researchers) to function, despite different versions of libraries or robots used over years.

He (she) will have the task of training and supporting the people (doctoral students, post-docs, students, interns, etc.) who will use software and platforms.

#### Skills

The candidate must:

- be fluent in french or english
- be fluent or even expert with linux, C ++ and Python languages
- have experience on distributed computing, network and multithreading
- be familiar with Cmake, ROS and Gitlab





If necessary, skills development will be offered for the mastery of ROS (Robot Operating System, to control robots and sensors), Gazebo (to simulate robots), Docker (installations and dependencies), OpenCV, machine learning frameworks and Deep Learning for Vision (Cuda, Theano, Torch, Tensor Flow).

He (She) should like teamwork and will be called to develop abilities to manage subcontracting.

## Application

Applications should include a detailed curriculum vitae, brief statements of interests and two reference letters.

Applications and letters should be sent via electronic mail to:

- Pr. Liming Chen ( <a href="mailto:liming.chen@ec-lyon.fr">liming.chen@ec-lyon.fr</a> )
- Dr.Emmanuel Dellandréa (emmanuel.dellandrea@ec-lyon.fr)