2018-00385 - Developing a wheel-leg hybrid robot

Contract type : Internship agreement
Level of qualifications required : Master's or equivalent
Function : Internship Research

Context
Our team works on new machine learning algorithms to allow robots to adapt to unexpected situations. For instance, we seek to make a hexapod robot that broke a leg re-learn to walk in a few minutes. We recently obtained promising results (see [1] and [2]).


Assignment
We now wish to extend the adaptation possibilities by making our approach work on an hybrid wheel-legs robot, that is to say a robot capable of both walking and driving (see [3]). To do so, a new gait controller has to be designed and our learning algorithms have to be adapted.


Main activities
The objective of this internship is:

1. improve the existing wheel-legs platform (hardware and software);
2. adapt the walking and learning algorithms to use the wheels;
3. extend the current hexapod simulator to handle wheels.

The position is for at least 5 months and, due to the French law, available only to students.

We aim at experimenting on the robots as much as possible. In case of blocking hardware issue, the work could be done in simulation.

Skills
Depending on the selected candidate, the internship can be more focused on the mechatronics side or the machine learning side. Nonetheless, basic skills are wished in:

- C++ programming,
- Python programming,
- use of ROS,
- basic CAD (we use SolidWorks or OpenSCAD),
- (optional) machine learning,

It is expected that the candidate be proficient in English, or in French.

Benefits package
- Subsidised catering service
- Partially-reimbursed public transport

Remuneration
Gratification : environ 500 € par mois