Title: Experiments of multi-agent path planning algorithms with wired mobile robots

Duration : 16 months

Level required : Engineer or Master

Function : Scientific Engineer in the INRIA/INSA *Chroma team*, CITI lab.

Desired Level of experience : 1 to 5 years

Context

Within the framework of the european project ***BugWright2*** (https://www.bugwright2.eu/), the Inria CHROMA team explores multi-robot path planning problems to deal with inspection of large structures. The proposed mission is to implement and experiment a solution developed by the team with a specific robotic platform : wired mobile robots, i.e. moving on a large surface and each one attached to a drop-down cable.

Mission

- **Simulate** (with Gazebo/ROS) and **build a robotic demonstrator** (with modified Turtlebot robots) of a path-planning algorithm allowing a set of wired robots to cover a room with obstacles. Xiao Peng's Phd allowed us to build a path-planning algorithm ensuring that robot cables do not cross[1]. This work will be carried out in collaboration with Xiao Peng, and with Johan Faure who is developing the team's simulation tool on the Gazebo/ROS platform.

- Participate in the **BugWright2** project, interacting with partners and in particular with Cedric Pradalier's team in Metz. This will involve participating in the setting up of demonstrations with the mobile inspection robots (crawlers) and potentially other robots.

- Participate in meetings and demonstrations with the project's European partners (planned trips mainly to Spain, Greece and Portugal)

- Participate in the writing of documentation on the simulations and experiments developed

- Participate in the writing of deliverables (in English) at the end of the project.

BugWright2 project : https://www.bugwright2.eu/

Chroma team : https://team.inria.fr/chroma/en/

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1   X. Peng, C. Solnon, O. Simonin, "Solving the Non-Crossing MAPF with Constraint Programming", the 27th International Conference on Principles and Practice of Constraint Programming, 2021

Collaborations

The recruited person will work with

- Olivier Simonin (Chroma team leader and head of the 'Multi-Robot Inspection' WorkPackage in the BugWright2 project), Xiao Peng (PhD student) and Christine Solnon (thesis co-director).

- Johan Faure, Engineer in Chroma, responsible for developments on the team's robotic simulator and for the UAVs platform.

Responsabilities

The recruited person will be in charge, for Chroma, of simulations and demonstrations with wired robots within the framework of the European BugWright2 project.

Main activities

Robotic experimentation, simulation development with Gazebo/ROS and C++/Python.

Other activities : participation in the writing of reports/deliverables, presentations (in the BugWright2 project), and missions abroad for joint demonstrations.

Skills

Technical skills: C++ and Python programming, experience with GAZEBO and ROS, and experience with mobile robots.

Language: English (B2)

Relational skills: work in a team and in an intercultural environment.

Other valued appreciated: writing and communication of results, autonomy, rigor and dynamism.

Salary

From 2 570€ (gross salary).

Advantages : 42 days off / year, 50% reimbursement of public transport costs, Access to INSA staff restaurant, Possibility of teleworking one day per week, Social, cultural and sporting activities via CASI INSA.

General information
- **City :** Lyon (CITI lab., Campus de la Doua/INSA de Lyon, Villeurbanne)
- **Desired start date:** april 2022
- **Contract duration :** 16 months
- **Deadline to apply :** 31/03/2022

Contact
- Olivier Simonin / olivier.simonin@insa-lyon.fr

  Send a detailed CV with a cover letter.