Robot Operating System (ROS) support for a swarm robotic hardware platform

Project Description and Role

The Pi-puck [1] is a hardware platform used for swarm robotics research that is powered by a Raspberry Pi Zero single-board computer. This internship aims to implement Robot Operating System (ROS) [2] support for the Pi-puck robot, to facilitate integration with code written by other robotics researchers. ROS is a widely-used open-source hardware abstraction layer that enables robotics control/navigation algorithms to be developed against a common API, and ported to various robot platforms. An added benefit to implementing ROS support for a robot platform, is that the same control code can be executed in simulation or physical hardware without modification.

A variety of sensors and actuators will need to be interfaced with ROS, including: infra-red proximity sensors, time-of-flight laser rangefinders, a camera (for colour blob / tag detection), ground colour sensors, an inertial measurement unit (IMU), XBee mesh networking, and differential drive stepper motors. Some of this functionality has already been developed, so this internship will build upon and extend the existing implementation [3]. Simple control algorithms will be written to test the functionality of each sensor/actuator, and a series of experiments will be carried out to demonstrate robot autonomy via the ROS navigation stack.

Skills required:

Skills required: Experience of programming in Python / C++ and familiarity with Linux (preferably Ubuntu / Raspberry Pi OS) is desired.

Timings & Pay

The internship should take place during the summer vacation (i.e. start on or after Monday 27 June and end no later than Friday 23 September, at the very latest).

The project is expected to be full time (37 hours per week) and last 10 weeks and the successful intern will be paid £9.96 per hour.

Deadline for Applications is 22nd of June 2022

How to Apply

Applicants should complete this [Google Form](#) including attaching a copy of their transcript.

Supervisors

Alan Millard (alan.millard@york.ac.uk), Department of Computer Science

References and Further Reading

1. Allen, Jacob M., et al. "The Pi-puck Ecosystem: Hardware and Software Support for the e-puck and e-puck2." International Conference on Swarm Intelligence (ANTS), 2020.

2. ROS - Robot Operating System: https://www.ros.org/

3. Cyberbotics e-puck driver for ROS 2: https://github.com/cyberbotics/epuck_ros2