Project Title: On-line novelty detection and landmark recognition

Degree Scheme for which the project is applicable:

DSP  ✔  PMRC  ✔  SSC  ✔

Industrial Support: Yes  ✔  No  ☐

First Supervisor: Dr. P Angelov  Second Supervisor: Mr. X.-W. Zhou

Project Description:

A number of important tasks in robotics such as landmark recognition, self-localization, novelty detection, navigation (wall following, obstacle avoidance) etc. require computational intelligence (neural networks, fuzzy logic controllers, rule-based classifiers, clustering etc.).

In this project computational intelligence algorithms will be studied and applied to real robots (Pioneer-3DX available in the Intelligent Systems Research Laboratory of the Department). New algorithms will be developed in Matlab and C++ (ARIA – C++ based set of packages used by Pioneer-3DX). Experimental work will be conducted on the robot simulator and in real environment (in and out of Infolab). The following problem will be addressed: Robot exploring unknown environment recognizes landmarks and classifies them without any pre-training, any prior knowledge, and any communication link (GPS etc.) using motor and sonar sensors and on-board PC only.

This work is novel, and presents an opportunity for research publication and potential interest from companies (QinetiQ).

Skills required: Adaptive filters, Neural Networks, Fuzzy logic, on-line subtractive clustering, programming in C++, Matlab

References:


Supervisor Signature

Student Signature