Project No:

Department of Communication Systems

Project Title: Development of Software for mobile robots

Degree Scheme: CCS ☒ ITM ☒ ECS ☒ TCS ☒

Level: BSc/BEng ☒ MSci/MEng ☐

Supervisor: Dr. P Angelov 2nd Supervisor: Dr. Z Ding
Assistant: Mr. P. Sadeghi-Tehrani

Project Description:

This industry related project aims the development of software in C and/or Matlab language for the use of mobile robots (Pioneer-3DX) available in the Department of Communication Systems (Intelligent Systems Research Laboratory). The software will make use of the C class library called ARIA which is available with each robot (each robot has an on-board PC). The aim is to enable mobile robot with capabilities to avoid obstacles, walls, to navigate in a more 'intelligent' manner, to cooperate between each other. The software will also assist the robots in mapping the environment by measuring the distance to the obstacles using the sonar sensors (also available) and localisation by measuring the distance and current position. The project involves work with mobile robots, software and reading new literature about an exciting subject of mobile robotics and autonomous systems.

The robots have embedded computer and part of the project will be to develop and extend existing algorithms (written in C and ARIA - specifically designed language for use by Pioneer robots) that allow the robots to behave in an intelligent and collaborative fashion.

Skills required:

Software - programming in C and or Matlab, image and data processing, knowledge of AI.

References:

1. Pioneer-3DX, User Guide, ActiveMedia Robotics, Amherst, NH, USA, 2004.

2. Zhou, X., P. Angelov, An Approach to Autonomous Self-localization of a Mobile Robot in Completely Unknown Environment using Evolving Fuzzy Rule-based Classifier, *First 2007 IEEE International Conference on Computational Intelligence Applications for Defense and Security*, April 1-5, 2007, Honolulu, Hawaii, USA, pp.131-138.

3. Zhou, X.-W., P. Angelov, Real-Time joint Landmark Recognition and Classifier Generation by an Evolving Fuzzy System, *2006 IEEE World Congress on Computational Intelligence*, Vancouver, Canada, July 16-21, 2006, pp. 6314-6321.

4. Angelov, R. Ramezani,X. Zhou, Autonomus Novelty Detection and Object Tracking in Video Streams using Evolving Clustering and Takagi-Sugeno type Neuro-Fuzzy System, 2008 IEEE Intern. Joint Conference on Neural Networks, IEEE World Congress on Computational Intelligence, Hong Kong, June 1-6, 2008, pp.1457-1464.