

Design and Development of Fleet Management System for Multi-Agent Autonomous Surface Vessel

Authors : Zulkifli Zainal Abidin, Ahmad Shahril Mohd Ghani

Abstract : Agent-based systems technology has been addressed as a new paradigm for conceptualizing, designing, and implementing software systems. Agents are sophisticated systems that act autonomously across open and distributed environments in solving problems. Nevertheless, it is impractical to rely on a single agent to do all computing processes in solving complex problems. An increasing number of applications lately require multiple agents to work together. A multi-agent system (MAS) is a loosely coupled network of agents that interact to solve problems that are beyond the individual capacities or knowledge of each problem solver. However, the network of MAS still requires a main system to govern or oversees the operation of the agents in order to achieve a unified goal. We had developed a fleet management system (FMS) in order to manage the fleet of agents, plan route for the agents, perform real-time data processing and analysis, and issue sets of general and specific instructions to the agents. This FMS should be able to perform real-time data processing, communicate with the autonomous surface vehicle (ASV) agents and generate bathymetric map according to the data received from each ASV unit. The first algorithm is developed to communicate with the ASV via radio communication using standard National Marine Electronics Association (NMEA) protocol sentences. Next, the second algorithm will take care of the path planning, formation and pattern generation is tested using various sample data. Lastly, the bathymetry map generation algorithm will make use of data collected by the agents to create bathymetry map in real-time. The outcome of this research is expected can be applied on various other multi-agent systems.

Keywords : autonomous surface vehicle, fleet management system, multi agent system, bathymetry

Conference Title : ICCRV 2017 : International Conference on Computer and Robot Vision

Conference Location : Paris, France

Conference Dates : August 28-29, 2017