

Fuzzy Autonomy in Offshore Robotics: Theory, Algorithms, and Applications

Offshore robotics, including unmanned surface vehicles (USV), autonomous underwater vehicles (AUV) and unmanned aerial vehicles (UAV), are now being deployed widely in an array of different applications in both civil and military sectors. For such offshore vehicles to be capable of undertaking the kinds of missions that are now being contemplated, they need to be equipped with sophisticated autonomy. Fuzzy technique is one of the most important ways to complete automation in offshore robotics and has made great breakthroughs in recent years. Not only there has been a constantly growing flow of related research papers, but also made a great success in real-world applications.

While substantial progress has been achieved in fuzzy autonomy of offshore robotics, many challenging issues still remain and new crucial problems emerge. For instance, the precise perception in uncertain environments with unknown disturbances from payloads, winds, waves and currents, etc. The appropriate modeling of complex dynamic behavior in offshore robotics that may occur owing to the deployment of different payloads, different mission requirements and varying environmental conditions. In addition, intelligent and robust fuzzy control laws, fuzzy decision-making mechanism, and fuzzy autonomy accuracy and efficiency in offshore robotics still leave large room for improvement.

In this special issue, we will solicit latest research results and technological reports about: (1) present state-of-the-art fuzzy methods for offshore robotics autonomy; (2) develop novel systems and applications; and (3) survey the recent progress in this area.

Topics of interests:

The main topics of this special issue include, but are not limited to, the following:

- Theoretical analysis of fuzzy control system in offshore robotics autonomy.
- Advanced perception technology in the maritime surface environment and underwater environment.
- Intelligent algorithms/systems which are used to support environment perception.
- Novel Fuzzy/neural approaches/algorithms to modelling, guidance, navigation and control (GNC) of autonomous offshore robotics.
- Advanced fuzzy/neural robust adaptive methods for modelling and GNC of autonomous offshore robotics.
- Intelligent learning systems developed for long-term autonomy of offshore robotics.
- Intelligent approaches to flocking/swarming/formation control of multiple autonomous offshore robotics.
- Application reports about fuzzy control systems using in autonomous offshore robotics.

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