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Patent Search

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Abstract:

This invention introduces a highly autonomous Unmanned Underwater Vehicle (UUV) equipped with an Artificial Intelligence (AI) and Machine Learning (ML) based advanced underwater object recognition and tracking. The system incorporates a deep learning model, possibly a Convolutional Neural Network (CNN), trained to identify and categorize a variety of underwater objects. It also includes an intelligent object tracking module which continually learns from the collected data to improve its performance. These features are integrated into the drone's navigation and control systems, enabling autonomous navigation and interaction with the underwater environment. This technology enhances the efficiency, safety, and capabilities of underwater drones, with applications in research, environmental monitoring, infrastructure inspection, thereby revolutionizing the field of marine robotics and autonomous navigation.

Complete Specification

Description:The present invention relates generally to unmanned underwater vehicles (UUVs) or underwater drones. More specifically, the invention pertains to the marine robotics and autonomous navigation, incorporating aspects of artificial intelligence (AI), machine learning (ML), computer vision, and object recognition and tracking technology. This technology is designed to enhance underwater exploration, monitoring, data collection and surveillance applications, by enabling the underwater vehicle to identify, categorize, and track various underwater objects or entities autonomously, while navigating in the complex and dynamic underwater environment.

Background of the invention:

In recent years, there has been a surge in the development and application of unmanned vehicles in various domains, including aerial, terrestrial, and marine environments. This proliferation is driven by the rapid advances in technologies such as robotics, artificial intelligence, machine learning, sensor fusion, and computer vision. The underwater domain, in particular, presents a unique and challenging environment for the exploration, monitoring, data collection, and surveillance. Traditional methods for underwater exploration, such as the use of divers and manned submarines, have been constrained by limitations in human endurance, safety concerns, the costs and logistical challenges associated with manned missions.

Underwater drones, or Unmanned Underwater Vehicles (UUVs), have emerged as a promising solution to these challenges. They offer a safe, efficient, and cost-effective way to conduct underwater missions, ranging from scientific research, environmental monitoring, military surveillance, infrastructure inspection, to search and rescue operations. However, the complex and dynamic nature of the underwater environment poses significant challenges to the autonomous operation of underwater drones. Navigating in an underwater environment involves dealing with various difficulties such as low light conditions, turbidity, strong currents, obstacles, and high-pressure conditions. Moreover, GPS signals, which are crucial for navigation in aerial and terrestrial domains, cannot penetrate water, making underwater navigation and navigation challenging.

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