

Review Article

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## Smart Technologies in Fisheries: Innovations in Monitoring, Management, and Sustainability

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**Abstract** This study mainly explores the core challenges during the global fishery transformation period, such as overfishing, deterioration of marine ecology, environmental pressure from aquaculture, and the problems of data deficiency and lag in fishery management. Why can intelligent technology become a key breakthrough for the sustainable development of the fishery industry? I have summarized the main technologies and application scenarios of intelligent fishery, such as Internet of Things sensing, artificial intelligence and big data, remote sensing and blockchain, as well as their practical application effects in resource assessment, water environment monitoring, IUU fishing identification, and precise aquaculture. I have also clarified the roles of these technologies in protecting fishery resources, improving production efficiency and industrial chain benefits, as well as their comprehensive impacts on the sustainability of the fishery environment, economy and society. Additionally, I have also paid attention to related issues such as international governance norms, national policy supervision and data ethics. I have also discovered that factors such as technology, economy and others have hindered the popularization of intelligent fishery, possibly exacerbating the uneven development of the industry. Intelligent fishery will integrate deeply with "Fishery 4.0" and AIoT. This study aims to combine technological innovation with inclusive development, people-oriented concepts and ecological protection, and promote the deep integration of technology with fishery systems and interests relations, so as to fully unleash its potential. This study provides practical theoretical and practical references for building an intelligent sustainable fishery industry globally.

**Keywords** Intelligent fisheries; Sustainable fishery development; Artificial intelligence; The Internet of Things; Fishery management

## 1 Introduction

In recent years, the global fishing industry has been in a critical transformation stage. Overfishing has put wild fish resources at risk, and climate warming and marine pollution have further damaged the ecological foundation of the fishing industry, directly affecting food security and the livelihoods of fishermen. Aquaculture has alleviated the pressure of fishing, but it also faces issues such as diseases and environmental burdens; while fishery management has always lacked data and the data is lagging behind, making resource assessment and law enforcement very difficult.

permeated every aspect of the fishing industry, becoming an important helper in the transformation of the industry. In marine fishing, electronic monitoring and remote sensing equipment can accurately collect data related to fishing, which is very helpful in combating illegal fishing (Barreiro et al., 2025); in aquaculture, the combination of the Internet of Things and artificial intelligence can automatically monitor water quality and identify fish diseases, not only improving the farming efficiency but also reducing carbon emissions (Lv, 2025); in the supply chain, the combination of blockchain and the Internet of Things can clearly trace the entire fishing process, and a new model of intelligent fishing is gradually taking shape.

In real-world settings, bringing intelligent technologies into use is rarely just a matter of choosing the most advanced option on offer. Much of the existing literature concentrates on what these tools can achieve in principle, but pays less attention to how they perform once they are introduced into established social arrangements and