

Sub-Theme: Technology and Community for Water Security

Topic : Use of Remote Sensing SCADA AI/ML in Water Sector

Background:

Water scarcity in India, with alarming growth predictions and also being multi-dimensional, requires integrated solutions supported by real-time data. Remote sensing technologies enable large-scale monitoring of water quality, pollution sources, contamination or harmful algal blooms and drought-prone areas alike. They also facilitate highlights seasonal shifts, siltation, risks of floods or droughts, over-exploited water bodies, etc., providing opportunity for early warning systems, as well as quick response. On the other hand, IoT delivers granular, localised data through sensor networks over wide array of parameters linking water quality, soil, river, reservoirs levels and usage offering real-time insights. Scalable and cost-effective, it enables efficient large-scale coverage that would otherwise be costly and error-prone, complementing remote sensing. Similarly, Supervisory Control and Data Acquisition (SCADA) systems conceptualises centralised monitoring and control of water infrastructure. Unlike IoT, which focuses on distributed localised sensing, SCADA integrates these inputs into a central dashboard, enabling operators to remotely manage operations in real time. Its ability to combine monitoring with direct control makes SCADA a cornerstone of modern water management, complementing the predictive analytics of AI and the granular sensing of IoT. Yet, the vast data from remote sensing and IoT requires Artificial Intelligence (AI) for effective analysis. AI algorithms process both historical and real-time datasets, identifying patterns, trends, and anomalies to support evidence-based action. They can forecast water shortages, predict drought risks, and optimise resource management strategies. In agriculture, AI enhances irrigation efficiency by analysing soil moisture, weather, and water availability, reducing waste and boosting productivity. As climate change intensifies the global water crisis, combined use of remote sensing, IoT, and AI presents a ground-breaking approach to tackle water scarcity while ensuring the sustainable management of water resources.

Suggested Sub-Topic:

- Tapping New Age Technologies: Remote Sensing, IoT, AI & Big Data for Water Governance

Expected Outcome:

- To provide a paradigm of integrating various technological tools for a real-time, effective water resources management.
