

Sustainable Water Resource Management Optimization Using Neural Networks and IoT-Based Techniques

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Abstract:

Effective water resource management is crucial for ensuring long-term sustainability, especially in water-scarce regions. This study presents an innovative approach that combines neural networks with IoT-based techniques to optimize water resource allocation and usage in urban and agricultural settings. IoT sensors are deployed to monitor real-time data such as water quality, flow rates, soil moisture, and environmental factors. Neural network models, including Artificial Neural Networks (ANNs) and Long Short-Term Memory (LSTM) networks, are used to analyze the collected data and forecast water demand, detect leaks, and optimize distribution systems. The system provides decision-makers with actionable insights to improve water usage efficiency, reduce waste, and enhance overall resource management. The proposed framework demonstrates enhanced accuracy in predicting water requirements and sustainable water distribution, contributing to the effective management of this precious resource.

Keywords:

Water management, neural networks, IoT, sustainability, resource optimization, water distribution.

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