

# Chapter 12

## Artificial Intelligence and Applications in Drinking Water Management

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### ABSTRACT

*The increase in the urban population and climate change have driven the development of Smart Water systems, which integrate artificial intelligence to improve drinking water management. AI optimizes water distribution, monitors water quality in real-time, detects leaks, and manages demand efficiently, thus addressing current challenges in water resource management. The aim of this research is to analyse the applications of AI in drinking water management within Smart Water systems. The method used includes a literature review, case studies and an analysis of the data obtained. The results show that AI improves the management of drinking water through continuous monitoring of its quality, accurate leak detection, optimization of the distribution and efficient use of water resources, demand prediction and management, and predictive maintenance. In addition, it reduces energy consumption in water treatment and distribution. However, there are technical, economic, and regulatory challenges that need to be addressed in order to achieve effective and sustainable implementation.*

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## **INTRODUCTION**

Water management includes activities such as planning, efficient distribution, and optimal use of water resources so that it can meet current and future needs (Jenny et al., 2020), this under clearly defined policies and regulations (Manawadu et al., 2021). Traditional water management systems use a variety of techniques, methods, and technology to manage water resources. These activities allow for the measurement of consumption, inspection of the infrastructure and limited data availability. Measurements and fault detection are carried out manually and physically. In traditional methods, consumption measurements and fault detection are carried out manually and physically, the data generated is not sufficient to be analyzed, thus limiting the achievement of a efficient and sustainable water management.

Properly managing water is essential in a situation of climate change and water scarcity. Intelligent water management aims to monitor and manage the aquatic environment, allocate and manage water resources, monitor the drainage network and water supply, as well as achieve the effectiveness and efficiency of flood monitoring, for this artificial intelligence and new information technologies must be used (This is the 2022 edition).

In the context of the Sustainable Development Goals (SDGs), SDG 6, called “Clean water and sanitation”, seeks to ensure the availability of water and its sustainable management for all. On the other hand, SDG 11, “Sustainable cities and communities”, aims to make cities and human settlements inclusive, safe, resilient and sustainable. These two objectives are closely linked to smart water management.

Organizations dedicated to water supply, by making use of data analysis and artificial intelligence, lead to make better decisions (water demand, leak detection, etc.), reduce costs, increase efficiency and improve services (Jenny et al., 2020)

## **BACKGROUND**

### **Related Works**

In (Krishnan et al., 2022) Water management techniques are analyzed, including water resource collection, recycling, and conservation. It uses Artificial Intelligence, deep and machine learning, and addresses challenges in deploying an efficient water management system, and proposes future directions.

Various works of water-oriented smart applications using Internet of Things technologies were reviewed, in the analyzed works it was identified that 5G technologies are not used for communication, they incorporate 3D printing and solar

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