Chapter 13
Using Augmented Reality (AR) and the Internet of Things (IoT) to Improve Water Management Maintenance and Training

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ABSTRACT

The convergence of augmented reality (AR) and the internet of things (IoT) holds great promise for transforming water management by improving maintenance, troubleshooting, and training. This chapter explores the synergy between AR and IoT in water management, highlighting their potential to enhance professionals' efficiency and address critical challenges. AR overlays real-time data and interactive guidance onto the physical environment, streamlining maintenance, troubleshooting, and training. IoT provides real-time data and remote monitoring capabilities, facilitating proactive decision-making and predictive maintenance. The integration of AR and IoT offers a powerful toolkit to tackle water management issues, promising increased reliability and sustainability for water resources in a digitally augmented world.

1. INTRODUCTION

The Internet of Things (IoT) and Augmented Reality (AR) have just come together, and this combination has the potential to revolutionize many different sectors. This powerful combination has opened the way for cutting-edge maintenance, troubleshooting, and training solutions with enormous promise for the water management industry. This chapter's introduction looks into the exciting world of AR and IoT technologies and examines how they may be used to manage water resources. The main emphasis is on the ways in which these technical developments may enable technicians to increase their effectiveness and productivity. We want to solve urgent concerns and discover new possibilities for the efficient management of water resources by using the combination of AR and IoT.

This chapter focuses on how AR and the IoT might be useful tools for managing water resources. Our goal is to analyse the complex interplay between AR and IoT, offering insightful information on how technicians might use AR for training, maintenance, and troubleshooting in the context of water management. This in-depth analysis aims to provide readers a thorough knowledge of the potential benefits and practical uses of this cutting-edge fusion within the sector.

This chapter sets off on a fascinating trip via the meeting point of AR and the IoT within the context of water management. It conducts an exhaustive analysis of their mutually beneficial connection, shedding light on their crucial functions in upkeep, troubleshooting, and specialist training. By closely examining the manners in which these technologies smoothly interact, we reveal cutting-edge strategies that may completely alter current methods of water management. The insights gained from this chapter are crucial for both professionals and stakeholders since this transformation has the potential to enable the efficient and sustainable use of this priceless resource. This investigation of AR and IoT promises to change the face of water resource management as the boundaries between the real and digital worlds become more permeable.

2. AR IN WATER MANAGEMENT

2.1. Overview of AR

With the help of the cutting-edge technology known as AR, which combines digital data with the actual environment, water management procedures may be improved in a number of ways (Revolti et al., 2023). To overlay digital material over the real world, AR uses gadgets like smartphones, tablets, smart glasses, or specialised headsets. This substantially enhances how technicians see and interact with their surroundings. With the help of this technology, professionals can more easily grasp complicated systems and spot problems in water systems. AR apps may show real-time data like water flow rates and temperature by connecting with IoT sensors and data streams, enabling personnel to make educated judgements and take prompt action.

By superimposing instructions and animations over technicians' actions to guide them through processes (Rahman et al., 2021), AR significantly reduces mistakes and shortens downtime in maintenance and troubleshooting. Additionally, it makes it possible for remote support, which lets professionals direct on-site personnel through tasks through live video feeds. For water management technicians, AR-based

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