**PROJECT-SMART WATER FOUNTAINS**

**PHASE 2**

**Introduction of Smart Water Management Systems**

One of the essential elements in the universe is water. Nowadays, consumers continuously seek methods to simplify their lives [**[1](https://www.mdpi.com/2227-9717/10/11/2462" \l "B1-processes-10-02462)**]. Monitoring water quality is critical to ensuring the planet’s health and long-term viability [**[2](https://www.mdpi.com/2227-9717/10/11/2462" \l "B2-processes-10-02462)**]. Water is the source of many infectious illnesses, and garbage thrown by residents and environmental disasters from industrial enterprises pollute most of the nearby freshwater supplies in SA [**[3](https://www.mdpi.com/2227-9717/10/11/2462" \l "B3-processes-10-02462)**]. Drinking water can be stored in an overhead tank [**[4](https://www.mdpi.com/2227-9717/10/11/2462" \l "B4-processes-10-02462)**]. The principal causes of water quality deterioration in residential buildings are the development of microbes in overhead tanks and distribution networks, corrosion of pipe material, and the non-replacement of existing pipes [**[5](https://www.mdpi.com/2227-9717/10/11/2462" \l "B5-processes-10-02462)**]. To avoid catastrophic health implications, it is necessary to continuously and remotely check the quality parameters of the water system in real-time [**[6](https://www.mdpi.com/2227-9717/10/11/2462" \l "B6-processes-10-02462)**].

 Traditional water quality monitoring in South Africa (SA) is expensive and does not allow continuous and timely monitoring of water quality from various sources [7]. Sustainable water management strives to combine many water management areas and optimize advantages in SA [8,9]. This can be accomplished in various ways, including water reuse, collecting, and conservation techniques [10]. The delicate balance of nature is maintained through ecosystem processes, whereas human consumption leads to an imbalance [11]. Sustainable water management can reduce water use by changing consumer habits and implementing water efficiency measures [12].

A key goal of sustainable and self-sufficient water management is to maximize water use at the regional or municipal level [13]. Information and control methods and monitoring leverage this resource [14]. Leakage can be reduced, quality assured, customer experience improved, and operations optimized through water management [15]. IoT can promote sustainable economic development and improved water resources and energy management in SA, which invests in citizens’ well-being by supporting IoT adoption [16,17]. Additionally, water systems should be equipped with technology to create smart procedures [18]. In many water systems with weak infrastructure, uncertain supply, and customer satisfaction, or significant discrepancies between proportional bills and actual consumption or use, smart water systems can help improve the situation [19,20]. There are several benefits to adopting a smart water system, including minimizing financial losses, and creating new business models better to serve urban and rural populations [21,22]. The benefits of IoT technology in our smart water system project are well-known to us at this point. As a result, we will be able to control our energy consumption better and manage our resources. This project’s primary objective is to design a novel, trustworthy, and adaptable water quality monitoring system for real-time monitoring of a remote water level throughout an IoT zone. Wireless sensor networks offer a novel framework for gathering and relaying data from various sources [23]. Extensive testing is performed on an Internet of Things system designed specifically for this network. The Internet of Things network’s end goal is to allow for the monitoring and management of water supplies, distribution systems, and reservoirs. There has been extensive testing and analysis of this [24].

In this paper, hybrid applications and IoT devices are given prominence. Water is more commonly squandered at residences, and the major supply source is wasted. GPRS and GSM modules are the two IoT devices: a water tank level sensor that sends data to the cloud for analysis and a motor that turns on and off automatically. Using an IoT-SWM system, the water level can be monitored and controlled while leaks in the tank are detected and an estimated measurement is provided.

The main contributions of this paper are:

Smart water management gives a greater understanding of the water system, including flaw detection, preservation, and water management.

A comprehensive database of regions with water losses or unlawful connections can be built with the introduction of smart water system technology by public service corporations.

Smart water grids can save costs by conserving water and energy while improving the quality of service to consumers. Wireless data transfer allows consumers to assess their water use to reduce water costs in other circumstances.

In this manner, the remaining components of the IoT-SWM system can be planned. Studies that are at the heart of this discussion are outlined in Section 2. The suggested study is summarized in Section 3, while the simulation results and comments are provided in Section 4. The report’s final Section 5, delves deeply into the findings and progress.

**Water Quality Monitoring**: Constantly assess the quality of the water, ensuring it meets safety standards.

**Bottle Refilling Stations:** Encourage reusable bottles, reducing single-use plastic waste.

**Hygienic Touchless Operation:** Incorporate sensors for touchless activation, promoting cleanliness and reducing the spread of germs.

**Digital Displays:** Provide real-time data on water quality, usage statistics, and hydration reminders, enhancing user experience.

**Water Conservation:** Employ leak detection and flow optimization to minimize water wastage.

**Mobile App Integration:** Enable users to locate nearby fountains, track their water intake, and receive notifications or incentives for sustainable choices.

**Eco-friendly Energy Sources:** Some models utilize solar panels to power the fountain, reducing energy consumption.

**Water Purification:** Advanced filtration systems remove impurities, ensuring high-quality drinking water.

**Accessibility Features:** Designed to accommodate individuals with disabilities, making them inclusive and accessible to all.

**Data Analytics:** Collect usage data to help cities optimize fountain placement and maintenance for maximum efficiency.

**Conclusion:**

Smart water fountains represent a convergence of environmental sustainability and technological advancement. Their potential to conserve water, reduce operational costs, and enhance user satisfaction makes them a promising solution for public spaces. While initial investments might be necessary, the long-term benefits in terms of resource conservation and efficient management make these fountains a compelling choice for cities and organizations looking to modernize their infrastructure.

**SUBMITTED BY,**

**(311421106004)**

**Akash**