UNIVERSITI TEKNOLOGI MARA

IOT- ENABLED WATER RESOURCE MANAGEMENT SOLUTION

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ABSTRACT

An inventive project called "IoT-Enabled Water Resource Management Solutions" makes use of sensors, an Arduino microcontroller, and a communication module to create a reliable real-time water turbidity and pH monitoring system. Ensuring that communities consistently receive clean, safe drinking water is the main goal of this project. The system's goal is to quickly detect deviations in the quality of the water and take appropriate action. The project is to develop a trustworthy early-warning system by integrating sensors for pH and turbidity monitoring. The system is designed to sound alerts and, if required, stop the water flow when the water quality deviates from permitted bounds. As a precautionary measure, this quick reaction system keeps people from unintentionally drinking tainted water.In addition, the project incorporates a proactive purifying component, expanding its capability beyond simple detection. The IoT-enabled technology takes action to fix possible problems before the water reaches the end-user's home by connecting smoothly with a water treatment system. The project's main objective of providing uncompromising water quality is in line with this two-tiered strategy, which adds an extra layer of safety and purity. A system that is easy to use and adaptable to changing communitydemands is made possible by the integration of the Arduino microcontroller. Real-time data transmission is made possible by the communication module, giving stakeholders prompt access to information on the state of the water quality. The system architecture, the choice and use of sensors, the complexities of the Arduino microcontroller's coding, and the smooth integration with a water treatment system will all be covered in detail in this technical report. To evaluate the system's functionality and user input, field tests and assessments will be carried out. This will provide important new information to the field of water resource management. In summary, "IoT-Enabled Water Resource Management Solutions" provides a concrete and workable solution for guaranteeing the availability of clean drinking water in addition to providing a state-of-the-art method of monitoring water quality. The initiative has the potential to have a significant influence on the actual world since it can combine technology with quick, practical solutionsto tackle problems with water quality at its root.

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INTRODUCTION

1.1 Introduction

The way we connect with the physical world is being revolutionized by the Internet of Things (IoT), which has emerged as a transformational force. It entails the incorporation of embedded electronics into tangible objects to enable communication and interaction between them and their surroundings. Significant progress has been made in many areas under this technology paradigm, changing the face of sectors like energy, gene therapies, smart homes, smart cities, and medicine.

The Internet of Things is based on the idea of smart devices. These are connected objects, each having its unique IP address, that may gather and send data via a network. These devices can interact with their surroundings through embedded technology thanks to this digital representation, which empowers them to make wise decisions. The Internet of Things has far-reaching ramifications that affect people's daily lives and spur innovations that improve the intelligence and efficiency of systems.

IoT has the potential to completely change how we handle water scarcity and make sure that water is used efficiently in the field of water management, where the demand for fresh water is rising worldwide. Significant risks to biodiversity exist in both aquatic and terrestrial environments due to water constraints. It lowers the general quality of the water, endangers the supply of food, and helps diseases proliferate. Given the seriousness of this problem, conserving water is essential to ensuring that our demands are met in the future.

Agricultural irrigation systems in the past relied solely on simple timers and switches, regardless of the soil moisture content or the weather. Nevertheless, there are restrictions on how well these traditional techniques may maximize crop output and water use. There has been a move towards sophisticated sensing and regulating systems to address these issues. These devices use the Internet of Things technologies to improve irrigation operations' accuracy and effectiveness.