UNIVERSITI TEKNOLOGI MARA SARAWAK

FINAL YEAR PROJECT REPORT

(EEE368)

IOT-BASED IRRIGATION SYSTEM

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ABSTRACT

This paper introduces an economical and automated smart irrigation system for farms. The objective of this study is to develop a Wi-Fi-based irrigation system controlled by an Arduino board. The proposed system utilizes solar powered system, water level monitoring, and sensors. Based on the water level, the system regulates the irrigation process. When the water level falls below a set threshold, the ultrasonic sensor sends a signal to the Arduino board, triggering a notification via an IoT platform and activating the water pump. In comparison to other systems, this solution offers superior efficiency at a lower cost. The Arduino board collects data from the sensors and links it to the cloud. A key advantage of this system is that farm owners can remotely monitor their farms using their mobile phones. The project's primary goal is to enhance agriculture through automation and IoT technology.

Keywords—Arduino, Sensors, Wi-Fi Module, Pump

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Agriculture plays a vital role in feeding the world's population, yet it faces significant challenges such as water shortage and climate changeability. Smart irrigation systems, powered by the Internet of Things (IoT), offer a promising solution to optimize water usage and enhance crop productivity. These systems utilize advanced technology to monitor and control irrigation processes in real-time, improving efficiency and sustainability in agriculture.

The concept of smart irrigation systems has been around for decades, but early implementations were delayed by high costs and technical problems. Recent advancements in IoT technology, including smaller sensors and wireless connectivity, have made smart irrigation more accessible and affordable. These systems allow sensors to collect data on relevant parameters, which is then analysed to determine optimal irrigation schedules.

Contemporary research in smart irrigation systems focuses on enhancing sensor accuracy, energy efficiency, and scalability. Advanced sensor technologies, offer greater precision and reliability. Additionally, machine learning algorithms are being integrated to predict irrigation requirements based on historical data and environmental conditions. Cloud-based platforms enable remote monitoring and management, empowering farmers to optimize irrigation practices from anywhere.

This study aims to develop a cost-effective and user-friendly IoT-enabled smart irrigation system shaped for agricultural use. The objectives include designing low-cost sensor nodes for measuring water level, optimizing communication protocols for energy efficiency, and implementing intelligent algorithms for irrigation scheduling. The performance and economic possibility of the system will be evaluated under field conditions, considering factors such as crop yield, water savings, and return on investment.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In recent years, technology has been changing farming a lot, especially with smart irrigation systems that use the Internet of Things (IoT). These systems can monitor fields in real-time, control watering precisely, and make decisions based on data. Because of this, many researchers and farmers are interested in learning more about how these systems work and what impact they have on farming.

To understand smart irrigation systems better, I need to look at a lot of research and studies already done on them. This helps me see what's been learned so far, what's important to focus on, and what questions still need answers. I explore different parts of these systems, like the sensors they use, how they communicate, and the software that helps make decisions. I also look at how they affect things like crop growth, water use, and the environment.

Additionally, I look at how smart irrigation systems affect farmers and their communities. This includes things like who can use the technology, what challenges they might face, and how policies and rules can help or hurt. By bringing together information from different fields like farming, engineering, and economics, I hope to get a full picture of how smart irrigation can help farmers grow food more sustainably and improve their lives.