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OCEAN AND RIVER MONITORING BUOY SYSTEM FOR SAFETY ALERT

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ABSTRACT

The "Ocean and River Monitoring Buoy System for Safety Alert" project is designed to address critical challenges in environmental monitoring, particularly in aquatic ecosystems. Recognizing the natural occurrence of flooding, the project seeks to mitigate the associated risks to life and property by proposing a cost-effective, robust, and accessible buoy system. The existing buoys in the market are often large, heavy, and expensive, limiting their mobility and accessibility. Moreover, private sectors predominantly own these buoys, restricting public access to crucial data. This report advocates for a more accessible buoy system, suggesting the use of a gravity water pressure sensor instead of the traditional and complex ultrasonic sensor. The proposed system aims to provide a cheaper alternative that can be owned and accessed by the public, incorporating a microcontroller and Internet of Things (IoT) for improved data sharing and alert systems. This project envisions contributing to timely and widespread dissemination of water level data, offering a potential solution to the challenges posed by conventional monitoring systems.

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CHAPTER 1: INTRODUCTION

In this chapter, the focus will be on establishing the purpose and reason behind the research project, “Ocean and River Monitoring Buoy System for Safety Alert” and looking into the problems it aims to fix. Furthermore, this chapter will uncover the objectives of the project and see where it can be implemented.

In the vast expanses of the oceans and rivers, understanding and monitoring environmental conditions are paramount for the safety of both ecosystems and human activities. The need for innovative solutions to safeguard our aquatic ecosystems has never been more critical. This thesis introduces the "Ocean and River Monitoring Buoy System for Safety Alert," a project to provide monitoring and early warning systems to strategic areas. Through advancement of technology and environmental consciousness, this initiative aims to address the need for real-time surveillance in our oceans and rivers, contributing to both environmental sustainability and human safety.

1.1 RESEARCH BACKGROUND

Flooding, being a natural occurrence, remains unavoidable, however, the tragic disaster involving loss of life and property can be reduced. Implementing a robust monitoring system, specifically designed to constantly observe water levels in rivers, lakes, and oceans, enables the prediction and early detection of potential floods. Existing solutions, known as buoys, have been employed globally for this purpose. Unfortunately, many of these buoys in the market are bulky, heavy, expensive, and challenging to maintain due to their reliance on complex circuitry and vulnerable components such as ultrasonic sensors.

In certain bodies of water, like dams and lakes, buoys solely utilizing ultrasonic sensors for depth measurement are privately owned. The data collected is typically confined to specialized control rooms, concealed from the public. Consequently, vital information, including government data, prove to be slow and outdated. Moreover, news outlets become the primary source of information, resulting in delayed communication during emergency situations. Even when early warnings are issued to