Development and Evaluation of an IoT-Based Plant Monitoring System.

GDAC Priyadarshani

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MSc in Artificial Intelligence

Department of Computational Mathematics

Faculty of Information Technology

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Thesis/Dissertation submitted in partial fulfillment of the requirements for the degree

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DECLARATION

I affirm that the content presented in this thesis is the result of my own research and original work. It does not include any material previously submitted for academic purposes at any other institution, nor does it contain content that has been previously published or authored by another individual, except where proper acknowledgment is provided within the text. I acknowledge my right to utilize this material, either in its entirety or in part, for future academic endeavors such as articles or books.

Signature: Date: 17.07.2024

I confirm that the student named above conducted research for their PhD/MPhil/Masters thesis/dissertation under my supervision. I verify that the declaration made by the student is accurate and truthful.

Name of Supervisor: Dr. ATP Silva

Signature of the Supervisor: Date: 17.07.2024

DEDICATION

This work is dedicated to my family, whose steadfast love and encouragement have been a constant source of strength throughout my academic journey. I extend my heartfelt gratitude to my supervisors for their invaluable guidance and patience, which have significantly shaped my research efforts. Finally, this thesis is dedicated to all plant enthusiasts and horticulturalists, whose dedication to nurturing plants continually inspires innovation and advancement in plant care practices.

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I extend my deepest appreciation and gratitude to everyone who contributed to the completion of this research thesis.

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ABSTRACT

The increasing popularity of indoor and outdoor plant cultivation has led to a growing demand for effective and user-friendly plant care solutions. However, existing methods often rely on manual observation and intervention, resulting in labor-intensive processes and suboptimal plant health outcomes. Concurrently, advancements in Internet of Things (IoT) technology offer promising avenues for revolutionizing plant care practices through real-time monitoring, data analysis, and remote-control capabilities.

In response to these challenges, this research proposes the development and evaluation of an IoT-Enhanced Smart Plant Monitoring System, designed to address the need for comprehensive, user-friendly, and sustainable plant care solutions. The proposed system leverages IoT technology to collect and analyze critical environmental data, including soil moisture, light exposure, temperature, and humidity, from both indoor and outdoor plant environments. Utilizing NODEMCU devices and a centralized processing unit, the system offers real-time plant insights, personalized recommendations, and remote care control functionalities.

Key features of the proposed system include a user-friendly interface for seamless interaction and accessibility, remote control capabilities via IoT cloud platform, and sustainability considerations to minimize environmental impact. Through a comprehensive review of existing literature, methodology development, and real-world testing, this research seeks to evaluate the effectiveness and usability of the IoT-Enhanced Smart Plant Monitoring System in addressing plant care challenges.

Furthermore, implications for future research, industry applications, and societal benefits are discussed, highlighting the potential impact of IoT technology in advancing plant care practices and promoting environmental sustainability. In conclusion, the proposed IoT-Enhanced Smart Plant Monitoring System represents a significant step forward in the realm of plant care technology, offering a holistic and sustainable solution to the challenges faced by plant enthusiasts and horticulturalists. By harnessing the power of IoT technology and data analytics, this innovative system empowers users to make informed decisions, optimize plant health, and foster a deeper connection with nature in both indoor and outdoor settings.

Keywords: Plant care, IoT technology, Smart monitoring system, Remote control.

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