Design of an Automatic Flower Care System for Minh Tam Flower Garden

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***Abstract*—This thesis focuses on the design and implementation of an automatic flower care system for Minh Tam Flower Garden, utilizing PLC (Programmable Logic Controller) and WinCC software. The author explores the hardware components of the PLC, including the CPU 313C, and the programming software Step 7 Manager V5.5. The SCADA system and WinCC v7.4 are applied to monitor and control environmental parameters such as soil moisture, temperature, and light intensity. The author successfully designed and simulated a water irrigation system that closely mirrors real-world conditions, measuring soil moisture, light intensity, and temperature in greenhouses. However, the project has limitations, such as the high cost of the technology and the incomplete development of a fertilizer mixing system. The research highlights the practical significance of the technology and its potential for cost savings and improved efficiency in flower cultivation.**

***Index Terms*—PLC, SCADA, WinCC, water irrigation, environmental monitoring**

I. Introduction

In recent years, the flower cultivation industry has seen significant growth, becoming a valuable commodity in agricultural and export markets. This thesis aims to design an automatic flower care system for Minh Tam Flower Garden, utilizing PLC and WinCC to automate the irrigation process and monitor environmental conditions. The author also explores the practical applications of PLC S7-300 and SCADA systems. Published books on the methods and subject of this project provide context for this English summary [5].

II. Methods

The thesis involves the design and implementation of a water irrigation system using PLC S7-300 and WinCC software. The author studies the hardware components of the PLC, including the CPU 313C, and the programming software Step 7 Manager V5.5. The SCADA system and WinCC v7.4 are applied to monitor and control environmental parameters such as soil moisture, temperature, and light intensity. The author also references textbooks and online resources to gain a deeper understanding of the technology and its applications. The project is conducted in a controlled environment, with the author focusing on the practical aspects of the system's design and implementation [1].

Supervisor: Lê Hùng Linh, Thai Nguyen University of Information and Communication Technology.

III. Results

The source report presents the design and WinCC simulation of an automated irrigation and flower-care system using PLC S7-300. It shows how soil moisture, light, and temperature information can be represented in the monitoring interface and used in the proposed control logic. The conclusion identifies limitations, including cost and an unfinished fertilizer-mixing component. The report does not document a controlled field experiment at the garden, so this summary treats the result as a designed and simulated model [1].

IV. Discussion

The thesis discusses the practical applications of the designed system, including its potential to save energy and improve efficiency in flower cultivation. The author suggests future developments, such as controlling the speed of the pump to match production conditions and developing a lighting system using LED lights to harness solar energy. The author also highlights the limitations of the project, such as the need for more experience and the high cost of the technology. The author suggests further development in areas such as pump speed control and LED lighting systems to enhance the overall functionality and cost-effectiveness of the system [1].

V. Conclusion

The author concludes that the project has achieved several goals, including the design and simulation of a water irrigation system, an introduction to PLC S7-300, and the application of SCADA and WinCC for monitoring environmental parameters. However, the author also identifies several limitations, such as the need for more experience and the high cost of the technology. The author suggests further development in areas such as pump speed control and LED lighting systems to enhance the overall functionality and cost-effectiveness of the system [1].

References

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