Traffic Light Control System at Intersections Using PLC S7-200

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***Abstract*—This thesis focuses on the design and implementation of a traffic light control system at intersections using the PLC S7-200. The author discusses the definition and classification of traffic lights, their structure and operating principles, and the programming techniques for the S7-200. The study highlights the advantages of using PLC S7-200 for traffic light control, such as cost-effectiveness and ease of installation and maintenance. The thesis also covers the configuration of the PLC, memory organization, and programming languages (Ladder Logic and Statement List). The author acknowledges the limitations of the project, noting that it only covers a simple intersection and lacks detailed circuit and component information.**

***Index Terms*—traffic light, PLC, S7-200, Ladder Logic, Statement List**

I. Introduction

The thesis addresses the increasing number of vehicles on the road and the resulting traffic congestion. It emphasizes the importance of traffic lights in ensuring smooth traffic flow and safety. The author chose to use the PLC S7-200 for traffic light control due to its advantages, such as cost-effectiveness and ease of maintenance. The project aims to create a practical model and explore the potential applications of PLC in various fields, including traffic light control and automation in production. The author acknowledges the limitations of the project, noting that it only covers a simple intersection and lacks detailed circuit and component information [1]. Related earlier ICTU undergraduate theses provide context for this English summary [2], [3], [4]. Published articles on the methods and subject of this project provide context for this English summary [5], [6]. Published books on the methods and subject of this project provide context for this English summary [7].

II. Methods

The thesis details the structure and operating principles of traffic lights, including their classification and the programming techniques for the S7-200. The author explains the memory organization of the PLC, including the program memory, parameter memory, and data memory. The programming languages used are Ladder Logic and Statement List, with a focus on the organization and execution of the program. The author describes the configuration of the PLC, including the setup of input and output ports, and the use of Step 7 Micro/Win software for programming. The study does not report specific numerical evaluations or performance metrics [1].

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III. Results

The document describes traffic-light structure and operating principles and outlines a control program using the Siemens S7-200 PLC and Step 7 Micro/Win. It explains the controller's hardware configuration, memory organization, input and output expansion, and programming concepts. The scope is a simple intersection. The source conclusion explicitly says that equipment constraints prevented construction of a complete working model. It gives no measured traffic-flow result and no completed field installation. The reported output should therefore be read as a limited design and programming study [1].

IV. Discussion

The author acknowledges that the project is limited to a simple intersection and lacks detailed circuit and component information. The study highlights the potential of PLC S7-200 in traffic light control and automation, but notes that a more comprehensive model is needed for practical implementation. The author suggests that further research and development are necessary to address the limitations of the current project and to explore more complex scenarios [1].

V. Conclusion

The thesis outlines a traffic-light controller for a simple intersection using the S7-200 and Step 7 Micro/Win. It brings together a description of signal operation, PLC hardware, memory, input and output, and the proposed control program. The author states that a complete model could not be constructed because of equipment and time constraints, and that the circuit and component description remained preliminary. The work is thus a design exercise and a basis for future implementation rather than evidence of a finished or evaluated traffic-control system [1].

References

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