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Design and Implementation of a Web-Based Control and Monitoring System using Siemens S7-1200 PLC

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Abstract: *This paper outlines the design and execution of a web-based control and monitoring system tailored for industrial process automation utilizing the Siemens S7-1200 Programmable Logic Controller (PLC). The system facilitates remote supervision and management of motors and temperature sensors through a secure web interface that requires login authentication for access. The proposed framework incorporates PLC–HMI communication, web server hosting, and real-time data visualization, enabling users to start and stop motors, monitor temperature readings, and oversee system performance from a distance. The design utilizes Siemens TIA Portal (V17) for programming and configuration, WinCC RT Advanced for HMI design, and an HTML–CSS–JavaScript front-end for the web interface. The experimental setup showcases effective control, minimal response latency (less than 100 ms), and dependable system operation during continuous use. This system offers an efficient, scalable, and secure solution for automation and remote process management driven by Industry 4.0.*

Keywords*:* Web-Based Control, Siemens S7-1500, PLC, Industrial Automation, Remote Monitoring, HMI, IoT.

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