

ABSTRACT

The food and beverage processing industry in Indonesia faces significant challenges in meeting increasingly stringent food safety standards and growing consumer demands. In the first quarter of 2023, this sector contributed 38.61% to the non-oil and gas processing industry GDP and 6.47% to the national GDP, highlighting its strategic role in the economy. PT XYZ, a producer of pasteurized milk, addresses these needs by developing a Human-Machine Interface (HMI) system to support the pasteurization process a critical stage that requires precise control of temperature, airflow, and timing to eliminate pathogenic microorganisms without compromising nutritional content. The HMI system is designed to enable real-time and accurate monitoring and control in compliance with applicable industrial safety standards.

The HMI system design adopts the waterfall method, consisting of five main stages: preliminary study, software learning, system design, testing, and conclusion. The ISA-101 standard is used as a reference to ensure a consistent, ergonomic, and user-oriented interface design. The developed system includes key features such as a login window for access security, a home window as the main menu, and a station window for real-time monitoring of the pasteurization process. The platform used is Wonderware InTouch AVEVA, integrated with a MySQL database for historical data recording. The system supports three user levels with different access rights. Testing was conducted using black-box testing and validation based on ISA-101. The results show that all system components passed the tests with a score of 100%, indicating the system's readiness for implementation. This research successfully addresses the problem formulation and design objectives, offering a practical solution for PT XYZ to digitize its production process more efficiently and safely.

Keywords: Human Machine Interface, Pasteurization, ISA-101, Waterfall