Sensor Contactless Water Level Measurement Using and Linear Regression Method

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ABSTRACT

This research aims to develop a contactless liquid level measurement system for the food and beverage industry using the ultrasonic sensor HCSR04 and linear regression method. The system is expected to avoid product contamination due to direct contact with the sensor and produce accurate measurements. Experiments were conducted using the ultrasonic sensor HCSR04, Arduino Uno microcontroller, and beaker glasses with capacities of 1000 ml, 500 ml, and 250 ml. The success analysis of the contactless liquid level measurement with the ultrasonic sensor HCSR04 was performed using the linear regression method to achieve low error values and enhance the production efficiency in the food and beverage industry. The research results show that this system can measure liquid levels with an error of approximately ±2% for a 1000 ml beaker glass, ±4% for a 500 ml beaker glass, and ±19% for a 250 ml beaker glass. The high error in the 250 ml beaker glass is likely due to the beaker's smaller diameter compared to the sensor size, making the measurements inaccurate. The lowest measurement error was found in the 1000 ml beaker glass. This research concludes that the contactless measurement system helps prevent contamination and ensures product hygiene while improving production efficiency in the industry.

Key Words: *Contactless Level Measurement, ultrasonic HCSR04 sensor, linear regression.*