SOYMILK BOTTLE FILLING AND CLOSING CONTROL SYSTEM USING ARDUINO UNO MICROCONTROLLER

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ABSTRACT

Soy milk is increasingly favored as an alternative to animal-based milk, especially for individuals with lactose intolerance. The growing demand presents an opportunity for small and medium enterprises (SMEs) to enhance their production capacity. However, the manual process of filling and sealing bottles remains a challenge in maintaining production efficiency. This study aims to design and implement an automated soy milk bottle filling and sealing system based on the Arduino Uno microcontroller to improve production speed and product quality consistency. The system includes an E18-D80NK proximity sensor for bottle detection, a 12V water pump for filling, an AC motor for sealing, as well as an MG996R servo motor and a stepper motor for bottle positioning. Test results show that the system is capable of filling 500 ml bottles with a liquid volume reaching 490 ml—close to full capacity and without overflow—within 9.6 seconds, and sealing the bottles automatically in 4.83 seconds, with high sensor accuracy and stable actuator performance. This system is considered effective in improving production efficiency and quality at the SME scale.

Keywords: Soy Milk, Arduino Uno, Automation, Bottle Filling, Bottle Capping, MSMEs.