

DESIGNING AND DEVELOPING A VENDING MACHINE WITH RFID-BASED FOOD AND BEVERAGE ORDERING SYSTEM

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ABSTRACT

Technological advancements in food and beverage service systems within corporate environments demand faster, more practical, and efficient solutions, especially to overcome limited break times, long queues, and ineffective manual transactions. Conventional vending machines generally still rely on cash or credit card payments, which are less efficient in modern workplaces. Based on this background, this study aims to design and develop an automated RFID-based vending machine capable of recording transactions and managing stock in real time via a cloud-based platform—Google Spreadsheet. This research focuses on developing a vending machine prototype using an ESP32 microcontroller integrated with an RFID reader, keypad, infrared sensor, LCD, and Google Spreadsheet for transaction logging and stock updates. Food distribution is handled using a DC geared motor and infrared sensors to ensure the correct quantity per order, while beverage distribution is managed separately. Testing results show a 100% success rate in reading RFID cards and processing single-menu and multi-menu orders. Additionally, transaction data logging to the spreadsheet was achieved with 100% accuracy. Therefore, the developed system is deemed effective in improving employee break time efficiency as well as the accuracy of stock and transaction management.

Keywords: Vending Machine, RFID, ESP32, Automated Ordering, Google Spreadsheet