ABSTRACT

Development of a Self-Checkout System with Loyalty-Based Discount Implementation Using the Recency, Frequency and Monetary Value Algorithm

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In recent months, the retail sector in Indonesia has faced significant pressure due to the weakening purchasing power of consumers, as reflected in the sluggish growth of household consumption. To retain customer loyalty and encourage repeat purchases, many retailers have adopted loyalty-based discount strategies. However, the effectiveness of such programs is often hindered by long checkout queues, especially during promotions or weekends. This study aims to develop a self-checkout system prototype based on ESP32 hardware and a Flutter application, integrated with the RFM (Recency, Frequency, Monetary) algorithm to automatically provide loyalty-based discounts. The system also supports digital payment methods to enhance transaction convenience. Test results indicate that the self-checkout system can significantly accelerate the payment process, reduce queues, and offer rewards in the form of loyalty discounts, thereby increasing customer preference for the store. This system offers an innovative solution to address operational challenges in modern retail amid current economic uncertainties.

Keywords: *Self-Checkout, Loyalty Discounts, Flutter, ESP32, Retail Efficiency*