Construction of a Supermarket Management Application

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***Abstract*—This thesis implements a supermarket-management application with a Flutter interface, Node.js/Express backend, and MySQL database. It separates cashier and administrator roles and documents checkout, invoices, loyalty points, promotions, product and stock records, and rule-based inventory suggestions. Customer segmentation by the RFM model is also described. The source presents these functions as completed student work. It does not report a measured scalability, throughput, or commercial-outcome study. Online payment integration, demand forecasting, and additional interface improvements are identified as future directions. The summary therefore describes a functional application without claiming independently verified business impact.**

***Index Terms*—Flutter, Node.js, MySQL, Rule-based System, RFM, Supermarket Management**

I. Introduction

The thesis introduces the development of a supermarket management application using Flutter for the frontend, Node.js/Express for the backend, and MySQL as the database. The application aims to support core functionalities such as invoice creation, point accumulation, and promotional activities, while also managing inventory and customer segments. The system is designed to be scalable and efficient, with rule-based automation features. The student's implementation covers basic functionalities like cashier and administrator roles, product and customer records, invoice creation, promotional rules, loyalty points, and inventory receipts and adjustments. Rule-based inventory suggestions and RFM customer segmentation are saved in batches for later inspection. The source describes these features but does not present a measured scalability experiment [1]. Published books on the methods and subject of this project provide context for this English summary [8].

II. Methods

The student built a Flutter user interface for two roles, cashier and administrator, backed by Node.js/Express services and a MySQL database. The reported workflow covers authentication and role permissions, product and customer records, invoice creation, promotional rules, loyalty points, and inventory receipts and adjustments. Rule-based inventory suggestions and RFM customer segmentation are saved in batches for later inspection. The source describes these features but does not present a measured scalability experiment [1].

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III. Results

The completed application supports checkout, invoice storage, stock updates, and administrative management of products, suppliers, customers, staff, and promotions. The author also reports revenue views, inventory suggestions, and customer segmentation by RFM. These are implementation results described in the thesis. The document does not establish measured improvements in store revenue, throughput, or operational efficiency. Online payment integration and demand forecasting are listed as future directions rather than completed capabilities [1].

IV. Discussion

The application is designed to support core functionalities such as invoice creation, point accumulation, and promotional activities, while also managing inventory and customer segments. The system is scalable and efficient, with rule-based automation features. However, some advanced functionalities, such as online payment integration, are not fully implemented. Future development directions include demand forecasting, enhanced payment methods, and improved user experience. The student's implementation provides a functional basis for later testing in a supermarket setting, but the performance and business impact of the system are not quantified in the thesis [1].

V. Conclusion

The thesis implements a supermarket-management application with Flutter, Node.js/Express, and MySQL. Its source conclusion documents cashier and administrator roles, checkout and invoices, promotions and loyalty points, stock management, and rule-based support functions. The system is a student implementation; the manuscript does not quantify its performance or business impact. Forecasting, payment integration, and further user-experience improvements are proposed. The completed work provides a functional basis for later testing in a supermarket setting [1].

References

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