

PENGEMBANGAN SISTEM POINT OF SALES DENGAN INTEGRASI GEMINI UNTUK PERAMALAN STOK BARANG OTOMATIS BERBASIS WEB

Oleh:

Mohammad Rezzy Al Zamzammi, NIM 2215051104

Program S1 Pendidikan Teknik Informatika

Jurusan Teknik Informatika

Fakultas Teknik dan Kejuruan

Universitas Pendidikan Ganesha

Email: rezzy@student.undiksha.ac.id

ABSTRAK

Pengelolaan stok apotek masih menghadapi kendala kekurangan maupun kelebihan persediaan obat akibat sistem POS konvensional yang belum memiliki fitur prediktif. Penelitian ini bertujuan membangun sistem POS berbasis web yang terintegrasi dengan AI Gemini untuk peramalan stok otomatis, serta menguji fungsionalitas, penerimaan pengguna, dan akurasi peramalannya. Penelitian ini merupakan penelitian R&D dengan metode Agile, menghasilkan sistem dengan fitur manajemen produk, transaksi penjualan, pengelolaan stok, laporan penjualan, serta peramalan otomatis berbasis AI Gemini dengan Exponential Smoothing sebagai pembanding, yang diujicobakan pada Apotek Sumber Waras. Hasil Black Box Testing menunjukkan pass rate 100% pada 79 test case, sementara White Box Testing berhasil menelusuri seluruh 66 jalur independent tanpa jalur unreachable. Hasil *User Acceptance Testing* (UAT) menunjukkan penerimaan pengguna sebesar 93,32% dengan kategori Sangat Baik. Pengujian komparatif menunjukkan AI Gemini (MAE 6,63) tidak lebih akurat dibandingkan Exponential Smoothing (MAE 5,21; $\alpha = 0,6$), sehingga Exponential Smoothing ditetapkan sebagai core engine peramalan, sementara integrasi Gemini bersifat eksploratif. Hasil Paired Sample t-Test menunjukkan bahwa mekanisme pre-processing serta validasi dan fallback berkontribusi signifikan secara statistik dalam menurunkan nilai MAE. Berdasarkan hasil tersebut, sistem yang dikembangkan dinyatakan valid secara fungsional, diterima dengan sangat baik oleh pengguna, dan layak digunakan sebagai pendukung operasional pengelolaan transaksi dan persediaan barang pada apotek.

Kata Kunci: Point of Sale (POS), Peramalan Stok, *Exponential Smoothing*, Artificial Intelligence (AI) Gemini, Apotek

DEVELOPMENT OF A WEB-BASED POINT OF SALE SYSTEM WITH GEMINI INTEGRATION FOR AUTOMATIC INVENTORY FORECASTING

By:

Mohammad Rezzy Al Zamzammi, NIM 2215051104

Study Program of Informatics Engineering Education

Department of Informatics Engineering

Faculty of Engineering and Vocational

Universitas Pendidikan Ganesha

Email: rezzy@student.undiksha.ac.id

ABSTRACT

Pharmacy inventory management still faces challenges related to stock shortages and overstocking due to conventional Point of Sale (POS) systems that lack predictive features. This study aims to develop a web-based Point of Sale (POS) system integrated with Gemini Artificial Intelligence (AI) for automatic inventory forecasting, as well as to evaluate its functionality, user acceptance, and forecasting accuracy. This research employed the Research and Development (R&D) approach using the Agile method. The developed system provides product management, sales transaction processing, inventory management, sales reporting, and AI-based automatic inventory forecasting features, with Exponential Smoothing used as a comparison method. The system was implemented at Apotek Sumber Waras. Black Box Testing achieved a 100% pass rate across 79 test cases, while White Box Testing successfully covered all 66 independent execution paths without any unreachable paths. User Acceptance Testing (UAT) yielded a user acceptance score of 93.32%, which falls into the Excellent category. Comparative evaluation revealed that Gemini AI (MAE = 6.63) was less accurate than Exponential Smoothing (MAE = 5.21; $\alpha = 0.6$). Therefore, Exponential Smoothing was established as the core forecasting engine, while the Gemini integration served an exploratory purpose. Furthermore, the Paired Sample t-Test demonstrated that the implemented preprocessing, validation, and fallback mechanisms significantly reduced the Mean Absolute Error (MAE). Based on these findings, the developed system is functionally valid, highly accepted by users, and suitable for supporting pharmacy transaction and inventory management operations.

Keywords: Point of Sale (POS), Inventory Forecasting, Exponential Smoothing, Gemini Artificial Intelligence (AI), Pharmacy