

ABSTRAK

INTEGRASI *XGBOOST* DAN *CHATBOT* AI PADA SISTEM MANAJEMEN PERSEDIAAN PRODUK DENGAN *DEPLOYMENT CLOUD* DENGAN NOTIFIKASI *REAL-TIME*

(2026 : xx + 127 halaman + 40 gambar + 33 tabel)

AULIA SYAFITRI

8TEB

JURUSAN TEKNIK ELEKTRO

PROGRAM STUDI SARJANA TERAPAN TEKNIK TELEKOMUNIKASI
POLITEKNIK NEGERI SRIWIJAYA

Sistem manajemen persediaan ShelfMind dirancang dan dikembangkan untuk mengatasi permasalahan pengelolaan stok manual pada Toko Tika Baru dengan mengintegrasikan algoritma *Extreme Gradient Boosting* (XGBoost) berbasis teknik *Time-Based Feature Extraction* untuk prediksi penjualan dan risiko kadaluarsa produk, serta AI Assistant berbasis *Large Language Model* (LLM) dengan pendekatan *Retrieval-Augmented Generation* (RAG) untuk akses informasi secara interaktif melalui bahasa alami. Sistem dibangun menggunakan arsitektur *multi-tier* yang mencakup lapisan *frontend* (HTML, Tailwind CSS, Alpine.js), *backend* (Node.js/Express.js), layanan *machine learning* (Python/FastAPI), dan basis data (MySQL), dengan *deployment* berbasis *cloud* dan notifikasi *real-time*. Hasil pengujian fungsional *black-box* terhadap 31 skenario menunjukkan tingkat kelulusan 100%, model XGBoost yang dilatih menggunakan 29 variabel prediktif menghasilkan nilai R^2 sebesar 0,8734, MAE sebesar 0,4107 unit per hari, dan RMSE sebesar 0,5081 unit per hari, sedangkan AI Assistant mencapai nilai rata-rata 4,94 dari skala 5,00 dengan latensi respons yang berhasil direduksi sebesar 83,5% melalui mekanisme *caching*, sehingga sistem dinyatakan layak digunakan sebagai solusi manajemen persediaan berbasis kecerdasan buatan untuk UMKM ritel.

Kata Kunci: manajemen persediaan, XGBoost, *Time-Based Feature Extraction*, prediksi penjualan, *Large Language Model*, *Retrieval-Augmented Generation*, AI Assistant, UMKM ritel

ABSTRACT

INTEGRATION OF XGBOOST AND AI CHATBOTS IN A PRODUCT INVENTORY MANAGEMENT SYSTEM WITH CLOUD DEPLOYMENT AND REAL-TIME NOTIFICATIONS

(2026: xx + 127 pages + 40 figures + 33 tables)

AULIA SYAFITRI

8TEB

JURUSAN TEKNIK ELEKTRO

PROGRAM STUDI SARJANA TERAPAN TEKNIK TELEKOMUNIKASI

POLITEKNIK NEGERI SRIWIJAYA

The ShelfMind inventory management system was designed and developed to address the challenges of manual inventory management at Tika Baru Store by integrating the Extreme Gradient Boosting (XGBoost) algorithm—based on Time-Based Feature Extraction techniques for sales forecasting and product expiration risk prediction, as well as an AI Assistant based on a Large Language Model (LLM) with a Retrieval-Augmented Generation (RAG) approach for interactive access to information via natural language. The system is built using a multi-tier architecture that includes a frontend layer (HTML, Tailwind CSS, Alpine.js), a backend layer (Node.js/Express.js), a machine learning service layer (Python/FastAPI), and a database layer (MySQL), with cloud-based deployment and real-time notifications. Black-box functional testing results across 31 scenarios showed a 100% pass rate; the XGBoost model, trained using 29 predictive variables, yielded an R^2 value of 0.8734, an MAE of 0.4107 units per day, and an RMSE of 0.5081 units per day, while the AI Assistant achieved an average score of 4.94 on a scale of 5.00, with response latency successfully reduced by 83.5% through caching mechanisms, thereby validating the system's suitability as an AI-based inventory management solution for retail SMEs.

Keywords: inventory management, XGBoost, Time-Based Feature Extraction, sales prediction, Large Language Model, Retrieval-Augmented Generation, AI Assistant, retail SMEs