

ABSTRAK

PERANCANGAN SISTEM MANAJEMEN PERPUSTAKAAN BERBASIS *INTERNET OF THINGS* MENGGUNAKAN *NAIVE BAYES* DAN METODE TOPSIS UNTUK PREDIKSI KETERLAMBATAN DAN *REWARD* SISWA DI SMK NEGERI 1 TALANG UBI KABUPATEN PALI

(2026: xv + 101 halaman + 60 gambar + 7 tabel)

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Sistem manajemen perpustakaan di SMK Negeri 1 Talang Ubi saat ini masih dikelola secara manual, sehingga rentan terhadap kesalahan pencatatan, keterlambatan pengembalian buku, dan penilaian *reward* yang subjektif. Penelitian ini merancang sistem perpustakaan terpadu berbasis *Internet of Things* (IoT) menggunakan modul *scanner* GM66 dan *QR Code* yang terhubung dengan mikrokontroler ESP32 untuk mengotomatisasi transaksi kunjungan, peminjaman, dan pengembalian buku. Sistem ini diakses melalui antarmuka *website* dan dilengkapi dengan algoritma *Naive Bayes* untuk memprediksi potensi keterlambatan peminjam berdasarkan data historis peminjaman. Hasil prediksi ini diintegrasikan dengan layanan *WhatsApp Gateway* (Fonnte) untuk mengirimkan notifikasi peringatan dini serta tagihan denda secara otomatis kepada siswa. Selain itu, penentuan *reward* bagi siswa aktif dilakukan secara objektif menggunakan metode *Technique for Order Preference by Similarity to Ideal Solution* (TOPSIS) berdasarkan lima kriteria operasional perpustakaan. Berdasarkan hasil pengujian, model *Naive Bayes* mencapai tingkat akurasi yang sangat baik sebesar 0,9975 dari 402 data uji. Pengujian TOPSIS juga berhasil melakukan pemeringkatan secara transparan dengan kriteria frekuensi kunjungan sebagai indikator berbobot tertinggi. Hasil penelitian ini membuktikan bahwa integrasi IoT, kecerdasan buatan, dan sistem pendukung keputusan berbasis *website* mampu bekerja secara efektif dalam memantau sirkulasi perpustakaan, meminimalisir keterlambatan, dan mengapresiasi kedisiplinan siswa.

Kata Kunci: IoT, *QR Code*, *Naive Bayes*, TOPSIS, *WhatsApp Gateway*, perpustakaan

ABSTRACT

DESIGN OF AN INTERNET OF THINGS-BASED LIBRARY MANAGEMENT SYSTEM USING NAIVE BAYES AND TOPSIS METHODS FOR PREDICTING STUDENT OVERDUE RETURNS AND REWARDS AT SMK NEGERI 1 TALANG UBI, PALI REGENCY

(2026: xv + 101 pages + 60 pictures + 7 tables)

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The library management system at SMK Negeri 1 Talang Ubi is currently managed manually, making it prone to recording errors, delayed book returns, and subjective reward assessments. This research designs an integrated library system based on the Internet of Things (IoT), utilizing a GM66 scanner module and QR codes connected to an ESP32 microcontroller to automate visit, borrowing, and return transactions. The system is accessed via a web interface and incorporates the Naive Bayes algorithm to predict short-term borrowing potential based on historical data. These predictions are integrated with a WhatsApp Gateway service (Fonnte) to automatically send early warning notifications and fine alerts to students. Furthermore, rewards for active students are determined objectively using the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method, based on five operational library criteria. Testing results show that the Naive Bayes model achieved an excellent accuracy rate of 0.9975 across 402 test data points. The TOPSIS testing also successfully generated transparent rankings, with visit frequency serving as the highest-weighted indicator. The study demonstrates that integrating IoT, artificial intelligence, and a web-based decision support system effectively streamlines library circulation, minimizes delays, and recognizes student discipline.

Keywords: IoT, QR Code, Naive Bayes, TOPSIS, WhatsApp Gateway, library