

SEPTIAN DWI ANDARESTA, 23.230.0014

ANALISIS KINERJA ALGORITMA NAIVE BAYES DAN ALGORITMA ID3 UNTUK MEMPREDIKSI PENERIMAAN PESERTA DIDIK BARU DI MTs NEGERI BATANG dibawah bimbingan Bapak Eko Budi Susanto, M.Kom., dan Ibu Nur Ika Royanti, M.Kom. 463+xii hal/15 gambar/24 tabel/2 lampiran/40 pustaka (1986 - 2024).

ABSTRAK

Proses seleksi penerimaan peserta didik baru di MTs Negeri Batang masih dilakukan secara manual yang memiliki kendala seperti waktu pengolahan data yang lama, potensi kesalahan dalam pengambilan keputusan, dan kurangnya objektivitas dalam proses seleksi. Penelitian ini bertujuan untuk mengimplementasikan dan membandingkan performa algoritma Naïve Bayes dan ID3 dalam memprediksi penerimaan peserta didik baru. Metodologi penelitian menggunakan pendekatan kuantitatif dengan data historis penerimaan siswa yang mencakup fitur nilai akademik, prestasi non-akademik, asal sekolah, dan status ekonomi. Implementasi algoritma Naïve Bayes menunjukkan tingkat akurasi 83.00% pada *testing set* dan 79.40% pada *cross-validation*, sementara algoritma ID3 mencapai akurasi 89.50% pada *testing set* dan 87.00% pada *cross-validation*. Analisis *feature importance* menunjukkan nilai akademik sebagai faktor paling penting (56.8%), diikuti prestasi non-akademik (28.2%), status ekonomi (8.5%), dan asal sekolah (6.4%). Uji signifikansi statistik dengan $p\text{-value} = 0.0029 < 0.05$ membuktikan perbedaan performa yang signifikan antara kedua algoritma. Hasil penelitian menunjukkan bahwa algoritma ID3 lebih unggul dalam semua metrik evaluasi dengan *accuracy*, *precision*, *recall*, dan *F1-Score* yang lebih tinggi dibandingkan Naïve Bayes. Berdasarkan evaluasi komprehensif, algoritma ID3 direkomendasikan untuk implementasi sistem prediksi penerimaan peserta didik baru di MTs Negeri Batang karena performa yang lebih baik dan interpretabilitas yang tinggi melalui pohon keputusan yang mudah dipahami.

Kata Kunci : Algoritma Naïve Bayes, Algoritma ID3, Prediksi Penerimaan Siswa, Pohon Keputusan, Seleksi Peserta Didik Baru

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PERFORMANCE ANALYSIS OF THE NAIVE BAYES ALGORITHM AND THE ID3 ALGORITHM FOR PREDICTING NEW STUDENT ADMISSIONS AT MTs NEGERI BATANG under the guidance of Mr Eko Budi Susanto, M.Kom., and Mrs Nur Ika Royanti, M.Kom. 463+xii pages/15 figures/24 tables/2 attachments/40 references (1986 - 2024).

ABSTRACT

The selection process for new student admissions at MTs Negeri Batang is still conducted manually, which has constraints such as long data processing time, potential errors in decision making, and lack of objectivity in the selection process. This research aims to implement and compare the performance of Naïve Bayes and ID3 algorithms in predicting new student admissions. The research methodology uses a quantitative approach with historical student admission data that includes academic scores, non-academic achievements, school origin, and economic status features. Implementation of the Naïve Bayes algorithm shows an accuracy rate of 83.00% on the testing set and 79.40% on cross-validation, while the ID3 algorithm achieves 89.50% accuracy on the testing set and 87.00% on cross-validation. Feature importance analysis shows academic scores as the most important factor (56.8%), followed by non-academic achievements (28.2%), economic status (8.5%), and school origin (6.4%). Statistical significance test with $p\text{-value} = 0.0029 < 0.05$ proves significant performance differences between the two algorithms. The research results show that the ID3 algorithm is superior in all evaluation metrics with higher accuracy, precision, recall, and F1-Score compared to Naïve Bayes. Based on comprehensive evaluation, the ID3 algorithm is recommended for implementing a new student admission prediction system at MTs Negeri Batang due to its better performance and high interpretability through easily understandable decision trees.

Keywords : Naïve Bayes Algorithm, ID3 Algorithm, Student Admission Prediction, Decision Tree, New Student Selection