

Implementasi Metode Naive Bayes Dalam Memprediksi Performa Mahasiswa Berdasarkan Aktivitas Akademik Mahasiswa Pada E-Learning Management Systems (EMAS) = Implementation of the Naive Bayes Method in Predicting Student Performance Based on Student's Academic Activities in E-Learning Management Systems (EMAS)

Monika Adhi Permata, author

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Abstrak

E-Learning Management Systems (EMAS) adalah sebuah platform belajar daring yang digunakan oleh Universitas Indonesia (UI). Dengan menggunakan platform EMAS, aktivitas akademik mahasiswa dapat dipantau. Berdasarkan aktivitas akademik mahasiswa, dimungkinkan untuk menentukan klasifikasi performa akademik mahasiswa. Aktivitas akademik yang dimaksud diantaranya adalah mahasiswa mengakses EMAS, mahasiswa mengerjakan quiz di EMAS, dan mahasiswa berpartisipasi forum di EMAS. Pada tugas akhir ini digunakan model klasifikasi Naïve Bayes, yaitu klasifikasi dengan asumsi kondisi antar fitur adalah saling bebas. Hasil performa model dilihat dari nilai Matthew's Correlation Coefficient (MCC) terbesar. Sebelum implementasi, ditentukan proporsi data training dan data testing terbaik. Proporsi 80%:20% dengan periode data 4 minggu adalah proporsi dengan nilai MCC terbesar, yaitu 0,4745. Metode Mutual Information menghasilkan tujuh fitur terpilih, yaitu banyaknya tugas yang diunggah, banyaknya materi yang dikunjungi, banyaknya kunjungan ke start quiz, banyaknya quiz yang diunggah, banyaknya materi dokumen yang dikunjungi, banyaknya forum yang dikunjungi, dan lamanya durasi mengerjakan quiz. Dengan 7 fitur terpilih, performa model naik sebesar 15,15%, dan performa model meningkat lagi sebesar 26,5% jika dilakukan oversampling dengan metode Synthetic Minority Oversampling Technique. Hasil prediksi dari 47 mahasiswa adalah 43 mahasiswa diprediksi benar lulus, 2 mahasiswa diprediksi benar tidak lulus, dan 2 mahasiswa yang diprediksi salah yaitu mahasiswa diprediksi tidak lulus namun sebenarnya lulus.

.....E-Learning Management Systems (EMAS) is an online learning platform that used by the University of Indonesia (UI). By using the EMAS platform, student academic activities can be monitored. Based on the student's academic activities, it is possible to determine the classification of student academic performance. The academic activities in question include students accessing EMAS, students taking quizzes at EMAS, and students participating in forums at EMAS. In this final project, the Naïve Bayes classification model is used, namely classification with the assumption that the conditions between features are independent of each other. The results of the model's performance are seen from the largest Matthew's Correlation Coefficient (MCC). Prior to implementation, the proportion of the best training and testing data is determined. The proportion of 80%:20% with a data period of 4 weeks is the proportion with the largest MCC value, which is 0.4745. The Mutual Information method resulted in seven selected features, namely the number of tasks uploaded, the number of materials visited, the number of visits to the quiz start, the number of quizzes uploaded, the number of document materials visited, the number of forums visited, and the length of duration of taking the quiz. With 7 selected features, the performance of the model increases by 15.15%, and the performance of the model increases again by 26.5% if oversampling is carried out using the Synthetic Minority Oversampling Technique method. The prediction results from 47 students were 43 students were

predicted to pass correctly, 2 students were predicted to fail correctly, and 2 students were predicted to be wrong, namely students predicted not to pass but actually passed.