

PERBANDINGAN *RANDOM FOREST* DAN *SUPPORT VECTOR MACHINE* DALAM MEMPREDIKSI PEMILIHAN JURUSAN SISWA SMK

Oleh

Dwita Ega Lestari Ginting, NIM 2213101005

Program Studi Matematika

Jurusan Matematika

ABSTRAK

Pemilihan jurusan di Sekolah Menengah Kejuruan (SMK) merupakan keputusan penting yang dapat memengaruhi keberhasilan belajar, pengembangan kompetensi, dan kesiapan siswa memasuki dunia kerja. Namun, proses pemilihan jurusan masih sering dilakukan berdasarkan pertimbangan subjektif sehingga berpotensi menyebabkan ketidaksesuaian antara kemampuan akademik siswa dengan jurusan yang dipilih. Penelitian ini bertujuan untuk menganalisis dan membandingkan kinerja algoritma *Random Forest* dan *Support Vector Machine (SVM)* dalam memprediksi pemilihan jurusan siswa SMK berdasarkan data akademik siswa. Penelitian ini menggunakan pendekatan kuantitatif dengan metode klasifikasi pada bidang *Educational Data Mining*. Data yang digunakan berupa nilai mata pelajaran Bahasa Indonesia, Matematika, IPA, IPS, dan Bahasa Inggris sebagai variabel prediktor, sedangkan jurusan siswa dijadikan sebagai variabel target. Tahapan penelitian meliputi *data preparation*, pemodelan menggunakan algoritma *Random Forest* dan *Support Vector Machine*, serta evaluasi model menggunakan *confusion matrix* dan metrik akurasi. Implementasi model dilakukan menggunakan bahasa pemrograman Python. Hasil penelitian menunjukkan bahwa algoritma *Random Forest* memperoleh akurasi sebesar 84,05%, sedangkan algoritma SVM memperoleh akurasi sebesar 90%. Berdasarkan hasil tersebut, algoritma SVM memiliki performa yang lebih baik dibandingkan *Random Forest* dalam memprediksi pemilihan jurusan siswa SMK. Dengan demikian, SVM dapat dijadikan sebagai metode yang lebih efektif dalam membantu pengembangan sistem pendukung keputusan untuk memberikan rekomendasi jurusan yang lebih objektif sesuai dengan kemampuan akademik siswa.

Kata kunci: *Data Mining*, *Random Forest*, *Support Vector Machine*, Klasifikasi, Pemilihan Jurusan SMK.

COMPARISON OF RANDOM FOREST AND SUPPORT VECTOR MACHINE FOR PREDICTING VOCATIONAL HIGH SCHOOL STUDENTS' MAJOR

By

Dwita Ega Lestari Ginting, NIM 2213101005

Mathematics Study Program

Department of Mathematics

ABSTRAK

Selecting a major in a Vocational High School (SMK) is an important decision that influences students' learning outcomes, competency development, and career readiness. However, the major selection process is often based on subjective considerations, which may result in a mismatch between students' academic abilities and their chosen majors. This study aims to analyze and compare the performance of the Random Forest and Support Vector Machine (SVM) algorithms in predicting vocational high school students' major selection based on their academic performance. This research employed a quantitative approach using classification methods in the field of Educational Data Mining. The dataset consisted of students' academic scores in Indonesian Language, Mathematics, Science, Social Science, and English as predictor variables, while the selected major served as the target variable. The research stages included data preparation, model development using the Random Forest and Support Vector Machine algorithms, and model evaluation using a confusion matrix and accuracy metrics. The models were implemented using the Python programming language. The results showed that the Random Forest algorithm achieved an accuracy of 84.05%, while the Support Vector Machine (SVM) algorithm achieved an accuracy of 90%. These findings indicate that the Support Vector Machine (SVM) outperformed Random Forest in predicting vocational high school students' major selection. Therefore, SVM can be considered a more effective method for developing a decision support system to provide objective and accurate recommendations for students' major selection based on their academic performance.

Keywords: Data Mining, Random Forest, Support Vector Machine, Classification, Vocational High School Major Selection.