

ABSTRAK

Penentuan minat akademik mahasiswa merupakan aspek penting dalam mendukung pengembangan kompetensi sesuai potensi yang dimiliki. Namun, proses penentuan minat masih sering dilakukan berdasarkan pertimbangan subjektif sehingga belum sepenuhnya menggambarkan karakteristik mahasiswa. Penelitian ini bertujuan mengembangkan sistem rekomendasi minat akademik berbasis machine learning dengan mengombinasikan algoritma K-Means dan Decision Tree CART untuk menghasilkan rekomendasi yang lebih objektif.

Data penelitian diperoleh melalui kuesioner mahasiswa Program Studi Sistem Informasi Universitas PGRI Madiun dengan 13 indikator yang mencakup perilaku belajar, motivasi, gaya belajar, pengalaman akademik, pengalaman profesional, dan preferensi mata kuliah. Pengolahan data dilakukan menggunakan metode Knowledge Discovery in Database (KDD) yang meliputi seleksi, pembersihan, transformasi data, pembentukan pseudo-label melalui Weak Supervision, clustering menggunakan K-Means, serta klasifikasi menggunakan Decision Tree CART. Model yang dihasilkan kemudian diimplementasikan dalam aplikasi berbasis web menggunakan framework Flask dan Bootstrap.

Hasil evaluasi menggunakan Confusion Matrix menunjukkan bahwa model klasifikasi memperoleh akurasi sebesar 70,59%. Sistem mampu memberikan rekomendasi enam kategori minat akademik, yaitu Pengembangan Aplikasi, Data Science, UI/UX Design, Digital Business, Cyber Security & Jaringan, serta Sistem Informasi (Manajemen & Analisis). Penelitian ini menunjukkan bahwa sistem yang dikembangkan dapat digunakan sebagai pendukung keputusan dalam membantu mahasiswa menentukan arah pengembangan akademik secara lebih objektif.

Kata kunci: Sistem rekomendasi, *machine learning*, K-Means, Decision Tree CART, *Weak Supervision*, minat akademik.

ABSTRACT

Determining students academic interests is an essential aspect of supporting competency development based on their individual potential. However, the process of identifying academic interests is often conducted subjectively, resulting in recommendations that do not fully represent students' characteristics and abilities. This study aims to develop a machine learning-based academic interest recommendation system by employing a hybrid approach that integrates the K-Means and Decision Tree CART algorithms to provide more objective recommendations.

The study utilized questionnaire data collected from students of the Information Systems Study Program at Universitas PGRI Madiun, consisting of 13 indicators covering learning behavior, motivation, learning style, academic experience, professional experience, and course preferences. Data processing followed the Knowledge Discovery in Database (KDD) methodology, including data selection, data cleaning, data transformation, feature selection, pseudo-label generation using the Weak Supervision approach, clustering with the K-Means algorithm, and classification using the Decision Tree CART algorithm. The resulting model was then implemented in a web-based application using the Flask framework and Bootstrap.

Model performance was evaluated using a Confusion Matrix, which showed an accuracy of 70.59%. The developed system successfully generated recommendations across six academic interest categories: Application Development, Data Science, UI/UX Design, Digital Business, Cyber Security & Networking, and Information Systems (Management & Analysis). These findings indicate that the proposed system can serve as a decision support tool or second opinion to assist students in selecting academic interests more objectively.

Keywords: Recommendation System, Machine Learning, K-Means, Decision Tree CART, Weak Supervision, Academic Interest.