ABSTRAK

Nur Fuad Alrasyid.S, 105841102521. Klasifikasi Mahasiswa Berprestasi Menggunakan Algoritma *Fuzzy K-Nearest Neighbors* Berdasarkan Riwayat Akademik Dan Aktivitas Organisasi. Program Studi Informatika Fakultas Teknik Universitas Muhammadiyah Makassar. Di bimbing oleh Muhammad Faisal dan Muhyiddin AM Hayat.

Penentuan mahasiswa berprestasi di perguruan tinggi umumnya masih dilakukan secara manual dengan menitikberatkan pada aspek akademik, sehingga berpotensi menimbulkan subjektivitas, ketidakkonsistenan, dan ketidakefisienan dalam pengambilan keputusan. Permasalahan ini mendorong perlunya pendekatan berbasis data yang mampu mengintegrasikan aspek akademik dan non-akademik secara objektif. Penelitian ini bertujuan untuk membangun model klasifikasi mahasiswa berprestasi menggunakan algoritma *Fuzzy K-Nearest Neighbors* FKNN berdasarkan riwayat akademik dan aktivitas organisasi. Data penelitian diperoleh dari 112 mahasiswa Universitas Muhammadiyah Makassar yang mencakup data akademik, prestasi, dan keaktifan organisasi. Tahapan penelitian meliputi pra-pemrosesan data, *feature engineering*, pembobotan fitur, penerapan algoritma *FKNN*, serta evaluasi model menggunakan *confusion matrix* dan *5-fold cross validation*. Hasil pengujian menunjukkan bahwa model *FKNN* dengan parameter terbaik $k = 5$ dan $m = 2.0$ mampu mencapai akurasi sebesar 91,3%, *precision* 81,82%, *recall* 100%, dan *F1-score* 90%. Nilai *recall* yang tinggi menunjukkan bahwa seluruh mahasiswa berprestasi berhasil teridentifikasi tanpa kesalahan klasifikasi negatif. Berdasarkan hasil tersebut, dapat disimpulkan bahwa algoritma *FKNN* efektif dan stabil dalam mengklasifikasikan mahasiswa berprestasi dengan mempertimbangkan ketidakpastian data dan tingkat kemiripan antar mahasiswa. Implikasi penelitian ini adalah tersedianya sistem pendukung keputusan yang objektif dan efisien bagi perguruan tinggi dalam proses seleksi mahasiswa berprestasi, serta menjadi dasar pengembangan sistem klasifikasi berbasis data yang lebih adil dan transparan di lingkungan pendidikan tinggi.

Kata Kunci : Klasifikasi, *FKNN*, mahasiswa berprestasi

ABSTRACT

Nur Fuad Alrasyid.S, 105841102521. *Classification of High-Achieving Students Using the Fuzzy K-Nearest Neighbors Algorithm Based on Academic History and Organizational Activities. Informatics Study Program, Faculty of Engineering, Muhammadiyah University of Makassar. Supervised by Muhammad Faisal and Muhyiddin AM Hayat.*

Determining high-achieving students in higher education is generally still done manually, with an emphasis on academic aspects, potentially leading to subjectivity, inconsistency, and inefficiency in decision-making. This problem drives the need for a data-driven approach capable of objectively integrating academic and non-academic aspects. This study aims to develop a classification model for high-achieving students using the Fuzzy K-Nearest Neighbors (FKNN) algorithm based on academic history and organizational activities. The research data was obtained from 112 students at Muhammadiyah University of Makassar, covering academic data, achievements, and organizational activities. The research stages included data preprocessing, feature engineering, feature weighting, application of the F-KNN algorithm, and model evaluation using a confusion matrix and 5-fold cross-validation. Test results showed that the F-KNN model with the best parameters of k = 5 and m = 2.0 achieved an accuracy of 91.3%, a precision of 81.82%, a recall of 100%, and an F1-score of 90%. The high recall value indicates that all high-achieving students were successfully identified without negative classification errors. Based on these results, it can be concluded that the F-KNN algorithm is effective and stable in classifying high-achieving students, taking into account data uncertainty and the level of similarity between students. The implications of this research are the availability of an objective and efficient decision support system for universities in the selection process for high-achieving students, as well as the basis for developing a fairer and more transparent data-based classification system in the higher education environment.

Keywords: *Classification, FKNN, high-achieving students*