

ABSTRAK

Perkembangan teknologi yang pesat meningkatkan kebutuhan pengguna terhadap laptop yang sesuai dengan kebutuhan dan anggaran, namun banyaknya pilihan yang tersedia sering menyulitkan pengguna dalam menentukan pilihan. Penelitian ini membangun sistem rekomendasi laptop menggunakan kombinasi metode *User-Based Collaborative Filtering* dan *K-Medoids clustering* untuk mengatasi masalah *user cold-start*, yaitu kondisi ketika pengguna baru belum memiliki riwayat interaksi. Data yang digunakan berasal dari dataset *Amazon Laptop Reviews Enriched* di platform *Hugging Face* terdiri dari 32.759 ulasan laptop. Tahapan penelitian mencakup *preprocessing* data, pengelompokan menggunakan *K-Medoids*, membangun model *Collaborative Filtering*, serta evaluasi performa sistem. Pengujian *clustering* dilakukan dengan variasi jumlah kluster $k=2$ hingga $k=15$ menggunakan 5 atribut. Hasil terbaik diperoleh pada $k=8$ dengan nilai *silhouette score* sebesar 0,7049 yang menunjukkan kualitas kluster baik. Hasil *clustering* digunakan untuk menentukan kelompok laptop yang sesuai dengan preferensi pengguna lalu sistem merekomendasikan laptop populer pada kluster tersebut, sedangkan rekomendasi untuk pengguna lama menggunakan pendekatan *User-Based Collaborative Filtering* berbasis *Cosine Similarity*. Sistem dievaluasi menggunakan *Leave-One-Out Cross Validation*, nilai kesalahan terendah diperoleh pada jumlah tetangga $k=5$ dengan MAE sebesar 1,3358 dan RMSE sebesar 1,6466. Hasil penelitian menunjukkan bahwa kombinasi metode *User-Based Collaborative Filtering* dan *K-Medoids clustering* dapat digunakan untuk membangun sistem rekomendasi laptop yang mampu memberikan rekomendasi bagi pengguna baru maupun pengguna lama.

Kata kunci: Sistem Rekomendasi, Collaborative Filtering, K-Medoids, User Cold-Start, MAE, RMSE.

ABSTRACT

The rapid development of technology has increased users' need for laptops that match their requirements and budgets. However, the large number of available options often makes it difficult for users to determine the most suitable choice. This study develops a laptop recommendation system by combining User-Based Collaborative Filtering and K-Medoids Clustering to address the user cold-start problem, a condition in which new users have no interaction history. The dataset used in this study is the Amazon Laptop Reviews Enriched dataset from the Hugging Face platform, consisting of 32,759 laptop reviews. The research stages include data preprocessing, clustering using K-Medoids, building a collaborative filtering model, and evaluating system performance. Clustering was tested using a range of clusters from $k=2$ to $k=15$ based on five attributes. The best result was obtained at $k=8$ with a silhouette score of 0,7049, indicating good klaster quality. The clustering results were used to determine the laptop group that best matched user preferences, after which the system recommended popular laptops within the selected klaster. For existing users, recommendations were generated using a User-Based Collaborative Filtering approach based on cosine similarity. The system was evaluated using Leave-One-Out Cross Validation, and the lowest prediction error was achieved with $k=5$ neighbors, resulting in an MAE of 1,3358 and an RMSE of 1,6466. The results show that the combination of User-Based Collaborative Filtering and K-Medoids Clustering can be used to build a laptop recommendation system capable of providing recommendations for both new and existing users.

Keywords: Recommendation System, Collaborative Filtering, K-Medoids, User Cold-Start, MAE, RMSE.