

# SISTEM REKOMENDASI WISATA JEMBER BERBASIS *IMPLICIT FEEDBACK* MENGGUNAKAN METODE *HYBRID FILTERING*

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## ABSTRAK

Sektor pariwisata di Kabupaten Jember memiliki potensi besar, namun wisatawan sering mengalami kesulitan menemukan destinasi yang sesuai akibat kelebihan informasi (*information overload*). Sistem rekomendasi konvensional umumnya bergantung pada data *explicit feedback* seperti rating, yang rentan terhadap masalah *cold-start* karena minimnya partisipasi pengguna dalam memberikan penilaian secara manual. Penelitian ini mengembangkan JemberTrip, sebuah sistem rekomendasi wisata berbasis *implicit feedback* (riwayat klik pengguna) yang mengombinasikan tiga metode: *Content-Based Filtering* (CBF) menggunakan model Transformer all-MiniLM-L6-v2 untuk ekstraksi fitur semantik, *Memory-Based Collaborative Filtering* (CF) berbasis kemiripan pola klik antar-pengguna, dan *Hybrid Filtering* sebagai penggabungan keduanya melalui *Min-Max Normalization* dan pembobotan *Alpha*. Sistem diuji menggunakan 56 data destinasi wisata dan 1.185 rekaman klik dari 100 pengguna simulasi, dengan skema *10-Fold Cross Validation* dan metrik evaluasi *Precision@6*, *Recall@6*, dan *F1-Score*. Hasil pengujian menunjukkan CBF ( $K=10$ ) mencapai *F1-Score* sebesar 52,21%, CF ( $K=30$ ) mencapai 11,19%, sedangkan *Hybrid Filtering* ( $K=30$ ,  $Alpha=0,6$ ) mencapai 12,51%, meningkat 1,32% dibandingkan *Memory-Based CF* tunggal pada seluruh metrik evaluasi secara konsisten. Hasil ini membuktikan bahwa metode *Hybrid Filtering* mampu memperbaiki kelemahan *Memory-Based Collaborative Filtering* tunggal terkait data *sparsity* dan *cold-start* dengan memanfaatkan kekuatan pemahaman semantik dari *Content-Based Filtering*.

Kata kunci: *collaborative filtering*, *content-based filtering*, *hybrid filtering*, *implicit feedback*, *semantic embedding*, sistem rekomendasi

# JEMBER TOURISM RECOMMENDATION SYSTEM BASED ON IMPLICIT FEEDBACK USING HYBRID FILTERING METHOD

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## ABSTRACT

*The tourism sector in Jember Regency holds significant potential, yet tourists often struggle to find suitable destinations due to information overload. Conventional recommendation systems typically rely on explicit feedback data such as ratings, which are vulnerable to the cold-start problem due to low user participation in manual rating. This research develops JemberTrip, a tourism recommendation system based on implicit feedback (user clickstream) that combines three methods: Content-Based Filtering (CBF) using the all-MiniLM-L6-v2 Transformer model for semantic feature extraction, Memory-Based Collaborative Filtering (CF) based on similarity of user click patterns, and Hybrid Filtering that merges both approaches through Min-Max Normalization and Alpha weighting. The system was tested using 56 tourist destination records and 1,185 click logs from 100 simulated users, evaluated through a 10-Fold Cross Validation scheme with Precision@6, Recall@6, and F1-Score@6 as evaluation metrics. The results show that CBF (K=10) achieved an F1-Score@6 of 52.21%, CF (K=30) achieved 11.19%, while Hybrid Filtering (K=30, Alpha=0.6) achieved 12.51%, a consistent improvement of 1.32% over standalone Memory-Based CF across all evaluation metrics. These findings demonstrate that the Hybrid Filtering method successfully mitigates the limitations of standalone Memory-Based Collaborative Filtering related to data sparsity and cold-start by leveraging the semantic understanding capability of Content-Based Filtering.*

*Keywords: collaborative filtering, content-based filtering, hybrid filtering, implicit feedback, recommendation system, semantic embedding*