

HYBRID CONTENT-BASED FILTERING AND CLASSIFICATION RNN WITH PARTICLE SWARM OPTIMIZATION FOR TOURISM RECOMMENDATION SYSTEM



ABSTRACT

Economic recovery in the tourism sector after the COVID-19 pandemic is one of the main focuses of the Indonesian government at the moment, especially in Bandung City. This research aims to develop a personalized tourist spot recommendation system, by addressing the gaps in the existing literature through the integration of Content-Based Filtering (CBF) and Simple Recurrent Neural Network (RNN) methods that aim to improve recommendation accuracy. This study uses a hybrid approach that combines Term Frequency - Inverse Document Frequency (TF-IDF) and word embedding with the Robustly Optimized BERT (RoBERTa) model to identify similarities between tourist destinations based on their content characteristics. Simple RNN is used to analyze user preference patterns over time, which is then further optimized using Particle Swarm Optimization (PSO). As a result, the Simple RNN model that has been optimized with PSO shows an increased accuracy of up to 94.37%, outperforming other optimizations such as Adam and SGD. This research makes a novel contribution by applying advanced machine learning techniques to improve personalization in travel recommendation systems.

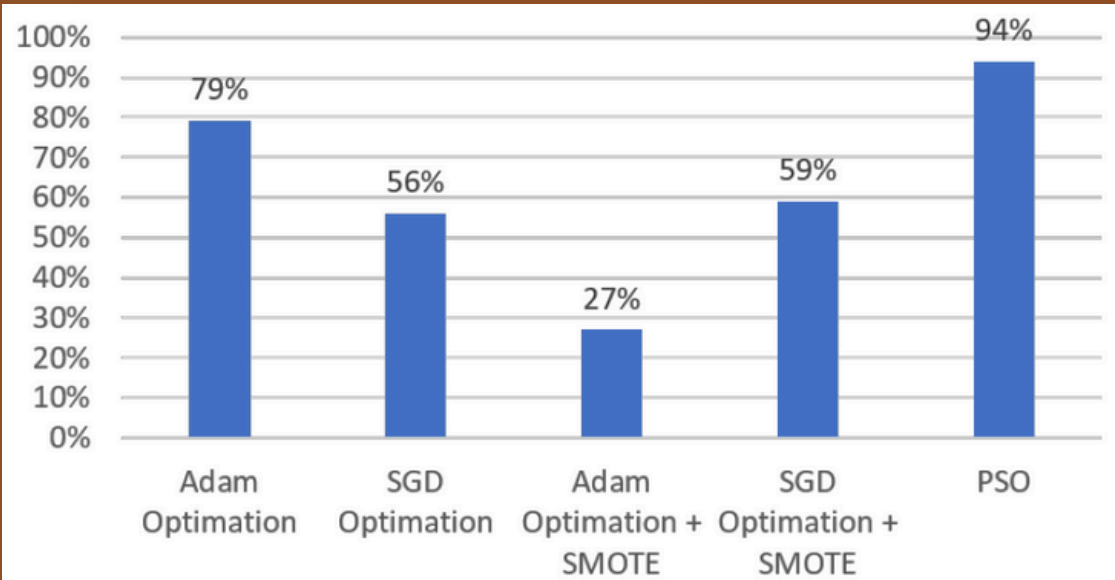
BACKGROUND

The effort to recover the tourism sector's economy after the COVID-19 pandemic has become a key focus for the Indonesian government, particularly in Bandung City. This research aims to develop a more personalized and targeted tourist destination recommendation system. By employing a hybrid approach that combines Content-Based Filtering (CBF) and Recurrent Neural Network (RNN), optimized through Particle Swarm Optimization (PSO), this study successfully increases the system's accuracy to 94.37%. This innovation is expected to help enhance the tourist experience and tourism marketing strategies in Bandung, while also strengthening the city's appeal as a competitive tourist destination.

FOCUS AND SCOPE

This research focuses on developing a hybrid-based tourism recommendation system by integrating Content-Based Filtering (CBF) and Recurrent Neural Network (RNN) optimized with Particle Swarm Optimization (PSO). The aim is to enhance the personalization of tourist destination recommendations in Bandung City post-COVID-19 pandemic. The system combines TF-IDF and RoBERTa to analyze the similarity between tourist destinations based on content, and uses RNN to model user preference patterns. However, the study is limited to user reviews from several verified platforms and is applied only to tourist destinations in Bandung, making the results more relevant to this area and potentially requiring adjustments if implemented elsewhere.

EVALUATION



Adam Optimization mencapai akurasi 79%, lebih tinggi dibandingkan SGD Optimization yang hanya mencapai 56%. Namun, setelah diterapkan SMOTE untuk menangani ketidakseimbangan data, akurasi Adam menurun drastis menjadi 27%, sementara SGD sedikit meningkat menjadi 59%. Optimasi terbaik dicapai oleh PSO, dengan akurasi tertinggi sebesar 94%, menunjukkan bahwa PSO lebih efektif dalam meningkatkan performa sistem rekomendasi dibandingkan metode lainnya.



This research will be designed based on the flowchart as shown in Figure 1 which presents the steps and design applied to produce a recommendation system. Starting from collecting data that will form a dataset to producing a model.

CONCLUSION

The effort to recover the tourism sector's economy after the COVID-19 pandemic has become a key focus for the Indonesian government, particularly in Bandung City. This research aims to develop a more personalized and targeted tourist destination recommendation system. By employing a hybrid approach that combines Content-Based Filtering (CBF) and Recurrent Neural Network (RNN), optimized through Particle Swarm Optimization (PSO), this study successfully increases the system's accuracy to 94.37%. This innovation is expected to help enhance the tourist experience and tourism marketing strategies in Bandung, while also strengthening the city's appeal as a competitive tourist destination.

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