JSCE (Journal of System and Computer Engineering)
Vol.7, No.4, October 2026, pp. 450-461
ISSN (online): 2723-1240
DOI : https://doi.org/10.61628/jsce.v7i4.2866

Research Article Open Access (CC–BY-SA) ■

Implementation of a Movie Recommendation System Using Collaborative Filtering and the K-Nearest Neighbors Technique

Masnur [1,a,*] ; Dian Fahmi R [2,b] ; Hasnawati [3,c] ; Ade Hastuty [4,d] ; A. Irmayani Pawelloi [5,e] ; Syahirun Alam [6,f]

[1,2,3,4] *Department of Informatics Engineering, Faculty of Engineering, Universitas Muhammadiyah Parepare, Parepare, Indonesia*

[5,6] *Department of Electrical Engineering, Faculty of Engineering, Universitas Muhammadiyah Parepare, Parepare, Indonesia*

[a] masnur2010@gmail.com; [b]dianfahmyr04@gmail.com; [c]hasnainformatika@gmail.com; [d] adehastuty@iainpare.ac.id; [e]airmayani@ac.id; [f]alamsyahirun74@gmail.com

** Corresponding author: masnur2010@gmail.com*

Abstract

The rapid growth of video services has greatly expanded the number of available films, making it increasingly difficult for users to identify titles that match their preferences. This study implements a web-based movie recommendation system using collaborative filtering and the K-nearest neighbors (KNN) technique to generate personalized recommendations from similarities among user preferences. An experimental quantitative design was adopted through requirements analysis, system design, implementation, testing, and evaluation. User ratings were used to calculate inter-user similarity, after which KNN selected the most similar users as the basis for recommendation generation. The system was evaluated using black-box testing and a five-point Likert-scale questionnaire covering system performance, information use, system use, and user satisfaction. All eleven functional test scenarios were classified as valid, and the questionnaire variables received mean scores in the good category. These results indicate that the approach is feasible, in terms of functionality and perceived quality, for a small-scale web-based film recommender. The contribution of the study lies in the end-to-end integration of established techniques and in an evaluation that separates functional correctness from user perception and distinguishes both from recommendation accuracy. Recommendation accuracy was not measured quantitatively; validation with prediction-error and ranking metrics on larger datasets is required.

Keywords— *movie recommendation system, collaborative filtering, K-nearest neighbors, information system, web-based recommendation*

1. Introduction

The development of information technology and the Internet has significantly changed how people access digital entertainment, particularly films. Video services such as Netflix, Disney+, Amazon Prime Video, HBO Max, and local streaming platforms now provide thousands of titles that can be accessed at any time (Permadani et al., 2025). Although this variety benefits viewers, it also creates information overload, a condition in which users struggle to identify films that match their interests (Nurfalah et al., 2022). Consequently, users may spend more time searching for a film than consuming the content itself.

Information overload is a central challenge in content-based digital services (Maulidya et al., 2025). Manual search becomes inefficient when users have no specific title in mind, while general

recommendations often fail because viewing histories and individual preferences differ substantially (Maulana Akbar et al., 2023). A system capable of identifying preference patterns and producing personalized suggestions is therefore required to make film discovery faster, easier, and more relevant(Yuliani et al., 2025).

Recommendation systems address this problem by identifying information or products that are likely to be relevant on the basis of prior user characteristics and behavior (Havandi et al., 2025). In streaming services, they can shorten search time, improve user experience and satisfaction, and encourage interaction with the platform (Indriani et al., 2024). Several approaches are available, including content-based filtering, knowledge-based recommendation, hybrid recommendation, matrix factorization, and collaborative filtering. Unlike content-based methods, collaborative filtering exploits similarities in user behavior or preferences and can generate personalized suggestions without requiring detailed film attributes (Salsabilla et al., 2025).

The quality and quantity of rating data nevertheless affect collaborative-filtering performance. Identifying users with sufficiently similar preferences also requires an effective nearest-neighbor procedure (Agustian et al., 2020). K-nearest neighbors (KNN) addresses this need by selecting users with the highest similarity to an active user and using their preferences to predict ratings for unseen films (Masnur et al., 2023)(Ritonga & Muhandhis, 2024). Recommendations derived from these comparable preference patterns are expected to be more relevant than randomly generated suggestions (Nugroho et al., 2025).

Previous studies have demonstrated the potential of collaborative filtering in film and other recommendation domains (Maharani, 2010), as well as the usefulness of KNN for identifying highly similar users (Wahono et al., 2024). However, much of the literature focuses on algorithmic performance using public datasets such as MovieLens and reports accuracy, precision, recall, or mean absolute error (Havandi et al., 2025). Evaluations of complete web-based implementations from the user's perspective remain comparatively limited (Masnur et al., 2022; Masnur & Alam, 2024). Some studies also examine recommendation algorithms as computational models without integrating them into an application that users can operate directly (Adam & Mokodaser, 2025). Yet the success of an information system depends not only on algorithmic accuracy but also on system quality, information quality, usability, and user satisfaction (Fracini & Suhari, 2024).

Table 1 compares representative previous studies. Collaborative filtering and KNN have been applied to film recommendation (Agustian et al., 2020; Nugroho et al., 2025), while other film studies use content-based filtering with cosine similarity on genre or KNN on item attributes (Permadani et al., 2025; Wahono et al., 2024). Content-based approaches have also been applied to e-commerce and tourism (Adam & Mokodaser, 2025; Salsabilla & Utomo, 2025), collaborative-filtering variants have been compared in the book domain (Yahya et al., 2025), and a hybrid recommender has been implemented as a web application for perfumes (Havandi et al., 2025). In parallel, usability evaluations of streaming applications exist (Indriani et al., 2024), but they do not examine how recommendations are generated. Overall, the literature concentrates on algorithm-level performance or on usability in isolation. Studies that connect a working CF–KNN film recommender with a structured evaluation of functional correctness and perceived system quality, while explicitly separating both from recommendation accuracy, remain limited.

Table 1. Comparison of representative previous studies and the present study

Study	Domain and technique	Primary focus	Difference from the present study
Maharani (2010)	Games; model-based collaborative filtering	Design of a recommendation model	Different domain; model-based rather than neighborhood-based CF.
Agustian et al. (2020)	Film; collaborative filtering with KNN	Film recommendation method	Closest methodological precedent. The present study adds a full web implementation with user and administrator functions and a separate functional and user-perception evaluation.

Study	Domain and technique	Primary focus	Difference from the present study
Nugroho et al. (2025)	Indonesian film; collaborative filtering	Film recommendation method	Same domain and CF family. The present study adds explicit KNN neighbor selection (K = 5) in an operational web application evaluated by 120 respondents.
Permadani et al. (2025)	Film; content-based filtering, cosine similarity on genre	Genre-based similarity	Depends on item attributes (genre); the present study uses user rating patterns.
Wahono et al. (2024)	Film; content-based filtering with KNN	Neighbors based on film content	Neighbors are selected from film features; the present study selects neighboring users from rating similarity.
Yahya et al. (2025)	Books; user-based CF, item-based CF, SVD	Comparison of CF variants	Algorithm comparison with error metrics in another domain; the present study delivers a film web application with user-centered evaluation.
Havandi et al. (2025)	Perfume; hybrid decision tree and TF-IDF (web)	Web-based hybrid recommender	Hybrid and content-oriented; different domain.
Adam & Mokodaser (2025)	E-commerce; content-based, cosine similarity	Recommendation algorithm	Content-based; different domain; not evaluated through user-facing system quality.
Indriani et al. (2024)	Streaming application; PSSUQ questionnaire	Usability evaluation	Evaluates usability only; the present study couples evaluation with a working recommender.
This study	Film; user-based CF, cosine similarity, KNN (K = 5)	Web implementation with functional and user-perception evaluation	Integrates established techniques in an operational Laravel/MySQL application, reports functional and perception evidence separately, and states explicitly that recommendation accuracy was not measured.

To address this gap, the present study develops a web-based movie recommendation system that integrates collaborative filtering with KNN. Collaborative filtering models preference patterns, whereas KNN efficiently identifies the users with the highest similarity(Yahya et al., 2025). Their integration is expected to improve recommendation relevance, system quality, and user experience (Wijaya et al., 2024). The study examines how this approach can be implemented, how the resulting system performs functionally, and how users evaluate system performance, information use, system use, and satisfaction.

The study aims to (1) design and implement the web-based recommendation system; (2) verify its functions through black-box testing; and (3) measure user perception of system performance, information use, system use, and user satisfaction. It is expected that all functional scenarios will produce the specified outputs and that mean questionnaire scores will fall in the good to very good range (Sugiantara et al., 2024). Recommendation accuracy is outside the scope of the experimental evaluation and is discussed as a limitation.

The contributions of this study are as follows. First, it presents an end-to-end implementation of user-based collaborative filtering with KNN (cosine similarity, K = 5, similarity-weighted prediction) in a Laravel and MySQL web application that includes registration, authentication, film rating and review, administrator management, and personalized recommendation components. Second, it applies an evaluation design that reports two types of evidence separately, namely functional correctness (black-box testing) and user perception (a five-point Likert questionnaire on system performance, information use, system use, and satisfaction, answered by 120 respondents), and it explicitly distinguishes both from recommendation accuracy, which was not quantitatively evaluated. Third, it provides a documented reference implementation and a discussion of its limitations for subsequent research on recommendation systems and information-system evaluation. Algorithmic novelty is not claimed: the similarity measure, the neighbor selection, and the prediction rule are established techniques. The contribution lies in system integration and evaluation design.

2. Method

2.1 Research Design

This study employed an experimental quantitative design to implement collaborative filtering with KNN in a web-based movie recommendation system. The quantitative component involved numerical user-rating data and Likert-scale questionnaire responses, which were analyzed descriptively to evaluate the implementation. The experimental component comprised system design, implementation, and testing. Black-box testing verified whether each function met its specified requirements, while white-box testing was used during development to examine program logic and the implementation of the recommendation algorithm. User evaluation measured system performance, information use, system use, and satisfaction.

2.2 Research Setting and Duration

The study was conducted online within the academic environment of Universitas Muhammadiyah Parepare using personal computers and the software required for system development. The work was carried out over six months, from January to June 2026, and included the literature review, data collection, requirements analysis, system design, implementation, testing, evaluation, and preparation of the research report.

2.3 Research Object and System Scope

The research object was a web-based movie recommendation system designed to suggest films by identifying other users with similar rating patterns. Its principal functions included registration, authentication, film rating, collaborative-filtering processing, KNN-based neighbor selection, and presentation of a personalized recommendation list. The interface was designed to provide efficient access to these functions.

2.4 Data Collection

Additional Dataset Characteristics. The recommendation dataset used in this study consisted of interaction data collected from the developed movie recommendation system. The dataset contained 120 users and 60 movie items. User preferences were represented using a rating scale from 1 to 5. The ratings were arranged into a user-item matrix where rows represented users and columns represented movie items. This matrix was used as the input for collaborative filtering and neighbor similarity calculation.

Data were collected through a literature review, observation, and a questionnaire. The literature review established the theoretical basis for recommendation systems, collaborative filtering, KNN, and related studies. Observation was used to identify user needs and recurring difficulties in discovering films. The questionnaire used a five-point Likert scale ranging from strongly disagree to strongly agree. Its indicators represented four variables: system performance, application information use, application system use, and user satisfaction.

The similarity between users was calculated using cosine similarity as follows:

$$Similarity(u,v) = \frac{\sum_{i=1}^{n} R(u,i) \times R(v,i)}{\sqrt{\sum_{i=1}^{n} R(u,i)^2} \times \sqrt{\sum_{i=1}^{n} R(v,i)^2}} \quad (1)$$

where R(u,i) represents the rating given by user u for movie i, and R(v,i) represents the rating given by user v for the same movie item. The similarity value was used to select the nearest neighbors in the KNN process.

The predicted rating for an unrated movie was calculated using a weighted average:

$$Predicted\ Rating(u,i) = \frac{\sum_{v \in N} Similarity(u,v) \times R(v,i)}{\sum_{v \in N} Similarity(u,v)} \quad (2)$$

where N represents the selected nearest neighbors. The movies with the highest predicted ratings were ranked and displayed as personalized recommendations.

The implementation used a user-based collaborative filtering approach combined with K-nearest neighbors. User similarity was calculated using cosine similarity. The KNN process selected the five users (K=5) with the highest similarity scores as nearest neighbors. Predicted ratings were generated using a similarity-weighted calculation from neighboring users. Movies with the highest predicted ratings were ranked and presented as personalized recommendation results.

2.5 Collaborative Filtering and K-Nearest Neighbors

Collaborative filtering was used as the principal recommendation approach. A user-film matrix was formed from the available ratings, and the system calculated similarity among users. Users with higher similarity scores provided evidence for predicting the active user's ratings for unseen films. The predicted values were then ranked to identify the highest-scoring recommendations.

KNN selected the K users with the greatest similarity to the active user. A weighted average based on the neighbors' similarity scores was used to estimate each candidate film's predicted rating. Films with the highest predicted ratings were displayed to the user. This procedure was intended to focus the recommendation calculation on the most relevant preference patterns.

2.6 Data Analysis

Questionnaire data were analyzed using descriptive statistics. Mean scores were calculated for each indicator and research variable, then interpreted using five Likert-scale categories: very poor, poor, fair, good, and very good. The interpretation was used to assess the implementation in terms of performance, information use, system use, and user satisfaction.

Recommendation accuracy, for example rating-prediction error (MAE) or ranking metrics such as precision and recall, was not computed in this study. The evaluation is therefore limited to functional correctness and user perception, and its results are not interpreted as evidence of recommendation accuracy.

2.7 Research Framework

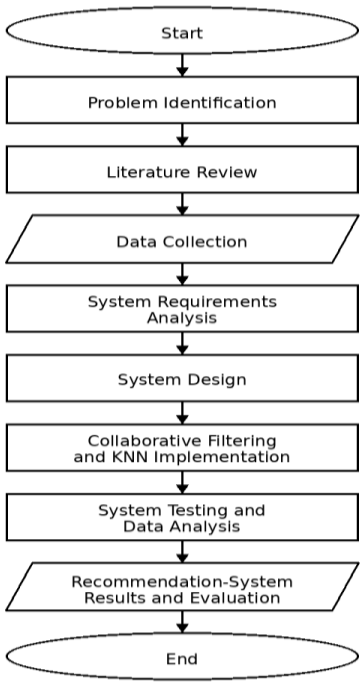


Figure 1. Research framework

The research began with problem identification and a review of the literature on recommendation systems, collaborative filtering, KNN, and evaluation methods. Data were then collected and analyzed to define system requirements. The design stage covered system modeling, the database, and the user interface, followed by implementation of the collaborative-filtering and KNN procedures. The completed application was subjected to functional testing and questionnaire-based evaluation, after which the findings were analyzed and recommendations for further development were formulated.

3. Results and Discussion

The collaborative-filtering and KNN procedure was implemented in a Laravel-based web application. The results encompass the user interface, functional testing, and user evaluation of the completed system.

3.1 System Implementation and Functional Results

3.1.1 User Interface

The application provides a responsive web interface through which users and administrators can access the available functions and the generated film recommendations.

a. Login Page

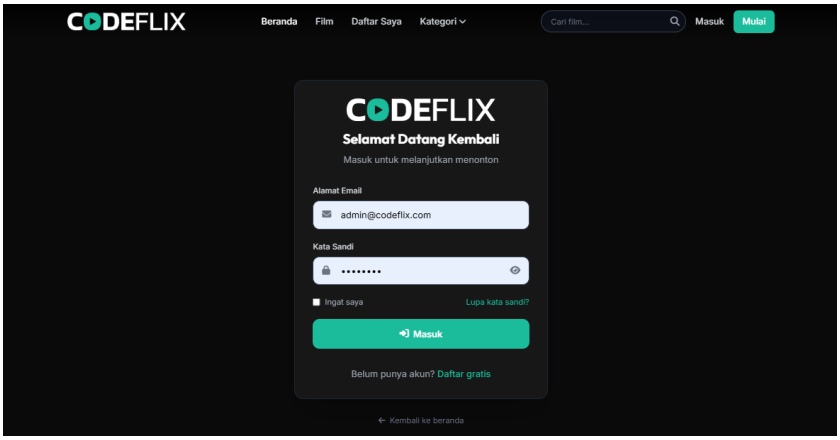


Figure 2. Application login page

The Codeflix login page accepts an email address and password and verifies the credentials against the users table in the MySQL database before granting access.

b. Administrator Dashboard

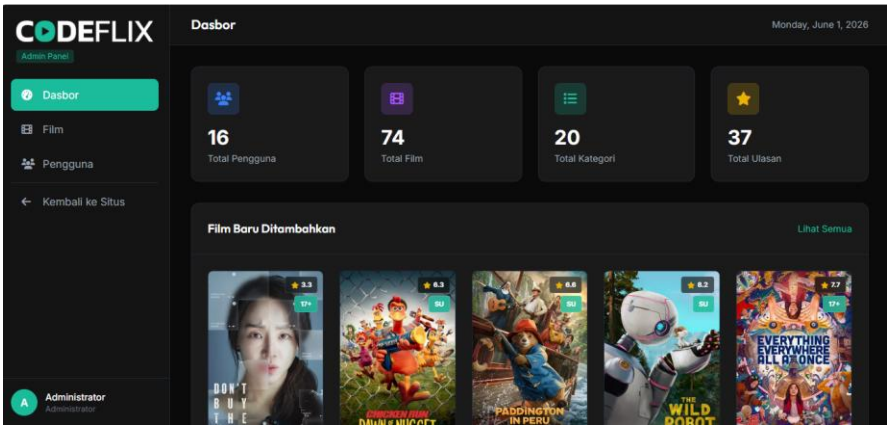


Figure 3. Administrator dashboard

The administrator dashboard presents real-time summary statistics for users, films, categories, and reviews, together with a list of recently added films. It enables the administrator to monitor system activity and content efficiently.

c. Film Management Page

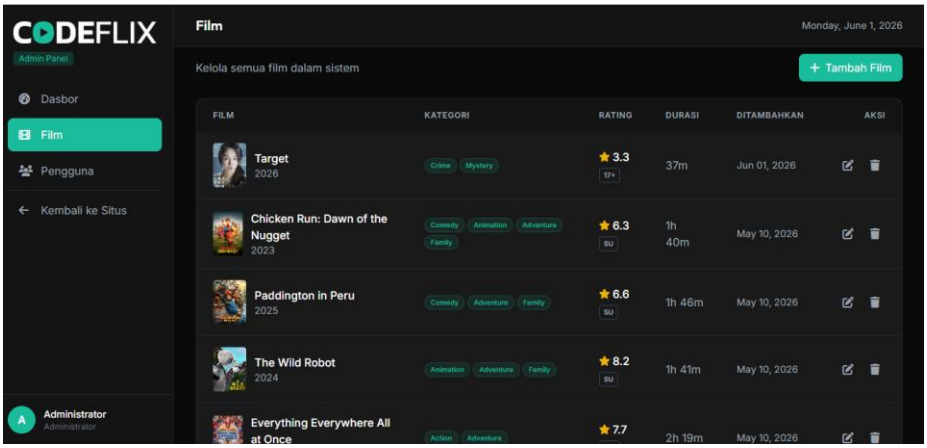


Figure 4. Film management page

The film management page provides a structured catalog containing posters, titles, genres, ratings, durations, dates, and action controls. Administrators can add, edit, or delete catalog records from this page.

d. Film and Recommendation Display

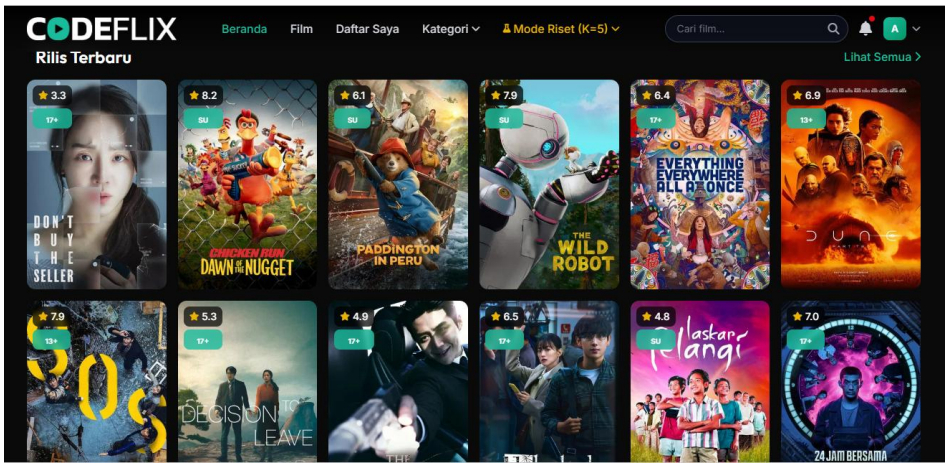


Figure 5. Film catalog and personalized recommendation display

The user-facing film page provides film information and personalized recommendation features. Users can inspect film details, submit ratings and reviews, and receive suggestions through the 'You May Also Like' and 'Personalized for You' components generated by the KNN-based recommendation process.

3.1.2 Black-Box Testing

Black-box testing examined the correspondence between specified inputs, expected behavior, and the system's observed outputs. Table 2 summarizes the functional test results.

Table 2. Black-box testing of the application

No.	Feature	Expected Result	Observed Result	Status
1	Registration	The user successfully creates an account	Successful	Valid
2	Login	The user successfully signs in	Successful	Valid

No.	Feature	Expected Result	Observed Result	Status
3	Search	The requested film is found	Successful	Valid
4	Notification	Notifications are displayed	Successful	Valid
5	Add film	Film data are stored in the database	Successful	Valid
6	Edit film	Film data are updated	Successful	Valid
7	Delete film	Film data are deleted	Successful	Valid
8	Manage users	A user role is changed to administrator	Successful	Valid
9	Film rating	A film rating is stored	Successful	Valid
10	Update profile	The user profile is updated	Successful	Valid
11	Account security	The password is updated	Successful	Valid

The questionnaire evaluation involved 120 respondents consisting of lecturers, university students, school students, and general users. The evaluation instrument used a five-point Likert scale and measured four variables: system performance, application information use, application system use, and user satisfaction.

All eleven test scenarios produced outputs consistent with their expected results and were therefore classified as valid. The registration, authentication, search, notification, administrative, rating, profile, and account-security functions operated without an observed functional error during the specified test cases.

3.1.3 Questionnaire Evaluation

The questionnaire evaluation covered four variables. Figures 6-9 present the indicator means contained in the source data.

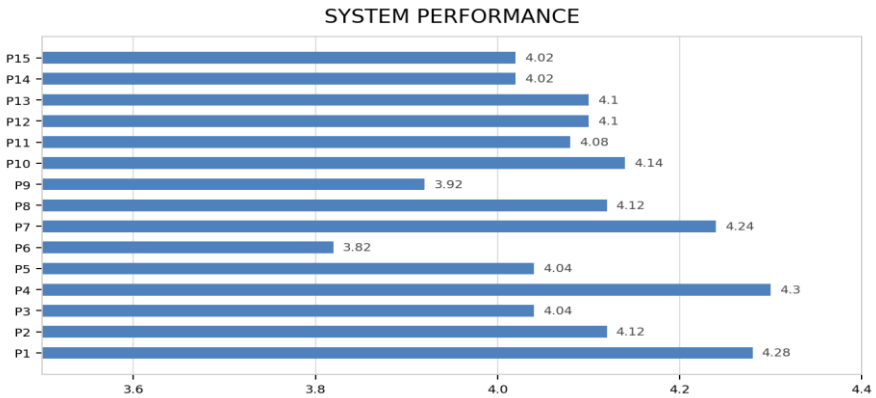


Figure 6. Evaluation of system performance

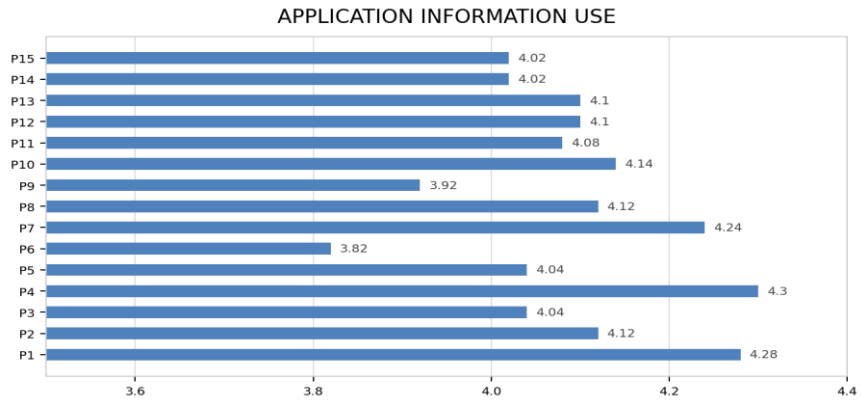


Figure 7. Evaluation of application information use

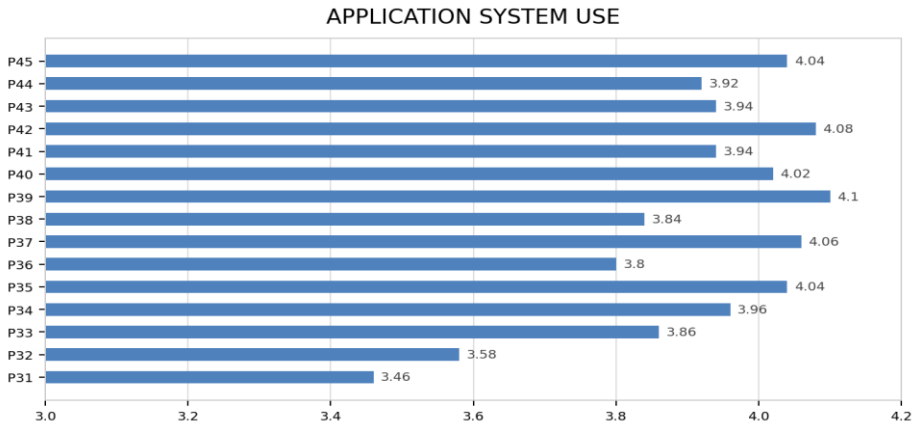


Figure 8. Evaluation of application system use

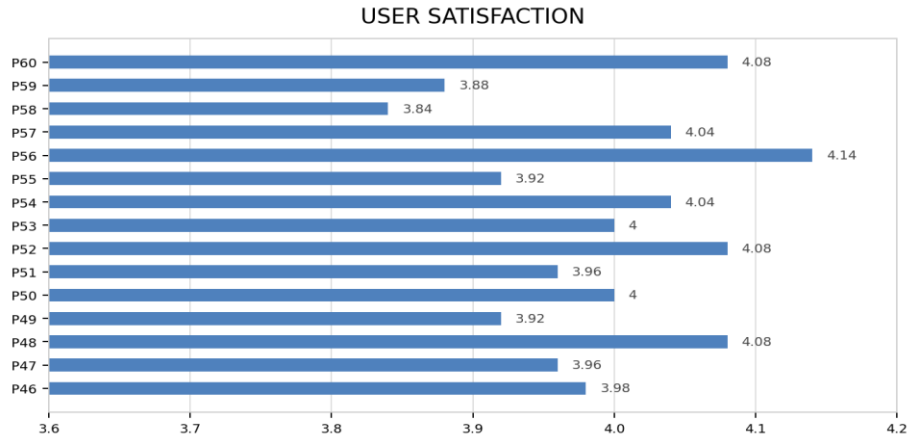


Figure 9. Evaluation of user satisfaction

Recommendation Quality Evaluation. Recommendation accuracy was not quantitatively evaluated in this study; no prediction-error metric (such as MAE) or ranking metric (such as precision and recall) was computed. The results in this section therefore describe functional correctness and perceived quality only, and they should not be interpreted as evidence that the recommended films match user preferences.

3.2 Discussion

3.2.1 System Performance

Most system-performance indicators achieved means above 4.00. P5 recorded the highest mean (4.30), followed by P1 (4.28), P7 (4.24), and P9 (4.14). These results indicate positive perceptions of speed, accessibility, stability, and the system's capacity to support user activities. The lowest means were obtained for P6 (3.82) and P10 (3.92); both remained in the good category but identify areas for targeted optimization.

3.2.2 Application Information Use

The narrative questionnaire results for application information use ranged from 3.82 to 4.26. P20 achieved the highest mean (4.26), followed by P26 (4.20), P24 (4.12), and P16 (4.10). Users therefore generally considered the information understandable, relevant, and useful for decision-making. P27 had the lowest reported mean (3.82), suggesting that completeness, timeliness, or interpretability could still be improved.

3.2.3 Application System Use

System-use scores ranged from 3.46 to 4.10. P39 received the highest mean (4.10), followed by P42 (4.08), P37 (4.06), and P35 and P45 (4.04 each). P31 and P32 obtained lower means of 3.46 and 3.58, respectively. Although overall acceptance remained favorable, these lower scores may reflect limited familiarity with certain features, lower usage frequency, or a need for additional user guidance.

3.2.4 User Satisfaction

User-satisfaction means ranged from 3.84 to 4.14. P56 achieved the highest mean (4.14), while P46, P52, and P60 each received 4.08. P58 recorded the lowest mean (3.84), which nevertheless remained in the good category. These findings indicate that users considered the system helpful and efficient and were generally satisfied with its system quality, information quality, and ease of use.

3.2.5 Comparison with Previous Studies

The findings are consistent with earlier work showing that collaborative filtering and KNN-based neighbor selection can be applied to film recommendation (Agustian et al., 2020; Nugroho et al., 2025). Unlike studies that examine the algorithm in isolation (Adam & Mokodaser, 2025; Yahya et al., 2025), the present study embeds the method in an operational web application and reports functional and perception results. Because recommendation accuracy was not measured, the present results cannot be compared numerically with studies that report error metrics (for example, Yahya et al., 2025). The lowest questionnaire means (P31 = 3.46 and P32 = 3.58 for system use) suggest that additional user guidance may be needed; usability instruments such as PSSUQ (Indriani et al., 2024) could be used in future work to identify the causes more precisely.

3.2.6 Functional Correctness, User Satisfaction, and Recommendation Accuracy

Taken together, the black-box and questionnaire findings show that the developed system operated correctly in the tested scenarios and was positively received by users. These results represent two different types of evidence, and a third dimension, recommendation accuracy, was not measured (Table 3). Passing all black-box scenarios shows that the implemented functions behaved as specified, but it does not show the quality of the recommendations. High questionnaire scores show that respondents perceived the system favorably, but they do not demonstrate that the recommended films match user preferences, because the questionnaire does not measure prediction correctness. Conclusions about accuracy therefore cannot be drawn from this study and require the evaluation described in Section 3.3.

Table 3. Types of evidence in this study and what each can support

Dimension	Evidence and method	What it supports	What it does not support
Functional correctness	Black-box testing, 11 scenarios, all valid	The implemented functions produced the expected outputs in the tested cases.	Absence of all defects; correctness of recommendation content; behavior under heavy load.
User satisfaction (perception)	Five-point Likert questionnaire, 120 respondents, four variables, descriptive means (3.46–4.30, good category)	Respondents perceived performance, information use, system use, and satisfaction favorably.	That recommendations are accurate; that satisfaction results from the algorithm; statistical significance (no inferential test was applied).
Recommendation accuracy	Not measured (no MAE, precision, or recall was computed)	No conclusion about accuracy can be drawn from this study.	That recommendations match user preferences; superiority over other methods; generalization to larger or sparser data.

3.3 Limitations of the Proposed System

This study has several limitations. Most importantly, recommendation accuracy was not quantitatively evaluated: no prediction-error metric such as MAE and no ranking metric such as precision, recall, or coverage was computed, so the quality of the recommendations is not

established by this study. Second, the dataset contains only 120 users and 60 films, and the sparsity of the user–item matrix was not analyzed, so the results may not generalize to larger or sparser data. Third, the method relies on rating history and therefore cannot produce reliable recommendations for new users or new films (the cold-start problem). Fourth, only cosine similarity and K = 5 were used, and the effect of other similarity measures and K values was not examined. Fifth, the method was not compared with baseline approaches such as item-based collaborative filtering, matrix factorization, or a popularity baseline, so no claim of superiority is made.

In addition, the questionnaire data were analyzed descriptively. The questionnaire measured perceived quality and recommendation accuracy, and inferential statistics were applied. Black-box testing covered eleven functional scenarios, as well as scalability and security. Finally, this study was conducted in a single academic environment over a period of six months, which limits external validity.

4. Conclusions

This study implemented user-based collaborative filtering with KNN (cosine similarity, K = 5) in a Laravel-based web application using a dataset of 120 users and 60 movie items. Two types of evidence were obtained. First, all eleven black-box scenarios produced the expected outputs, indicating that the implemented functions operated as specified in the tested cases. Second, questionnaire means from 120 respondents were in the good category for system performance, information use, system use, and user satisfaction (3.46–4.30), indicating positive user perception. Recommendation accuracy, however, was not quantitatively evaluated.

These results support the feasibility of the approach in terms of functionality and perceived quality at the scale of this study. They should not be read as evidence of recommendation accuracy, which remains untested, as do generalization to larger or sparser data and superiority over baseline methods.

Future work should first evaluate recommendation accuracy using prediction-error metrics such as MAE and ranking metrics such as precision, recall, and coverage. It should also address cold-start and data-sparsity problems, examine other similarity measures and K values, compare the method with baseline and hybrid approaches, and use larger and more diverse datasets.

References

Adam, S. I., & Mokodaser, W. G. (2025). Implementasi sistem rekomendasi produk e-commerce menggunakan content-based filtering berbasis cosine similarity. Simtek: Jurnal Sistem Informasi dan Teknik Komputer, 10(2), 418-424. https://doi.org/10.51876/SIMTEK.V10I2.1665

Agustian, E. R., Munir, D., & Nugroho, E. P. (2020). Sistem rekomendasi film menggunakan metode collaborative filtering dan K-nearest neighbors. Jurnal Aplikasi dan Teori Ilmu Komputer, 3(1), 18-21. https://doi.org/10.17509/JATIKOM.V3I1.33208

Fracini, R. S., & Suhari, Y. (2024). Pengaruh kualitas sistem, kualitas informasi dan kualitas layanan terhadap kepuasan pengguna SILALAPBAJA. Elkom: Jurnal Elektronika dan Komputer, 17(1), 176-187. https://doi.org/10.51903/ELKOM.V17I1.1763

Wijaya, A. F., Mulyana, T. M. S., & Liunard, G. J. (2024). Desain user experience (UX) pada website smart city untuk meningkatkan aksesibilitas layanan publik. Jurnal Teknologi dan Manajemen Industri Terapan, 3(2), 69-75. https://doi.org/10.55826/JTMIT.V4I2.582

Havandi, M. R., Azhari, M. R. A., Baihaqqi, A. F., Alfarid, A. Z., & Chrisnawati, G. (2025). Penerapan metode hybrid algoritma decision tree dan TF-IDF untuk sistem rekomendasi parfum berbasis web (Aromania). EDU Research, 6(4), 2495-2508. https://doi.org/10.47827/JER.V6I4.1883

Indriani, M., Ahsyar, T. K., Syaifullah, S., & Fronita, M. (2024). Evaluasi usability aplikasi streaming film menggunakan metode Post Study System Usability Questionnaire (PSSUQ). Jurnal Algoritma, 21(2), 221-231. https://doi.org/10.33364/ALGORITMA/V.21-2.1660

Maharani, H. (2010). Rancangan sistem rekomendasi game dengan model-based collaboration filtering. Jurnal Telematika, 6(1). https://doi.org/10.61769/TELEMATIKA.V6I1.40

Maulana Akbar, F., Poerna Wardhanie, A., & Amelia, T. (2023). Implementasi re-design UI/UX website fumigasi untuk meningkatkan customer experience. Journal of Applied Computer Science and Technology, 4(2), 90-99. https://doi.org/10.52158/JACOST.V4I2.488

Maulidya, L., Suadaa, L. H., Wijayanto, A. W., & Ridho, F. (2025). Multi-source data fusion for data extraction and integration of scientific publications in Academic Institution STIS. Jurnal Nasional Pendidikan Teknik Informatika (JANAPATI), 14(2), 348-363. https://doi.org/10.23887/JANAPATI.V14I2.87050

Masnur, & Alam, S. (2024). Web server based electrical control system analysis for smart buildings. Advance Sustainable Science Engineering and Technology, 6(4), 02404022. https://doi.org/10.26877/ASSET.V6I4.1120

Masnur, M., Alam, S., & Ihsar, M. (2022). Aplikasi sistem informasi geografis (SIG) pemetaan lahan pertanian dan komoditas hasil panen di Kabupaten Sidrap berbasis web. Jurnal Sintaks Logika, 2(1), 229-235. https://doi.org/10.31850/JSILOG.V2I1.1322

Masnur, M., Alam, S., Ismail, M., Wafiah, A., & Saing, F. (2023). Sistem klasifikasi potensi tanaman palawija menggunakan metode K-means. Jurnal INSTEK (Informatika Sains dan Teknologi), 8(2), 396-404. https://doi.org/10.24252/INSTEK.V8I2.42970

Alwi, M., Ivanisa, N. K. B., & Respati, H. T. (2023). Analisis penggunaan website Sistem Informasi Akademik (SIAMIK) menggunakan metode DeLone and McLean. CHAIN: Journal of Computer Technology, Computer Engineering, and Informatics, 1(3), 86-96. https://doi.org/10.58602/CHAIN.V1I3.45

Nugroho, E. W., Rohman, A. N., & Prabowo, D. (2025). Sistem rekomendasi film Indonesia menggunakan collaborative filtering. JATI (Jurnal Mahasiswa Teknik Informatika), 9(5), 9070-9076. https://doi.org/10.36040/JATI.V9I5.15202

Nurfalah, F., Asriyanik, & Pambudi, A. (2022). Sistem rekomendasi event online menggunakan metode content based filtering. Elkom: Jurnal Elektronika dan Komputer, 15(2), 271-279. https://doi.org/10.51903/ELKOM.V15I2.736

Permadani, T. W. I., Prasetya, D. A., & Daniati, E. (2025). Sistem rekomendasi film berdasarkan genre menggunakan metode content-based filtering dengan algoritma cosine similarity. Prosiding SEMNAS INOTEK, 9(3), 1835-1843. https://doi.org/10.29407/B17W5X77

Ritonga, A. S., & Muhandhis, I. (2024). Aplikasi Berbasis Website Untuk Mendeteksi Status Gizi Balita Menggunakan Metode K-Nearest Neighbors (KNN). *Journal of System and Computer Engineering*, *5*(1), 44–55. https://doi.org/10.61628/JSCE.V5I1.1081

Salsabilla, C., & Utomo, D. W. (2025). Sistem rekomendasi wisata Kabupaten Pekalongan dengan content based filtering. Sistemasi: Jurnal Sistem Informasi, 14(1), 2540-9719. http://sistemasi.ftik.unisi.ac.id

Sugiantara, I. N. Y., Nugraha, I. M. B. M., Menanti, G. E., Joyce, J., Lumingas, Y. H., Pradipta, I. M., Dewi, I. A. M. C., & Devi, N. K. T. N. (2024). Analisa pengalaman pengguna pada website SION (Sistem Informasi Online) ITB STIKOM Bali menggunakan metode User Experience Questionnaire (UEQ). Elkom: Jurnal Elektronika dan Komputer, 17(2), 511-520. https://doi.org/10.51903/ELKOM.V17I2.2202

Tarwoto, T., & Kuncoro, A. P. (2019). Evaluasi penerapan sistem informasi Smart Prodi dengan pendekatan DeLone McLean dan framework COBIT 5. MATRIK: Jurnal Manajemen, Teknik Informatika dan Rekayasa Komputer, 18(2), 222-236. https://doi.org/10.30812/matrik.v18i2.367

Wahono, A. R., Saputra, B. A., & Rahman, F. F. (2024). Sistem rekomendasi film menggunakan metode content-based filtering dan algoritma K-nearest neighbors (KNN). Prosiding Seminar Nasional Teknologi Informasi dan Bisnis, 1-6. https://doi.org/10.47701/SENATIB.V4I1.3994

Yahya, A., Informatika, M., Manajemen Informatika dan Komputer Luwuk Banggai, A., Akuntansi, K., & Tinggi Ilmu Ekonomi Pelita Buana Makassar, S. (2025). Book Recommendation System Based on Collaborative Filtering: User-Based, Item-Based, and Singular Value Decomposition Analysis. *Journal of System and Computer Engineering*, *6*(4), 329–342. https://doi.org/10.61628/JSCE.V6I4.2201

Yuliani, S. P., Ati, A., Muharani, P., Riyana, ;, Fatmawati, Q., & Fahmi, F. (2025). Sentiment Analysis in User Reviews of Gojek Application using Natural Language Processing. *Journal of System and Computer Engineering*, *6*(4), 296–305. https://doi.org/10.61628/JSCE.V6I4.2062