



Implementation of the Collaborative Filtering Algorithm in a Cultural Event Recommendation Application for Bekasi City

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Abstract: The dissemination of cultural event information in Bekasi City remains suboptimal, resulting in uneven public participation in cultural activities. This study aims to develop a web-based cultural event recommendation system using User-Based Collaborative Filtering with the Pearson Correlation approach to provide personalized recommendations based on users' preferences. The research employed observation, interviews, and rating data collected from 100 respondents, with the sample size determined using the Slovin formula. The recommendation process involved calculating users' average ratings, determining similarity between users using the Pearson Correlation coefficient, and predicting ratings for cultural events that had not been rated by the target user. The findings indicate that the proposed method is capable of identifying similarities among users based on their rating patterns and generating personalized recommendations for cultural events. In the case study, the predicted rating of User1 for the Pesta Nada event was 3.76, indicating a relatively high level of user preference and making the event suitable for recommendation. The system was further evaluated using Black-Box Testing to verify that the implemented features operated according to the specified functional requirements. The developed system is expected to facilitate public access to cultural event information that aligns with individual preferences and support the Bekasi City Tourism and Culture Office in improving the effectiveness of cultural event dissemination, thereby encouraging greater public participation in cultural activities.

Keywords: Recommendation System; User-Based Collaborative Filtering; Pearson Correlation; Cultural Events; Bekasi City

1. INTRODUCING

Tourism and culture are strategic sectors that play a significant role in strengthening regional identity, promoting the creative economy, and preserving cultural heritage. The integration of information technology into the tourism and cultural sectors has become one of the key approaches to improving public access to information on cultural activities in a faster, broader, and more effective manner [1]. The digitalization of cultural information also represents an implementation of the smart tourism concept, which integrates technology with public services to enhance the quality of users' experiences in accessing information [2].

Bekasi City is one of the regions in Indonesia that possesses rich cultural diversity, reflected through various activities such as art festivals, cultural performances, handicraft exhibitions, cultural seminars, and traditional music performances [3]. These activities serve not only as entertainment but also as educational media and instruments for preserving local cultural heritage. The success of cultural events





largely depends on the effectiveness of information dissemination, enabling event organizers to reach their target audiences more efficiently [4].

According to data from the Bekasi City Tourism and Culture Office, a total of 52 cultural events were organized throughout 2024. Despite the large number of events, public participation remained uneven. Some events, such as Pesta Nada, attracted approximately 6,000 visitors, whereas others, such as Bekasi Berpuisi, were attended by only around 140 participants. This disparity indicates that the dissemination of information regarding cultural events has not yet been optimized and has not effectively reached users according to their individual interests and preferences.

Currently, promotional activities rely primarily on social media, digital billboards (videotrons), government websites, and online print media. This approach follows a one-to-many communication model in which identical information is distributed to all users without considering individual preferences. Consequently, users often receive information about events that do not match their interests, while events that may better suit their preferences remain unnoticed [5]. This condition highlights the need for a system capable of personalizing information so that event recommendations can be delivered more accurately and relevantly to each user.

Recent advances in information technology have enabled the implementation of recommender systems as an effective solution for assisting users in discovering information that matches their needs and preferences. Recommender systems have been widely adopted across various domains, including e-commerce, multimedia services, education, tourism, and social media, due to their ability to improve user satisfaction through personalized information delivery [6]. Within the tourism sector, recommender systems have proven effective in assisting tourists in selecting destinations and activities that align with their characteristics and previous preferences [7].

One of the most widely adopted approaches in recommender systems is Collaborative Filtering. This method utilizes users' rating patterns or interaction histories to identify similarities in preferences and predict items that are likely to be favored by other users [8]. Compared with Content-Based Filtering, Collaborative Filtering offers the advantage of not requiring detailed information about item characteristics. Instead, it relies solely on user interaction data to generate recommendations [9].

The User-Based Collaborative Filtering approach predicts user preferences by measuring the similarity between users. One of the most commonly employed techniques for measuring user similarity is the Pearson Correlation coefficient, as it effectively captures the linear relationship between users' rating patterns while reducing the influence of individual rating biases [10]. Pearson Correlation has been extensively applied in recommender system research due to its ability to provide reliable recommendation accuracy when sufficient rating data are available [11].

Previous studies have demonstrated that Collaborative Filtering can significantly improve recommendation quality across various application domains, including movie recommendations, book recommendations, e-commerce products, tourist attractions, and academic activities [12]. However, most existing studies have primarily focused on commercial applications. The implementation of recommender systems for cultural events, particularly those supporting the dissemination of information on government-organized cultural activities, remains relatively limited. Furthermore, many previous studies have concentrated on recommending tourist destinations rather than dynamically scheduled cultural events [13] [14].

Based on these considerations, this study proposes the implementation of the User-Based Collaborative Filtering algorithm using the Pearson Correlation approach in a web-based cultural event recommendation system for Bekasi City. The novelty of this research lies in applying Collaborative Filtering to provide personalized recommendations for regional cultural events based on community preferences. The proposed system is expected not only to assist users in discovering cultural activities that match their interests but also to support the Bekasi City Tourism and Culture Office in disseminating event information more effectively to targeted audiences. Ultimately, the developed recommendation system is expected to increase public participation in cultural activities while contributing to the sustainable preservation of local cultural heritage [15].



2. RESEARCH METHODOLOGY

The research framework was developed to address the challenges faced by the Bekasi City Tourism and Culture Office in disseminating information about cultural events to encourage greater public participation. The primary issue identified is the limited availability of relevant and personalized event information for the community. The proposed research framework is presented as follows:

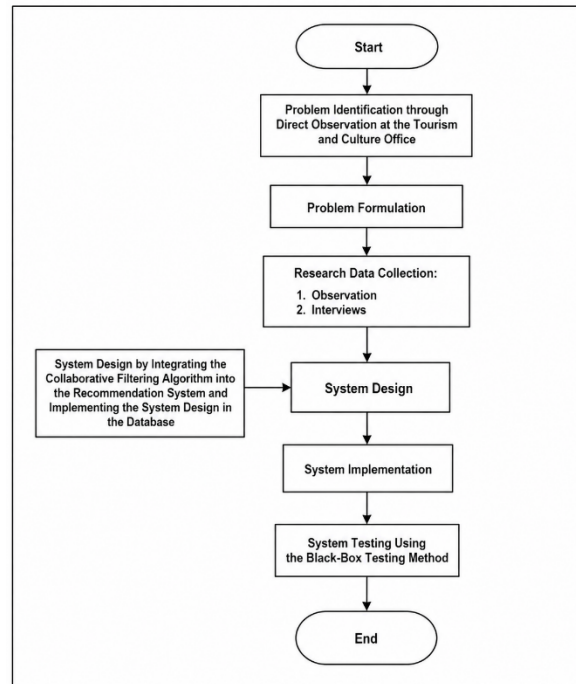


Figure 1. Research Framework

Figure 1 illustrates the research framework adopted in this study. The research process begins with the Start stage, which marks the initiation of the study. The first stage involves problem identification, conducted through direct observation at the Bekasi City Tourism and Culture Office to identify the existing conditions, organizational needs, and challenges related to the research object. After identifying the problems, the researchers formulate the research problem, which serves as the foundation for determining the objectives and direction of the study.

The next stage is data collection, which is carried out using two techniques: observation and interviews. Observation is conducted to obtain first-hand information regarding the existing operational processes, while interviews are performed to gather more comprehensive information from relevant stakeholders concerning system requirements and the challenges encountered in the current process.

The collected data are subsequently utilized during the system design stage. At this stage, the recommendation system is designed by integrating the User-Based Collaborative Filtering algorithm with the Pearson Correlation approach into the system architecture. In addition, the database structure is designed to support data storage and management. This stage aims to develop a recommendation system capable of providing personalized cultural event recommendations based on users' preferences.

The subsequent stage is system implementation, during which the proposed design is transformed into a fully functional web-based application. This process includes developing the user interface, implementing data processing mechanisms, integrating the Collaborative Filtering algorithm, and establishing connectivity with the database management system.

Once the implementation has been completed, the system is evaluated using the Black-Box Testing method. This testing approach is conducted to verify that all system functionalities operate according to the specified functional requirements without considering the internal structure or source code of the



application. The testing results are then used to determine whether the system performs correctly and is free from functional errors.

Finally, after all stages have been completed and the developed system satisfies the defined user requirements, the research process concludes with the End stage.

3. RESULT AND DISCUSSIONS

3.1. Research Population and Respondents

The 15–59 year age range was used as the operational definition of the productive-age target population in this study. This criterion was applied to define the target population of potential users who could access and interact with the web-based cultural event recommendation system. The age criterion was used for respondent selection and was not included as a variable in the Pearson Correlation calculation.

The interview participants consisted of the Head of the Tourism and Culture Office, representatives of cultural studios (sanggar), and members of the community. These participants were selected to obtain perspectives from relevant stakeholders involved in cultural-event management, cultural activities, and public participation. The interview data were used during the requirements-analysis stage to identify the existing cultural-event information dissemination process, user needs, difficulties in discovering relevant cultural events, and functional requirements for the proposed recommendation system. The findings from the interviews subsequently served as a basis for designing the system features and recommendation application.

The interview data were used during the requirements-analysis stage to identify user needs, information-discovery difficulties, existing information-dissemination processes, and functional requirements that informed the design and implementation of the proposed recommendation system. Interviews were conducted during the initial stage of the study as part of the requirements analysis to obtain a comprehensive understanding of users' needs. According to demographic data, Bekasi City has a total population of approximately 2.53 million inhabitants, of whom 1.69 million (66.83%) are within the productive age group (15–59 years). In this study, the productive-age population was selected as the target population. A total of 20 respondents participated in the interview process for the qualitative needs analysis, while 100 respondents were recruited to provide event ratings. These rating data served as the quantitative dataset for generating recommendations using the User-Based Collaborative Filtering algorithm [16].

Based on the productive-age population of 1.69 million individuals (66.83% of the total population) and a margin of error of 10% ($e = 0,1$), the required sample size was determined using the Slovin formula as follows:

$$n = \frac{N}{N \cdot d^2 + 1} = \frac{1.690.000}{1.690.000 \times (0,1)^2 + 1} \approx 99,99 \approx 100$$

The 100 respondents were selected using a random sampling technique. This technique was employed to provide each member of the defined population with an equal opportunity to be selected as a respondent. The sample size of 100 respondents was determined using the Slovin formula.

Based on the Slovin formula calculation, the required sample size was 99.99 respondents. Since the sample size must be expressed as an integer, this value was rounded to 100 respondents. Consequently, this study employed 100 respondents as the research sample, which was considered adequate to represent the target population of 1,690,000 individuals at a 10% margin of error.

3.2. Collaborative Filtering Algorithm Calculation

The event rating instrument used a five-point rating scale ranging from 1 to 5. A rating of 1 represented the lowest level of interest or preference, whereas a rating of 5 represented the highest



level of interest or preference. The rating data were treated as explicit feedback and were used to calculate user similarity and predict ratings for unrated cultural events.

The event rating respondents were users of the proposed application selected from the research population, and their rating data served as the input for the Collaborative Filtering algorithm. To illustrate the recommendation process, this study presents a calculation example involving three users and three cultural events, selected from a total of 52 cultural events available in Bekasi City. This simplified example is intended to demonstrate the computational procedure of the proposed recommendation method. The calculation process consists of the following steps. Step 1: Calculate the average rating of each user using the following equation:

$$\bar{r}_u = \frac{\sum_{i=1}^n r_{u,i}}{n} \quad (1)$$

The calculation example presented in this study involves three cultural events, namely Tarian Nusantara, Pesta Nada, and Inacraft Expo. Table 1 shows the average (mean) rating assigned by each user to these events. The mean rating reflects the overall rating tendency of each user toward the evaluated events. In the User-Based Collaborative Filtering approach, the mean rating is used as a baseline for calculating user similarity and serves as the foundation for predicting ratings of unrated events. The average rating for each user is calculated using the following equation:

Table 1. Rata-rata rating

User	Rating	Mean
User1	[3,4]	$(3+4)/2=3,5$
User2	[5,5,3]	$(5+5+3)/3=4,33$
User3	[5,2,3]	$(5+2+3)/3=3,33$

Based on the results presented above, User2 exhibits the highest mean rating (4.33), followed by User1 (3.50) and User3 (3.33). These differences indicate that each user demonstrates distinct rating behavior and preferences. To account for these variations, the User-Based Collaborative Filtering algorithm utilizes the mean rating to normalize individual rating tendencies prior to computing user similarity and predicting ratings for unrated items. This normalization reduces the influence of users who consistently assign either higher or lower ratings than others, thereby improving the accuracy of the similarity measurement.

Step 2: The similarity between users is then calculated using the Pearson Correlation coefficient, as expressed in the following equation:

$$Sim(u,v) = \frac{\sum_{i \in I_{uv}} (r_{u,i} - \bar{r}_u)(r_{v,i} - \bar{r}_v)}{\sqrt{\sum_{i \in I_{uv}} (r_{u,i} - \bar{r}_u)^2} \cdot \sqrt{\sum_{i \in I_{uv}} (r_{v,i} - \bar{r}_v)^2}} \quad (2)$$

$Sim(u,v)$ = similarity Let represent the similarity between User1 and User2. As presented in Table 2, User1 and User2 have both provided ratings for two cultural events, namely Tarian Nusantara and Inacraft Expo. The deviation (Δ) of each rating from the corresponding user's mean rating is first computed. Subsequently, the deviation values are multiplied to obtain the product of deviations, which forms part of the Pearson Correlation similarity calculation. The detailed computation is presented in Table 2.

Table 2. *Similarity User1 and User2*

Event	r_1	r_2	$\Delta_1 = r_1 - 3,5$	$\Delta_2 = r_2 - 4,33$	$\Delta_1 \times \Delta_2$
Tarian Nusantara	3	5	-0,5	0,67	-0,335
Inacraft	4	3	0,5	-1,33	-0,665

The calculation results indicate that the rating patterns of User1 and User2 exhibit a negative correlation for the two commonly rated cultural events. This is evidenced by the negative values of the deviation products, indicating that the users tend to assign opposite ratings to the same events. Consequently, these negative values contribute to a lower Pearson Correlation coefficient. The resulting numerator is then combined with the denominator to compute the similarity score between the two users, which is subsequently used in the recommendation process of the User-Based Collaborative Filtering algorithm.

The numerator is calculated as follows:

$$\sum_{i \in I_{uv}} (r_{u,i} - \bar{r}_u)(r_{v,i} - \bar{r}_v) = -0,335 + (-0,665) = -1,0$$

The denominator and the corresponding similarity score are calculated as follows:

$$\sum_{i \in I_{uv}} (r_{u,i} - \bar{r}_u)^2 \cdot \sqrt{\sum_{i \in I_{uv}} (r_{v,i} - \bar{r}_v)^2} \quad (3)$$

$$User1 = \sqrt{(-0,5)^2 + 0,5^2} = 0,707 \quad User2 = \sqrt{0,67^2 + (-1,33)^2} = 1,489 \quad Sim(1,2) = \frac{-1,0}{0,707 \times 1,489} = -0,951$$

The calculation results indicate that the similarity score between User1 and User2 is -0.951 . Since this value is close to -1 , it indicates a very strong negative correlation between the two users. This implies that their rating behaviors are highly dissimilar, with opposite preference patterns. Specifically, when User1 assigns a rating above his or her average rating, User2 tends to assign a rating below his or her average rating, and vice versa. Consequently, User2 is unlikely to be considered a suitable neighbor for generating recommendations for User1 in the User-Based Collaborative Filtering process.

The similarity between User1 and User3 is subsequently computed using the same procedure, and the detailed calculations are presented in Table 3.

Table 3. *Similarity User1 and User3*

Event	r_1	r_3	$\Delta_1 = r_1 - 3,5$	$\Delta_3 = r_3 - 3,33$	$\Delta_1 \times \Delta_3$
Tarian Nusantara	3	5	-0,5	1,67	-0,835
Inacraft	4	3	0,5	-0,33	-0,165

r_1 r_3 Table 3 presents the calculation of the Pearson Correlation components used to measure the similarity between User1 and User3 based on the cultural events that were rated by both users, namely Tarian Nusantara and Inacraft Expo. The variables and represent the ratings assigned by User1 and User3, respectively, for each event.

For the Tarian Nusantara event, User1 assigned a rating of 3, whereas User3 assigned a rating of 5. After subtracting each user's mean rating, the resulting deviations were -0.50 ($3 - 3.50$) for User1 and 1.67 ($5 - 3.33$) for User3. Multiplying these deviations yielded a value of -0.835 .

Similarly, for the Inacraft Expo event, User1 assigned a rating of 4, while User3 assigned a rating of 3. The deviations from their respective mean ratings were 0.50 for User1 and -0.33 for User3. The product of these deviations was -0.165 .

The deviation products for both events are negative (-0.835 and -0.165), indicating that User1 and User3 exhibit opposite rating behaviors. Specifically, when User1 assigns a rating above his or her

average rating, User3 tends to assign a rating below his or her average rating, and vice versa. These deviation products are then summed to obtain the numerator of the Pearson Correlation coefficient, while the denominator is calculated as the square root of the product of the sums of squared deviations for each user.

The subsequent calculation yields a similarity score of -0.831 . This value indicates a strong negative correlation between User1 and User3, although the relationship is weaker than that observed between User1 and User2, whose similarity score is -0.951 . In the User-Based Collaborative Filtering approach, users with negative similarity scores exhibit low preference similarity and therefore contribute less to the recommendation prediction process than users with positive similarity scores.

Since the numerator and the User1 denominator have already been calculated in the previous section, the following calculation presents the denominator for User3 and the resulting similarity score.

$$User3 = \sqrt{1,67^2 + (-0,33)^2} = 1,702 \quad Sim(1,3) = \frac{-1,0}{0,707 \times 1,702} = -0,831$$

The similarity score of -0.831 indicates a strong negative correlation between User1 and User3, suggesting that the two users exhibit opposite rating behaviors. Specifically, when User1 assigns a rating above his or her average rating for a cultural event, User3 tends to assign a rating below his or her average rating, and vice versa. Consequently, User3 is considered a less influential neighbor in the User-Based Collaborative Filtering algorithm, contributing less to the prediction of User1's ratings than users with positive similarity scores. Nevertheless, the similarity score is retained in the prediction process because the Pearson Correlation method incorporates all valid user relationships based on commonly rated items.

Step 3: The next stage involves predicting the ratings of unrated cultural events using the User-Based Collaborative Filtering algorithm with the Pearson Correlation approach. The prediction formula and the corresponding calculation are presented:

$$\hat{r}_{u,i} = \bar{r}_u + \frac{\sum_{v \in N(u)} Sim(u,v) \cdot (r_{v,i} - \bar{r}_v)}{\sum_{v \in N(u)} |Sim(u,v)|} \quad (4)$$

Table 4. Rating Prediction Using the Pearson Correlation Method

Event	User1	User2	User3
Tarian Nusantara Cap	3	5	5
Pesta Nada	?	5	2
Inacraft Expo	4	3	3

Table 4 presents the rating data provided by three users (User1, User2, and User3) for three cultural events, namely Tarian Nusantara, Pesta Nada, and Inacraft Expo. The question mark (?) in the User1 column for the Pesta Nada event indicates that User1 has not yet rated this event. Therefore, the missing rating is predicted using the User-Based Collaborative Filtering algorithm with the Pearson Correlation approach, based on the rating patterns of User2 and User3, who have previously evaluated the same event.

The data presented in this table serve as the basis for calculating user similarity and predicting the missing rating, enabling the recommendation system to generate personalized cultural event recommendations that align with User1's preferences.

The following section presents the prediction of User1's rating for the Pesta Nada event.

Table 5. Prediction of User1's Rating for the Pesta Nada Event

User	$Sim(1,v)$	$r_{v,1}(Pesta\ Nada)$	$\bar{r}_v$	$r_{v,1} - \bar{r}_v$
User2	-0,951	5	4,33	0,67
User3	-0,831	2	3,33	-1,33

Since User1 has not previously rated the Pesta Nada event, the missing rating is estimated using the User-Based Collaborative Filtering algorithm based on the contributions of neighboring users who have already rated the same event, namely User2 and User3.

The similarity scores between User1 and the neighboring users are -0.951 for User2 and -0.831 for User3. Subsequently, the deviation of each neighbor's rating for the Pesta Nada event from his or her mean rating is calculated. The deviation values are 0.67 ($5-4.33$) for User2 and -1.33 ($2-3.33$) for User3.

The numerator of the prediction equation is then calculated by multiplying each similarity score by the corresponding rating deviation, as presented below:

$$\text{Numerator} = (-0,951 \times 0,67) + (-0,831 \times (-1,33)) = 0,468$$

The denominator is calculated as the sum of the absolute similarity scores, resulting in the following value:

$$\text{Denominator} = (-0,951) + (-0,831) = 1,782$$

Based on the computed numerator and denominator, the predicted rating for User1 on the Pesta Nada event is obtained as follows:

$$\text{Rating Prediction} = 3,5 + \frac{0,468}{1,782} = 3,76$$

The prediction result indicates that User1 is expected to assign a rating of 3.76 to the Pesta Nada event. This value was generated using the User-Based Collaborative Filtering algorithm with the Pearson Correlation similarity measure. A higher predicted rating reflects a stronger likelihood that the recommended event matches the user's preferences. Consequently, the predicted rating of 3.76 suggests that Pesta Nada is highly relevant to User1 and can be recommended with a relatively high level of confidence.

4. CONCLUSION

Based on the findings of this study, it can be concluded that the User-Based Collaborative Filtering algorithm with the Pearson Correlation similarity measure was successfully implemented in a web-based cultural event recommendation system for Bekasi City. The proposed method effectively utilizes user rating data to calculate users' mean ratings, determine the similarity between users, and predict ratings for events that have not yet been evaluated. This process enables the system to generate personalized recommendations based on users' preference similarities, thereby providing more relevant information than conventional one-to-many information dissemination approaches.

The experimental results demonstrate that the proposed algorithm effectively identifies relationships among users through the Pearson Correlation coefficient. Based on the calculation example, the predicted rating for User1 on the Pesta Nada event was 3.76. This value indicates that the event has a high potential to be recommended because the predicted rating is above the user's average preference level. These findings confirm that the User-Based Collaborative Filtering approach can accurately estimate a user's interest in an event, even when the user has not previously rated that event. Consequently, the developed recommendation system is capable of providing personalized cultural event recommendations that are aligned with individual user preferences.

The implementation of the proposed recommendation system provides benefits not only for the public as end users but also for the Bekasi City Tourism and Culture Office as the organization responsible for managing cultural event information. For users, the system facilitates faster, easier, and more efficient access to cultural events that match their interests, thereby improving the overall information-seeking experience. For the local government, the recommendation system serves as an



effective decision-support tool for disseminating cultural event information to more targeted audiences. Delivering personalized event information is expected to enhance promotional effectiveness, broaden the reach of event publicity, and increase public participation in cultural activities.

Beyond improving access to information, the implementation of a Collaborative Filtering-based recommendation system also has the potential to support the preservation of local cultural heritage. Increased public participation in cultural festivals, art performances, exhibitions, and other cultural activities is expected to strengthen public appreciation of local culture while promoting the sustainability of cultural events in Bekasi City. Therefore, the application of information technology serves not only as a medium for information dissemination but also as an effective tool for supporting the sustainable development of the tourism and cultural sectors.

Despite these contributions, this study has several limitations. The proposed recommendation system relies solely on the User-Based Collaborative Filtering approach using explicit user rating data. This approach is susceptible to challenges such as the cold-start problem, where insufficient user ratings are available, and data sparsity, in which the user-item rating matrix contains many missing values. These limitations may reduce the accuracy and effectiveness of the generated recommendations. Furthermore, this study does not incorporate additional contextual factors that may influence user preferences, such as event categories, event locations, schedules, visit histories, or demographic characteristics.

Another limitation is that the current recommendation process does not explicitly incorporate the characteristics of cultural events. Although the system uses users' rating patterns to identify preference similarities, attributes such as event category, location, schedule, event type, and other contextual information are not currently included in the recommendation calculation. These attributes may provide additional information for determining whether an event is relevant to a particular user, especially when sufficient historical rating data are unavailable.

The proposed User-Based Collaborative Filtering approach relies primarily on users' historical explicit ratings. Consequently, the system may encounter the cold-start problem when a new user has provided only a limited number of ratings or has not yet rated any cultural events. In such situations, the system has insufficient historical preference information to identify reliable neighboring users and generate highly personalized recommendations. In addition, the user-item rating matrix may become sparse as the number of cultural events increases while individual users rate only a small portion of available events.

Therefore, future research may develop a Hybrid Recommendation System that integrates User-Based Collaborative Filtering with Content-Based Filtering. The Collaborative Filtering component can utilize similarities in users' historical rating patterns, while the Content-Based Filtering component can utilize cultural event attributes such as category, location, schedule, and event characteristics. The integration of these approaches is expected to reduce the impact of the cold-start problem and improve the relevance and personalization of recommendations, particularly for users with limited rating histories.

5. CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Nurfiyah: Conceptualization, Methodology, Formal Analysis, Writing Original Draft, Writing Review & Editing. **Aida Fitriyani:** Methodology, Investigation, Data Curation, Validation. **Mohammad Rizqi Rias Firmansyah:** Software, Implementation, Data Curation, Visualization. **Ratna Salkiawati and Hendarman Lubis:** Validation, Supervision, Project Administration.

6. DECLARATION OF COMPETING INTEREST

The authors declare that there are no financial, personal, or professional relationships that could have influenced or potentially affected the research, analysis, or publication of this article.

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8. DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the writing process, the authors used ChatGPT, an AI-assisted technology, for language improvement, grammar checking, paraphrasing, and refinement of the manuscript. The authors reviewed, verified, and revised the output generated by the AI tool and take full responsibility for the final content, originality, accuracy, and integrity of the manuscript.

9. REFERENCES

- [1] M. Aldayel, A. Al-Nafjan, W. M. Al-Nuwaier, G. Alrehaili, and G. Alyahya, "Collaborative Filtering-Based Recommendation Systems for Touristic Businesses, Attractions, and Destinations," *Electronics (Switzerland)*, vol. 12, no. 19, Oct. 2023, doi: 10.3390/electronics12194047.
- [2] C. Huda, Y. Heryadi, Lukas, and W. Budiarto, "Smart Tourism Recommender System Modeling Based on Hybrid Technique and Content Boosted Collaborative Filtering," *IEEE Access*, vol. 12, pp. 131794–131808, 2024, doi: 10.1109/ACCESS.2024.3450882.
- [3] Adeng, "Sejarah Sosial Kota Bekasi," Jul. 2014.
- [4] A. Redi Susanto, "Festival Budaya Sebagai Media Pelestarian Warisan Leluhur di Kabupaten Brebes Kata Kunci," Dec. 2024.
- [5] U. Yuniat, "Komunikasi dan Multikulturalisme di Era Disrupsi Tantangan dan Peluang," Feb. 2019.
- [6] E. Hasan, M. Rahman, C. Ding, J. X. Huang, and S. Raza, "Review-based Recommender Systems: A Survey of Approaches, Challenges and Future Perspectives," Sep. 05, 2025, *Association for Computing Machinery*. doi: 10.1145/3742421.
- [7] A. Solano-Barliza *et al.*, "Recommender Systems Applied To The Tourism Industry: A Literature Review," 2024, *Cogent OA*. doi: 10.1080/23311975.2024.2367088.
- [8] Petrus J. Darus, V. A. Kore Dima, and L. L. Momo, "Penerapan Sistem Rekomendasi Produk pada Marketplace Menggunakan Metode Colaborative Filtering," *Mars: Jurnal Teknik Mesin, Industri, Elektro Dan Ilmu Komputer*, vol. 3, no. 5, pp. 23–33, Oct. 2025, doi: 10.61132/mars.v3i5.1094.
- [9] K. R. Putra and M. A. Rachman, "Perbandingan Metode Content-based, Collaborative dan Hybrid Filtering pada Sistem Rekomendasi Lagu," *MIND Journal*, vol. 9, no. 2, pp. 179–193, Dec. 2024, doi: 10.26760/mindjournal.v9i2.179-193.
- [10] D. Frediansa, A. Mahmudi, and Y. A. Pranoto, "Sistem Rekomendasi Produk Berdasarkan Kesamaan Preferensi Antar Pembeli Dengan Menggunakan Collaborative Filtering Berbasis Web," 2025.
- [11] H. Murtina, "Pengukuran Reliabilitas Menggunakan Pearson Correlation Pada Technique For Order Preference by Similarity of Ideal Solutin (TOPSIS)," *Information Management For Educator And Professionals*, vol. 2, no. 2, p. 78839421, 2018.
- [12] H. Februariyanti, A. Dwi Laksono, J. Sasongko Wibowo, and M. Siswo Utomo, "Implementasi Metode Collaborative Filtering Untuk Sistem Rekomendasi Penjualan Pada Toko Mebel," *Jurnal Khatulistiwa Informatika*, Jun. 2021, [Online]. Available: www.unisbank.ac.id
- [13] R. A. Hamid *et al.*, "How Smart is E-Tourism? A Systematic Review of Smart Tourism Recommendation System Applying Data Management," *Comput. Sci. Rev.*, vol. 39, p. 100337, Feb. 2021, doi: 10.1016/J.COSREV.2020.100337.
- [14] Y. H. Alfaifi, "Recommender Systems Applications: Data Sources, Features, and Challenges," Oct. 01, 2024, *Multidisciplinary Digital Publishing Institute (MDPI)*. doi: 10.3390/info15100660.
- [15] E. D. Permatasari, "Analisis Penyelenggaraan Program Festival Dalam Pelestarian Budaya dengan Perspektif Collaborative Governance," Aug. 2021.
- [16] Sugiyono, *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif dan R&D*. 2013.

