ComicFaves: organizing shelves for favorite comics based on user's affection

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Abstract. This paper proposes ComicFaves, the system enabling users to organize their favorite comics in bookshelves format. Organizing comics in the form of bookshelves, which is different from the favorite list in conventional comic applications, enables us to understand users' preferences visually and intuitively. In the user test, multiple users arranged bookshelves based on some themes. We conducted a basic analysis of the characteristics and trends of the bookshelves. The result suggested that bookshelves for affective keywords more strongly reflect users' individuality and affection than bookshelves for genre information. Moreover, it was suggested that the arrangement of comic titles on bookshelves helped us to understand differences in users' preferences and sensibilities. It is expected that the features obtained from bookshelves could be applied to develop a novel feature space for comics reflecting readers' affection.

Keywords: Bookshelf · Comic Computing · Affective Computing.

1 Introduction

With the digitization of comics, a vast number of comic titles have become entertainment enjoyed on the Web. In existing comic retrieval systems, the author's names or titles can be used as queries to find comics of interest. The more comics there are, the higher the demand for comic retrieval systems. Searching comics with images of backgrounds and characters has recently been proposed [14,11]. However, affection-based information access, such as the kind seen in human recommendations like "What comic is as Heartwarming as title x?" has not been realized. This may cause readers to miss out on encounters with new comics. In this paper, we construct an affective dataset focusing on fan-talking, which means discussing and sharing one's favorite comics. By constructing the affective dataset, we can computationally evaluate the affection for comics and develop comic retrieval and recommendation systems complying with individual preferences.

Fan-talking [5,20] is the act of sharing one's impressions about something like favorite comics in the real world or on social media and recommending them to others. We consider that fan-talking can be utilized as affective information for

the content that can be processed electronically and as a source of affection to describe comics. However, treating fan-talking described in the text as affective resource may be influenced by recommenders' limited writing skills. For example, when someone evaluates a comic as having "a nostalgic atmosphere that makes me want to read it again and again," it can be interpreted in various ways: it might refer to the depiction of characters, the dialogue, or a combination of these elements. Therefore, when computationally analyzing users' affective impressions of comics, we need approaches that can capture fan-talking beyond just textual information. In music information processing, researchers have proposed music retrieval methods based on affective information by utilizing features extracted from playlists, which represent the result of users' music listening preferences [4]. Referring to this approach, we focus on digital bookshelves as a means to analyze collections of comics organized by users' affective impressions, which provide a computational representation of relationships between different comics.

Bookshelves provide visual cues that convey individual preferences without relying on verbal expressions. Although it is impossible to evaluate the details of comics in the same way as the text, bookshelves can be the form that enables users to show their relative affection for comics without requiring verbal ability [9,19]. Furthermore, we can infer how readers perceive these titles by observing the specific comics arranged and their order. Adding meta-information, such as rankings, to the arrangement of books means that the set of comic titles included in the bookshelf and the arrangement itself become meaningful expressions. By representing users' comic preferences as an ordered array, we can achieve affective information and recommendation, similar to the role of playlists in music.

In this paper, we develop the system called **ComicFaves** that allows users to organize their favorite comics in a manner similar to physical bookshelves. In ComicFaves, users can arrange bookshelves of their favorite comics in a ranking format for arbitrary themes. We analyze the arrangement of comics in ComicFaves by multiple users and examine its usefulness as a feature indicating affection for comics.

2 Related Work

Academic dataset construction focusing on comics has progressed primarily around Manga109 [17,1], with recent years seeing further enrichment of comic-related information by adding more data to Manga109. For example, there has been research that annotated the correspondence between dialogues and speakers in the Manga109 dataset to expand the dataset [18,12], aiming to establish a method for automatically estimating the speakers of dialogues [13]. There is also research that aims to extract the unique atmosphere of comics by annotating onomatopoeias within comics [16,2]. Although these papers have increased the richness of the dataset, there is a limitation depending on the comics included in Manga109. ComicFaves is not limited to the Manga109 collection but covers all

comics that can be searched with GoogleBooksAPI[1]. This makes it possible to arrange bookshelves that reflect readers' interest trends. Furthermore, we aim to build a dataset that focuses not on the information extracted from the comics themselves but on how people perceive comics. The accumulation and understanding of affective data regarding comics can potentially serve as the starting point for the future emotional understanding of artificial intelligence towards comics [6].

In our previous research [10], we have explored the method to computationally evaluate the readers' subjective evaluation of comics by using the tendency of the characters' activities As a result, we have found that it is possible to represent the storyline computationally as time-series information by analyzing the appearance rate series, which quantitatively shows the tendency of the character's activities. Other existing studies focus on the size and arrangement of panels and evaluate the storyline of comics from a linguistic perspective [7,8]. However, these studies mainly evaluated individual comics based on the content information, and it is challenging to evaluate comics relative to each other. In this paper, we aim to evaluate the relative standing of favorite comics by focusing on their arrangement of order without dealing with content information. This will make it possible to analyze the relationships between comics, e.g., whether the impressions of comics in close proximity on the bookshelf are similar. The analysis could not be realized by conventional evaluation methods.

3 ComicFaves

In this paper, we propose a system that enables users to organize their favorite comics visually. This oracular inspiration is from physical bookshelves, which is a familiar form to many users.

Many existing comic applications have a feature called a favorites list that allows users to save their favorite comic titles as a list. However, unlike bookshelves, these favorites lists do not allow users to freely arrange the comics spatially. Instead, they often display comic titles in order of their latest update date. For example, in the comic app "Jump+[2]," the favorites list displays comic titles in order of their update date. Additionally, the comic app "LINE Manga[3]" has a bookshelf feature for storing purchased comics, but it only allows sorting by viewing or purchase order. Therefore, it is difficult to understand the relationships between adjacent comic titles or the user's preference trends just by the collection of favorite comics. Furthermore, there is no ranking system to indicate the importance or priority of favorite comic titles. So, users cannot weigh their preferences. The lack of a filtering feature based on some themes means that heavy users who register many comic titles as favorites often find it challenging to discover favorite comic titles that align with a particular theme.

[1] https://developers.google.com/books(accessed June 30, 2025)
[2] https://shonenjumpplus.com/ (accessed June 30, 2025)
[3] https://manga.line.me/ (accessed June 30, 2025)

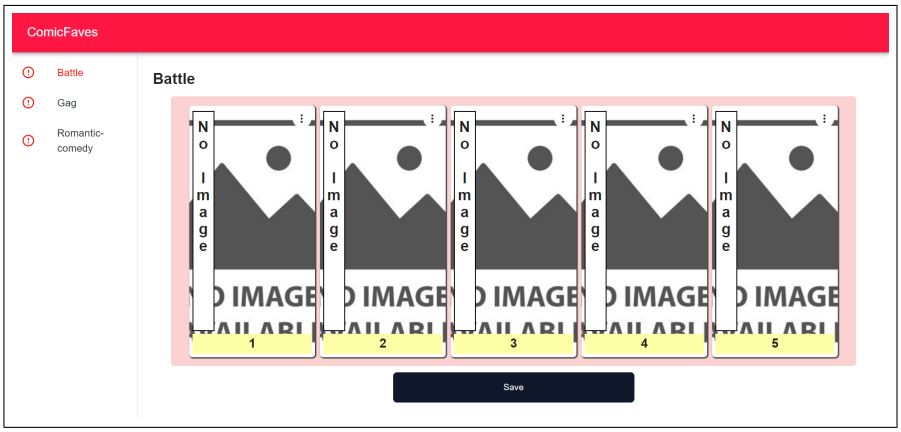

Fig. 1. Front page after logging into ComicFaves. The sidebar on the left side of the screen displays the themes of the bookshelves. In the initial state of each bookshelf, an empty book indicating an unregistered state is shown.

ComicFaves is expected to address these issues. Users of ComicFaves can arrange bookshelves for any themes and organize the comic titles in ranking order. Thereby, it is possible for users to express their sensibilities and favorites.

3.1 Design and Policy

ComicFaves allows users to arrange bookshelves for any theme. This function enables them to visually organize and express their individual preferences and favorite comics. In typical fan talking among comic readers, comic titles are often listed according to genres such as "romance," "fantasy," or based on more affective keywords like "deeply emotional" and "educational." Therefore, ComicFaves allows users to arrange individual bookshelves for any chosen theme.

Users can sort their favorite comics within a bookshelf in ranking order in ComicFaves. Their favorite comic titles are organized by priority for each theme, enabling users to express their preferences more clearly. We believe that the implementation of the ranking feature is useful not only as an organizational tool but also from a data analysis perspective. The arrangement of favorite comic titles within a bookshelf reflects the unique order based on the user's preferences. As a result, it becomes possible to quantitatively analyze each user's preference trends from the bookshelf information. This function allows for evaluating user similarity and popularity within some themes based on not only sets but also series.

3.2 Interface and interactions

Figure 1 shows the front page after the user logs into ComicFaves. The sidebar is located on the left side of the screen, displaying the themes of the bookshelves.

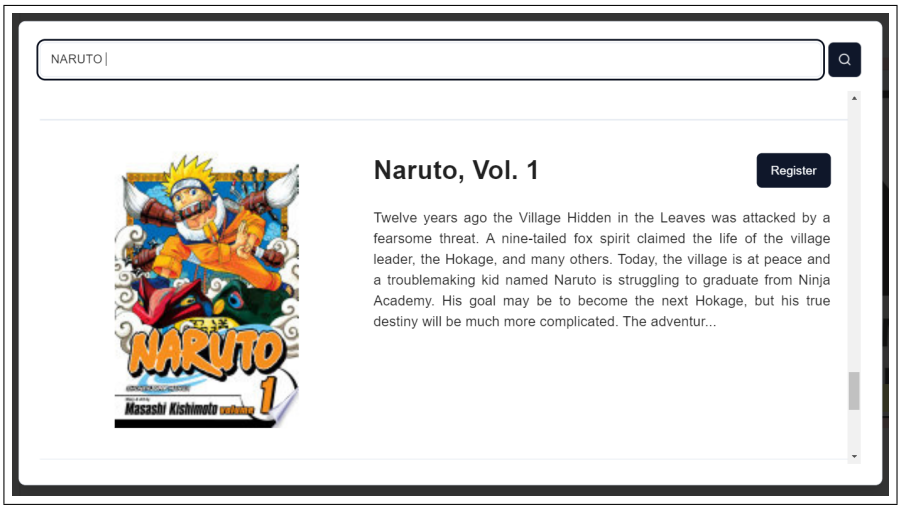

Fig. 2. An example of comic search results within ComicFaves. The figure shows the results when "NARUTO" is used as the query, for example. The search results display an image, title, and summary.

The corresponding bookshelf is displayed after the user selects the theme of the bookshelf they want to edit from the sidebar. In ComicFaves, users rank their favorite comics, with the comic positioned at the far left of the bookshelf being ranked first and the comic at the far right being ranked last.

In the initial state of each bookshelf in ComicFaves, as shown in Figure 1, an unregistered state (empty book) is displayed, and users can register their favorite comic titles of comics in these empty books. To enable users to obtain information about their favorite comic titles from the web, we implement a comic search function. When the user clicks the comic search button from the kebab button displayed at the top right of the book to be registered, a comic search dialog is displayed. By entering the information of the comic they want to register (such as title and author) in the input form displayed in the search dialog and pressing the search button, the related comic information is displayed in the dialog. Figure 2 shows an example of search results when "NARUTO" is used as a query. The comic information in the search results includes an image, title, and summary. For comic searches in ComicFaves, we use the GoogleBooksAPIs provided by Google, which is one of the book search APIs.

By selecting a comic from the search results and pressing the register button, the information of the selected comic is registered to the target book. After registration, the title and image of the selected comic are displayed in the target book. While registering favorite comics on the bookshelf, we implement a feature that allows users to rearrange the comic titles, considering their favorite rankings. The system is designed to support drag-and-drop for rearranging comics, with the rank displayed at the bottom of the book dynamically changing when the

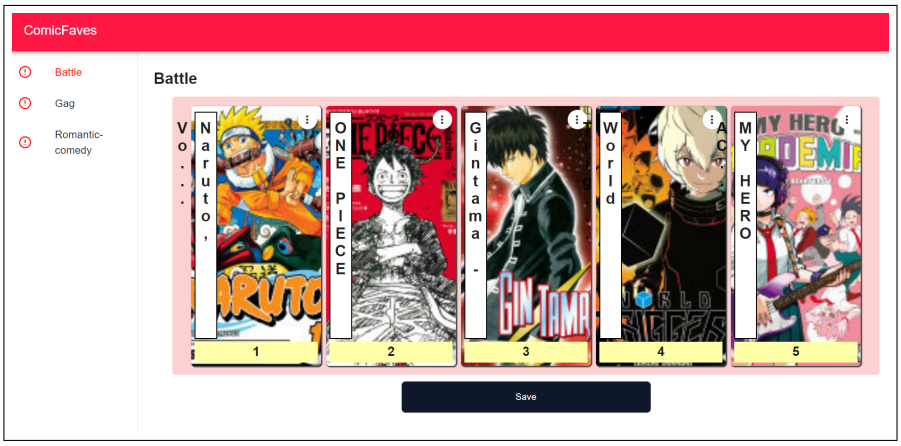

Fig. 3. An example of a completed bookshelf arranged by a user. All the books on the bookshelf have information about the user's favorite comics registered.

arrangement is altered. Figure 3 shows an example of a complete bookshelf arranged by a user. In this figure, all the books on the bookshelf have information about the user's favorite comics registered, displayed as a ranking based on the user's affection.

4 User Test

We targeted undergraduate and graduate students who regularly read comics. In total, 32 students participated in the user test to arrange several bookshelves within ComicFaves.

In this user test, we set the themes for the bookshelves as a genre and affective keywords, as determined by the first author. Genre is a general indicator widely used in labeling comic titles in comic apps and other media. On the other hand, affective keywords reflect the subjective and emotional experiences of readers when they enjoy comics. Affective keywords seem to be more useful for understanding individual preferences and sensitivities. We adopted three genres: "Gag," "Battle" and "Romantic comedy," and three affective keywords: "Thrilling," "Deeply emotional" and "Heartwarming." Participants registered five comics on each bookshelf and ranked them from 1st to fifth place. However, the GoogleBooksAPI treats different volumes of the same comic title as separate books. Since ranking comics is a crucial concept in creating bookshelves in ComicFaves, we restricted participants from registering different volumes of the same comic title in a single bookshelf for this user test.

We focused on the comics selected by many participants ranked highly on the bookshelves for each theme. The characteristics of bookshelves arranged for each theme and the similarities between themes were investigated. Addition-

Table 1. The comic titles selected by n users on the bookshelves for each theme.

	Gag	**Battle**	**Romantic comedy**	**Thrilling**	**Deeply emotional**	**Heartwarming**
$n = 15$	Gintama	—	—	—	—	—
$n = 14$	—	—	Kaguya-sama	—	—	—
$n = 12$	—	Hunter Hunter Jujutsu Kaisen	—	—	—	—
$n = 11$	—	—	My Dress-Up Darling	—	—	—
$n = 10$	Nichijou	—	—	—	—	—
$n = 9$	—	—	Takagi-sama	Haikyu!!	—	—
$n = 8$	—	My Hero Academia	The Quintessential Quintuplets	—	—	—
$n = 7$	—	ONE PIECE	The Dangers in My Heart	—	—	—
$n = 6$	Saiki-kusuo	Kimetsu NARUTO Tokyo Ghoul 3 other titles	—	ONE PIECE Jujutsu Kaisen My Hero Academia	—	—
$n = 5$	—	World Trigger	Wotakoi Nozaki-kun	Kimetsu SLAM DUNK	—	—
$n = 4$	BO-BOBO KochiKame Uncle from Another World	BLEACH	—	Aoashi NARUTO Attack on Titan	Takopi Chainsaw Man	Frieren
$n = 3$	Grand Blue Nozaki-kun 4 other titles	Kaiju No.8 Chainsaw Man	Nisekoi Call of the Night 4 other titles	Kuroko Tokyo Ghoul 5 other titles	Oshi no Ko Blue Period 7 other titles	Space Brothers A Man and His Cat 4 other titles
$n = 2$	Konosuba Hinamatsuri 10 other titles	Magi HELLSING 6 other titles	Horimiya Komi-san 10 other titles	Pinpon Chainsaw Man 4 other titles	NARUTO ONE PIECE 15 other titles	Tikawa NARUTO 15 other titles
$n = 1$	WORKING!! SPY×FAMILY 63 other titles	Ajin GANTZE 47 other titles	citrus YAIBA 61 other titles	Fate BORUTO 66 other titles	Chiikawa Ushijima-kun 77 other titles	COSMOS BEASTARS 103 other titles

ally, we analyzed order and the co-occurrence relationships between comic titles within the bookshelves. The advantages of organizing favorite comics in a ranked bookshelf format rather than just a collection of favorite comics were discussed.

4.1 Analysis of comics on the bookshelf for each theme

We analyzed the comic titles on the bookshelves for each theme. Table 1 shows the comic titles selected by users on the bookshelves for each theme. It was confirmed that every genre had two titles selected by more than 10 users in genre-based bookshelves. It, therefore, suggested that there were some comic titles particularly selected for each genre. On the other hand, no comic titles were selected by more than 10 users on the affective-keywords-based bookshelves. Additionally, the numbers of comic titles selected by only one user on the bookshelves for each affective-keywords were higher than for any of the genres. We considered that affective keywords resulted in a wider diversity of selected comic titles because affective keywords might be polysemous and abstract. Those might lead to varying images evoked by different individuals. This result suggested that analyzing bookshelves for affective keywords in ComicFaves could potentially be applied to user profiling and recommendation systems based on individual sensibilities.

Table 2. The comic titles selected as the top by n users on the bookshelf for each theme.

	Gag	**Battle**	**Romantic comedy**	**Thrilling**	**Deeply emotional**	**Heartwarming**
$n = 9$	Gintama	—	—	—	—	—
$n = 5$	Nichijou	—	—	—	—	—
$n = 4$	—	World Trigger My Hero Academia	My Dress-Up Darling	—	—	—
$n = 3$	—	DRAGON BALL	Kaguya-sama Nozaki-kun The Quintessential Quintuplets	Haikyu!!	—	—
$n = 2$	Konosuba Nozaki-kun	NARUTO Kimetsu Hunter Hunter FullmetalAlchemist	Takagi-san	SLAM DUNK Attack on Titan	School-Live! Madoka Magica The Promised Neverland Assassination Classroom	Natsume Doraemon Space Brothers A Bride's Story Ranking of Kings A Man and His Cat

Let us turn to the subject of the similarities between themes from the comic titles on the bookshelves. We found that some comic titles selected by four or more users overlap between the bookshelves themed "Battle" and "Thrilling."

Additionally, it was observed that comic titles selected for "Thrilling" included not only those selected for "Battle" but also sports-themed comic titles such as "Haikyu!!" and "SLAM DUNK." The result suggested that the affective keywords "Thrilling" could capture comic titles through a concept that spanned across genres like battle and sports. Therefore, it is expected that analyzing bookshelves themed on affective keywords in ComicFaves provides datasets of detailed insights into readers' sensibilities and interests beyond genres.

4.2 Analysis of the ranking of comics on the bookshelf

We focus on the ranking of comic titles on the bookshelf. Table 2 shows the comic titles selected as the top by multiple users on the bookshelf for each theme. "Jujutsu Kaisen" and "Kaguya-sama," which were selected by more than 10 users in Table 1, could not be observed in the same theme in Table 2. This result suggested that they did not receive a high ranking from all users, though many users knew and selected these two titles. Additionally, examining the detailed results of Table 1 and Table 2, we found that all users who included "Konosuba" in their "Gag" bookshelf ranked it as their top. That is, "KonoSuba" received a very high rating from some specific users. We confirmed that it was possible to understand how users evaluated each comic based on the arrangement of comic titles.

Additionally, we analyzed the comic titles on the bookshelf. Some comic titles were selected for the bookshelf by more than 10 users. However, there were no comic titles selected at the top by more than 10 users, This suggested that the top-ranked comic titles for each theme were unique to each user. These results indicated that arranging the books on the bookshelf in order of rank made it possible to understand detailed differences in user preferences and sensibilities.

Table 3. The combinations of comic titles selected by n users on the bookshelf for each theme. For example, "Gintama × Nichijou" is a combination where both "Gintama" and "Nichijou" were ranked between 1st and fifth place.

	Gag	**Battle**	**Romantic comedy**	**Thrilling**	**Deeply emotional**	**Heart warming**
$4 \leq n$	Gintama× Saiki	—	Kaguya-sama× Takagi-san Kaguya-sama× My Dress-Up Darling Kaguya-sama× The Quintessential Quintuplets	—	—	—
$n = 3$	Gintama× Nichijou Gintama× KochiKame Gintama× Saint Young Men	Hunter Hunter× Tokyo Ghoul Hunter Hunter× NARUTO Hunter Hunter× Attack on Titan My Hero Academia× Jujutsu Kaisen	Kaguya-sama× Nozaki-kun Kaguya-sama× Wotakoi My Dress-Up Darling× The Dangers in My Heart	Haikyu!!× My Hero Academia	—	—
$n = 2$	Nichijou× Konosuba Nichijou× Kobayashi's Dragon Maid etc.	Hunter Hunter× Jujutsu Kaisen Hunter Hunter× BLEACH etc.	Kaguya-sama× The Quintessential Quintuplets Kaguya-sama× The Dangers in My Heart etc.	Haikyu!!× SLAM DUNK Haikyu!!× Kurko etc.	Blue Spring Ride× Kimi ni Todoke	Natsume× My New Boss Is Goofy Doraemon× Crayon Shin-chan

To examine whether we can understand differences in user sensibilities by focusing on the rankings, we analyzed both unordered and ordered combinations of comic titles selected by some users on the bookshelf for each theme. Each Table 3 and Table 4 shows unordered and ordered combinations of comic titles selected by some users, respectively. In Table 3, for example, the combination "Gintama × Nichijou" indicates that both "Gintama" and "Nichijou" were ranked between 1st and fifth place. And, in Table 4, "Nichijou × Gintama" is a combination where "Nichijou" was ranked just before "Gintama," like "Nichijou" was ranked 1st and then "Gintama" was ranked 2nd, for example. From Table 3, some combinations were selected by multiple users on the bookshelf for each genre and "Thrilling." These combinations included specific comic titles. For example, the unordered combinations selected by multiple users on the bookshelf for "Battle" often included "HUNTER HUNTER." On the other hand, from Table 4, there were no common ordered combinations selected by three or more users on the bookshelves for each theme. Although we found common combinations selected by two users on the bookshelves for the genre from Table 4, the number of observed combinations was fewer than those in Table 3. Particularly, we did not find any ordered combinations that were common to multiple users on

Table 4. The ordered combinations of comic titles selected by n users on the bookshelf for each theme. For example, "Nichijou × Gintama" is a combination where "Nichijou" was ranked just before "Gintama", like "Nichijou" was ranked 1st and then "Gintama" was ranked 2nd.

	Gag	**Battle**	**Romantic comedy**	**Thrilling**	**Deeply emotional**	**Heartwarming**
$n = 2$	Nichijou× Gintama Gintama× KochiKame	NARUTO× ONE PIECE ONE PIECE× Jujutsu Kaisen Tokyo Ghoul× Fullmetal Alchemist NARUTO× Hunter Hunter Kimetsu× Hunter Hunter	My Dress-Up Darling× The Quintessential Quintuplets Kaguya-sama× Takagi-san Nisekoi× Kaguya-sama The Dangers in My Heart× My Dress-Up Darling My Dress-Up Darling× Kaguya-sama	—	—	—

the bookshelves for affective keywords. These results suggested that even users who selected the same comic titles or unordered combinations of titles assigned different rankings to those comic titles on the bookshelf.

4.3 Analysis of comics on bookshelves using a co-occurrence network

We constructed a co-occurrence network with comics appearing in users' bookshelves as nodes and performed clustering analysis on this network. Based on comic co-occurrence relationships, we conducted a quantitative clustering analysis to examine whether the clustering results show commonalities beyond the bookshelf themes. The identification of commonalities beyond bookshelf themes in clustering results suggests the possibility of extracting features that reflect users' latent preferences and affective impressions. This could lead to developing recommendation systems based on readers' affective impressions, unlike conventional genre-based recommendations in comic recommendation systems.

We constructed co-occurrence networks from bookshelves for "Battle" and "Thrilling." In these networks, edge weights between nodes represent the strength of relationships among comics. In the previous section, we confirmed that we can extract detailed differences in individual users' preferences and affective impressions by adding ranking information to bookshelf arrangements. Therefore, we can construct a network that better reflects users' preferences and affective impressions by adding ranking difference weights to edges connecting comics in the co-occurrence network. This enables clustering that more accurately reflects similarities in readers' affective impressions. For this reason, we added ranking difference weights to the edges connecting comics. The set of users who stored comic A and B in the same bookshelf is denoted as U. And, the rank given

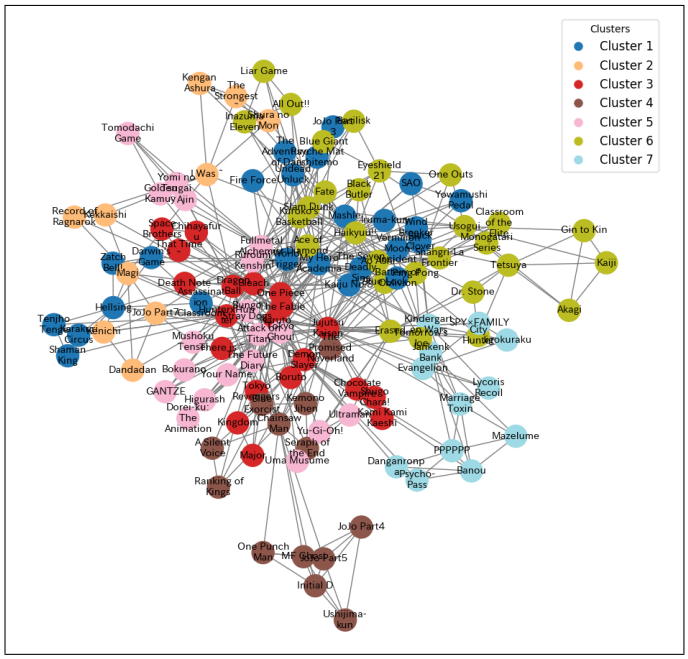

Fig. 4. The clustering results for the co-occurrence network constructed by comic titles observed on the bookshelves for "Battle" and "Thrilling." The nodes represent comics that the participants arranged on the target bookshelves.

by each user u_i to comics A and B are represented as $rank_i(A)$ and $rank_i(B)$, respectively. The edge weight $w(A, B)$ is defined as the following equation (1).

$$w(A,B) = \sum_{i=1}^{N} \left(5 - |rank_i(A) - rank_i(B)|\right). \tag{1}$$

As we analyzed the top five comic titles in each bookshelf, we used the constant five to ensure positive weights even when the ranking difference is a maximum of four. Additionally, by using a simple constant multiplication of ranking differences, we can reflect readers' evaluation order linearly and intuitively in the weights. This enables us to express relationships between comic titles more strongly when placed in adjacent rankings and more weakly when their rankings are far apart.

We applied Louvain clustering [3], a community detection algorithm that maximizes network modularity, on the weighted co-occurrence network. Modularity [15] is a measure that quantifies how densely and sparsely connected nodes are within/between clusters. The modularity Q is defined by the following

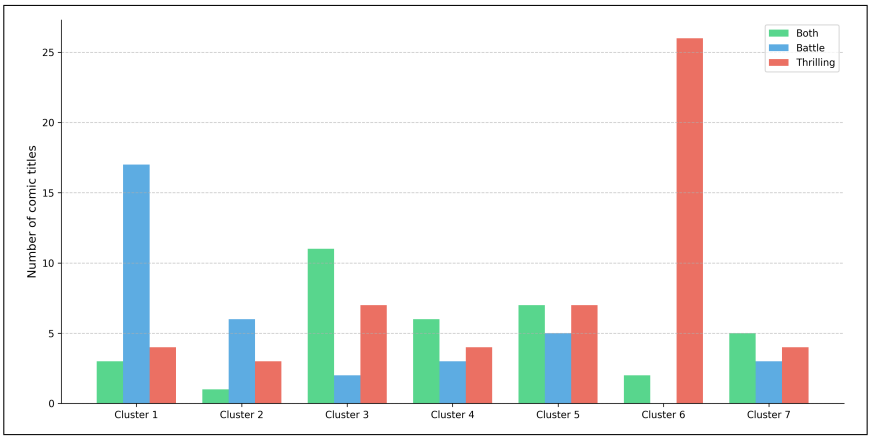

Fig. 5. Number of comic titles by theme in each cluster

equation (2).

$$Q = \frac{1}{2m} \sum_j \sum_i \left[A_{ij} - \frac{k_i k_j}{2m} \right] \delta(c_i, c_j) \tag{2}$$

where m represents the total sum of edge weights in the network, A_{ij} is the weight of the edge connecting nodes. A set of i and j and a set of k_i and k_j are the sums of edge weights connected to nodes i and j, respectively. And, c_i and c_j denote the communities to which nodes i and j belong, where δ is the Kronecker delta function. This paper reflects on ranking differences between comics as edge weights. Comic titles connected by edges with larger weights are more likely to be classified into the same cluster, enabling clustering that considers co-occurrence and similarities in users' ranking orders. A characteristic of the Louvain clustering is that it does not require prior specification of the number of clusters, as the number is automatically determined by maximizing modularity.

Figure 4 shows the clustering results for the co-occurrence network constructed by comics on the target bookshelves. The comic titles were classified into seven clusters in Figure 4. Figure 5 shows the number of comics by theme in each cluster as a stacked bar chart. The horizontal axis shows cluster IDs, and the vertical axis shows the number of comic titles in each cluster. Each bar consists of three colors: green indicates the number of comic titles appearing in both themes, blue represents comic titles appearing only on the bookshelves for "Battle," and red shows comic titles appearing only on the bookshelves for "Thrilling." We examined the comics within each cluster. We analyzed the characteristics of the comic titles in each cluster. Table 5 shows the comic titles included in each cluster. By focusing on each cluster, we found additional features beyond these initial themes, "Battle" and "Thrilling." For example, Cluster 3 contained more comic titles appearing in both themes. As another characteristic, Cluster 3 included

Table 5. The comic titles in each cluster shown in Figure 4.

1	2	3	4	5	6	7
JoJo	Magi	MAJOR	Initial D	Ajin	Kaiji	Banou
Mashle	Shura	Kingdom	MF Ghost	GANTZ	Akagi	PPPPPP
Fire Force	Kenichi	The Fable	Blue Exorcist	Dorei-ku	Usogui	Evangelion
Zatch Bell!	Kekkaishi	BLEACH	A Silent Voice	Higurashi	Tetsuya	Magilumiere
Kaiju No. 8	Dandadan	NARUTO	Chainsaw Man	Bokurano	Gin to Kin	Marriage
19 other titles	5 other titles	Chihayafuru	8 other titles	Tokyo Ghoul	ONE OUTS	Toxin
		Dragon Ball		Future Diary	LIAR GAME	7 other titles
		ONE PIECE		Attack on Titan	Aoashi	
		Demon Slayer		11 other titles	Haikyu!!	
		Jujutsu Kaisen			Ping Pong	
		DEATH NOTE			Blue Lock	
		Space Brothers			ALL OUT!!	
		Tokyo Revengers			Eyeshield 21	
		HUNTER× HUNTER			Ashita no Joe	
		7 other titles			SLAM DUNK	
					Inazuma Eleven	
					Ace of Diamond	
					Kuroko's Basketball	
					10 other titles	

14 comics, from "MAJOR" to "HUNTER HUNTER," which had over 20 million copies in circulation as of 2022. This cluster was constructed by well-known and highly recognized comics compared to other clusters. While similar to Clusters 4 and 7 in containing a balanced number of comic titles appearing in both themes and in each individual theme, Cluster 5 included a concentration of violent comic titles such as "Attack on Titan" and "Tokyo Ghoul," which feature more frequent and intense violent scenes compared to comic titles in other clusters. Cluster 6 was composed mostly of comics from the "Thrilling" bookshelves, with a particular focus on those featuring sports and gambling. Specifically, seven comics (from "Kaiji" to "Liar Game") focus on gambling, while eleven comics ("Haikyu!!" to "Kuroko's Basketball") focus on sports. It was suggested that the co-occurrence network could reveal groupings of comics that share common features beyond the bookshelf themes.

It seems that we are able to find meaningful groupings from the co-occurrence network that are not directly related to the bookshelf themes. We consider that a feature space for comics could be developed from an analysis of a co-occurrence network constructed from the bookshelf. We thus believe that the feature space may reflect human affective perception, which has not been covered by the general genre of comics.

5 Conclusions

This paper proposed a system for users to arrange their favorite comics in a ranking format as a bookshelf: ComicFaves. In ComicFaves, the arrangement of comics on the bookshelf visually and intuitively helped us understand the user's affection for comics. We conducted a preliminary analysis of bookshelves arranged by multiple users for some themes. The results suggested that book-

shelves for affective keywords more strongly reflected users' individuality and affection than bookshelves for genre information. Moreover, we confirmed the possibility of understanding differences in users' preferences and sensibilities by focusing on the arrangement of comic titles; even if different users selected the same comic titles, the arrangement of their bookshelves reflected their individuality.

In this paper, we conducted a preliminary investigation to examine whether ranking-based bookshelves could effectively extract latent relationships between comics, even with limited sample data. However, verification with a larger dataset is necessary to analyze relationships between comic works in more detail based on clustering. Therefore, in the future, we plan to expand the dataset by conducting additional experiments with an increased number of users and themes. Additionally, we will derive a comic co-occurrence matrix from multiple bookshelf datasets obtained in these experiments and consider vectorizing comics with contextual relationships by dimensionality reduction of the co-occurrence matrix. By representing comics as vectors, we can apply established methods from music information processing and natural language processing fields, enabling quantitative similarity evaluation between comics. We will conduct comparative experiments to investigate how well vector-based similarity evaluations between comics align with users' affective impressions, examining the effectiveness of comic vectors.

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