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TRANSFORMING LIBRARIES INTO KNOWLEDGE HUBS: THE IMPACT OF ARTIFICIAL INTELLIGENCE TECHNOLOGY

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Abstract

Library Manuals are becoming outdated as emerging information technology applications, particularly artificial intelligence (AI), are revolutionizing librarians' performance. AI, integrated into library systems, can automatically recommend literature based on keywords and user ratings. This paper explores the development of AI systems that resemble human intelligence and can potentially replace librarians in carrying out library operations. By utilizing AI, librarians can optimize their services without compromising their role as information managers. The introduction of AI recommendation systems addresses the challenge faced by potential readers who struggle with the abundance of literature choices. This system provides personalized literacy recommendations based on predefined categories, eliminating the need for manual bookshelf searches.

The rapid growth of information and communication technology has a profound impact on various human activities, necessitating librarians to adapt and balance services with users' needs. Information technology plays a vital role in library management and significantly influences people's lives. Collaborative and effective communication between librarians and information technology enables the automation of library processes, supporting effective and efficient use of libraries. Software and hardware applications are key components of information technology in libraries.

Artificial intelligence serves as a strategic tool for library managers to promote services and facilitate book searches for users. Librarians can focus on providing customized services while AI becomes a virtual partner in delivering one-stop service to library users. This collaboration impresses users by showcasing the expertise of librarians

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in understanding and addressing user needs. Integrating AI in libraries requires substantial knowledge, insight, and investment. However, successful implementation can transform libraries into engaging centers of knowledge and insight, expanding their presence to the online realm of cyberspace.

1 Introduction

Library Manuals are not the time anymore, searching for books manually in libraries will soon pass because there are many emerging information technology applications that can help librarians' performance become much simpler and easier, namely with artificial intelligence (AI). Artificial intelligence is an artificial intelligence that is integrated with the system, the technical work of the AI system in this library is that it can automatically recommend literature based on keywords and someone's rating.

Currently, there have been many developments of artificial intelligence that resembles human intelligence so that it can replace the role of librarians in carrying out performance in the library. The use of Artificial intelligence serves to assist librarians in carrying out librarian activities, with the presence of Artificial intelligence, it can be used as a solution for librarians to optimally serve users without leaving their job as information managers in the library.

With the presence of this recommendation system, it can really help potential readers who are confused because of the many types and choices of literacy available. This system will provide prospective readers with literacy recommendations in accordance with the categories provided, so that readers no longer have difficulty in searching for literacy on the bookshelf one by one.

The development of information and communication technology is currently growing rapidly thus providing many positive impacts on various human activities which in the end demands librarians to continue to adapt even balance between services and the needs of library users. The role of information technology today is of course very important for library management which will have a very large influence on people's lives today. Adjustment of information and communication technology can have an influence on the use of libraries effectively and efficiently [1]. Information and communication technology can be said to help support the process of managing librarians in the library. Information technology in the era of the industrial revolution 4.0 calls for librarians to collaborate and communicate well so that they can be automated into a system [1]. In its application in libraries, information technology can be seen from the use of software and hardware.

Artificial intelligence can be used as a strategy for library managers to promote services and facilities that later will be present and then given to library users to facilitate the process of searching for books. With the emergence of Artificial intelligence, librarians can focus on serving users according to the flow and policies agreed upon by the library so that Artificial intelligence can become a librarian's virtual world partner in providing one-stop service to library users. This collaboration can give an interesting impression to users when they know the sophistication of librarians who are able to read and translate user needs according to the specialist subject that has been determined.

Indeed, to bring artificial intelligence in this library is not as easy as turning the palm of the hand, it takes a lot of knowledge, insight and of course also costs that are not small. But if successful, the library will become a center of knowledge and insight that is not boring, even libraries can also be present online in cyberspace.

2 Research methodology

In this research using the recommendation method, where this system uses collaborative filtering and content based filtering. Where both methods are commonly found in recommendation systems [3].

The type of data that will be used in the research is qualitative data, and the data sources that will be used are primary data and secondary data. Primary data were obtained from field surveys, while secondary data were obtained from various publication sources. The analytical method used is a descriptive approach [4].

2.1 Dataset

This study uses the book recommendation dataset, which was obtained from the website of https://www.kaggle.com/arashnic/book-recommendation-dataset. The data that is analyzed and used in this study is in the form of a csv file which contains book data.

2.2 Collaborative filtering

Collaborative Filtering (CF) is one of 2 ways of recommendation that is the basis for assessing recommendations based on rating values, in short this method uses the opinions of other users to give preference to other users as well. This technique has been widely used in various applications such as Amazon.com.

2.3 Content based filtering

Content-based Filtering provides recommended articles that are slightly similar to items previously liked by users. The basic principles of this Content-based filtering system are: 1) To analyze the description of the items favored by the user in order to determine the main general attributes (preferences) that will be used to distinguish these items. 2) To compare the attributes of each item with the user profile so that only items that have a high acidity level with the user profile will be recommended. Application of the technique. [6]

Data obtained from electronic sources (internet) and so on which are related to this research and then we store them in a database. So, research will be carried out in a library to obtain data that will later be used as a method in making this AI.

In the application of artificial *intelligence* this is the first step, namely machine learning, AI knows the number of data collections entered by the user, starting from the title/book number/image which will later enter the database and for images, AI can detect it correctly based on data input, so as to find the appropriate literature. The following is Flowchart of artificial system *intelligence* in the library can be seen in Figure 1.

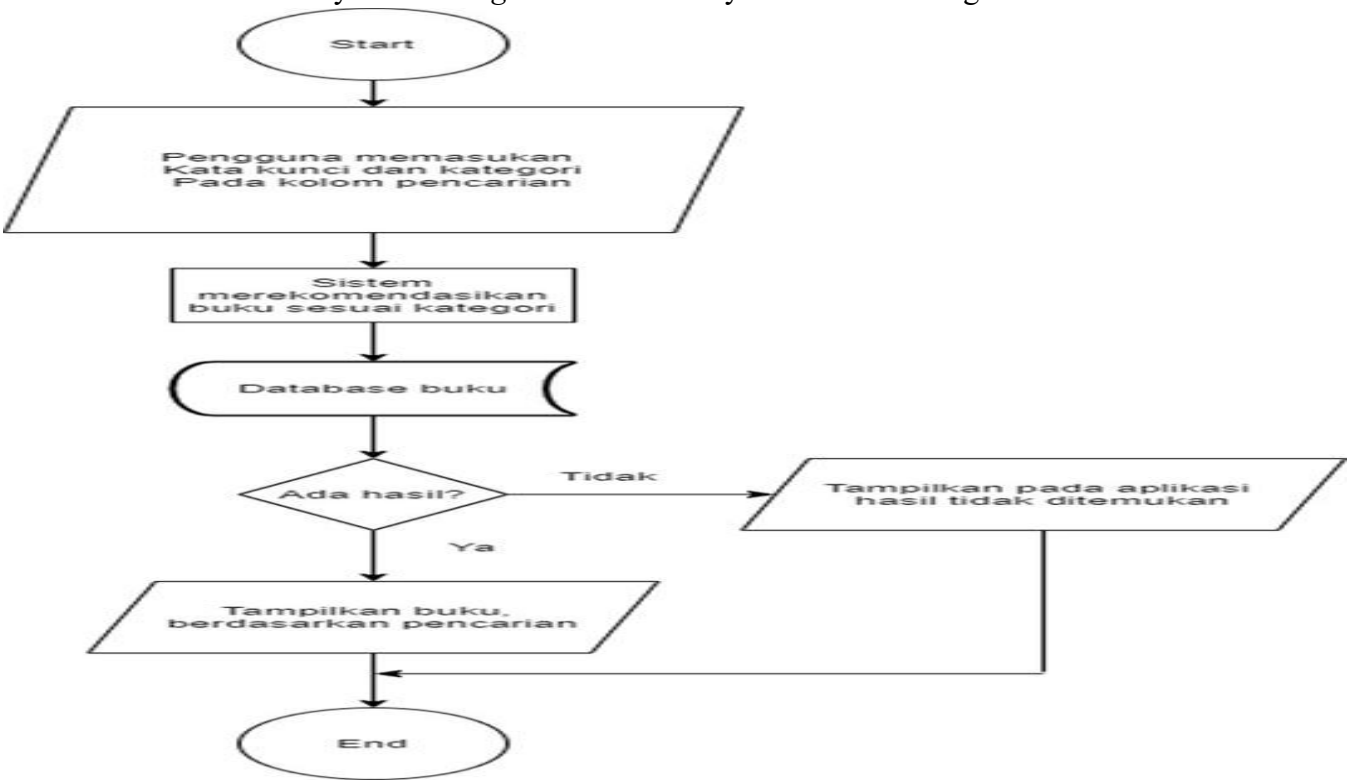

Fig. 1. Flowchart of artificial intelligent in the library

Judging from the flowchart above, it can be explained that AI works starting from when the user enters a book category using keywords (codes) that have been provided by the librarian to facilitate the book search process, after the librarian enters the code into the system, a book that matches the code entered will appear. However, if the book has not been registered into the system but there is already a code, then when the librarian enters the code into the system, no results will appear. So, librarians must ensure that each book and its code has been registered in the AI system used by librarian.

3 Discussion result

Based on the dataset owned, namely the number of book titles as much as 240,000 data, with the amount of data counted, the results stated will be more accurate.

3.1 Results

	Book-Title	Book-Author	mean	count	weighted rating	Year-Of-Publication
0	Harry Potter and the Goblet of Fire (Book 4)	J. K. Rowling	6.541237	194	5.985285	2000
1	Harry Potter and the Chamber of Secrets (Book 2)	J. K. Rowling	6.611765	170	5.978717	1999
2	Free	Paul Vincent	7.962963	54	5.973507	2003
3	Harry Potter and the Prisoner of Azkaban (Book 3)	J. K. Rowling	6.467005	197	5.929681	1999
4	Harry Potter and the Sorcerer's Stone (Book 1)	J. K. Rowling	6.363095	168	5.767724	1998
5	Harry Potter and the Order of the Phoenix (Boo...	J. K. Rowling	5.571856	334	5.320583	2003
6	The Fellowship of the Ring (The Lord of the Ri...	J. R. R. Tolkien	6.206349	63	5.036522	1999
7	Griffin & Sabine: An Extraordinary Corresp...	Nick Bantock	6.041667	72	5.024219	1991
9	Falling Up	Shel Silverstein	6.921053	38	5.008320	1996
10	The Stand (The Complete and Uncut Edition)	Stephen King	6.175439	57	4.942104	1990
11	Ender's Game (Ender Wiggins Saga (Paperback))	Orson Scott Card	5.302564	195	4.942059	1994
12	The Little Prince	Antoine de Saint-ExupÃ©ry	5.797468	79	4.918397	1968
13	The Secret Life of Bees	Sue Monk Kidd	5.500000	96	4.815270	2002
14	Harry Potter and the Sorcerer's Stone (Harry P...	J. K. Rowling	4.900175	571	4.786846	1999
15	The Hobbit : The Enchanting Prelude to The Lor...	J.R.R. TOLKIEN	5.007117	281	4.777967	1986
17	To Kill a Mockingbird	Harper Lee	4.920308	389	4.756743	1988
18	The Two Towers (The Lord of the Rings, Part 2)	J. R. R. Tolkien	6.230769	39	4.674876	1999

Fig. 2. List of top 20 rating book titles

	Book-Author	mean	count	weighted rating
0	J. K. Rowling	5.411434	2134	5.263202
1	Bill Watterson	5.498134	536	4.977312
2	J. R. R. Tolkien	5.265861	662	4.866023
3	Shel Silverstein	6.273333	150	4.674607
4	Dr. Seuss	5.168044	363	4.551501
5	Nick Bantock	5.278810	269	4.480927
6	Harper Lee	4.932039	412	4.427841
7	J.R.R. TOLKIEN	4.511224	980	4.314315
8	Neil Gaiman	4.453074	1236	4.298602
9	Daniel Quinn	5.012295	244	4.253716
10	George Orwell	4.568862	501	4.210602
11	Antoine de Saint-ExupÃ©ry	5.169492	177	4.178795
12	Gary Larson	4.470389	591	4.174605
13	Mitch Albom	4.474820	556	4.163105
14	J.D. Salinger	4.487713	529	4.160683
15	Herge	5.351724	145	4.159600
16	J.R.R. Tolkien	4.818533	259	4.153959

Fig. 3. List of top 20 author ratings

	ISBN	title	rating	userId	Book Read	Rated
0	0140293248	The Girls' Guide to Hunting and Fishing	5.665600	35859	Fahrenheit 451	10
1	0446612545	The Beach House	4.906809	35859	Harry Potter and the Sorcerer's Stone (Harry P...	10
2	0060959037	Prodigal Summer: A Novel	4.630792	35859	One for the Money (Stephanie Plum Novels (Pape...	10
3	0440206154	Red Dragon	4.475506	35859	The Red Tent (Bestselling Backlist)	10
4	0345339703	The Fellowship of the Ring (The Lord of the Ri...	3.652609	35859	Bel Canto: A Novel	9
5	0060987103	Wicked: The Life and Times of the Wicked Witch...	3.483041	35859	The Secret Life of Bees	9
6	0316769487	The Catcher in the Rye	3.086998	35859	Left Behind: A Novel of the Earth's Last Days ...	9
7	0440222656	The Horse Whisperer	2.994207	35859	The Joy Luck Club	8
8	0515131229	Dance upon the Air (Three Sisters Island Trilogy)	2.963652	35859	Two for the Dough	8
9	0316284955	White Oleander : A Novel (Oprah's Book Club)	2.868035	35859	Balzac and the Little Chinese Seamstress : A N...	8

Fig. 4. List of surprise library usage

The results obtained from Figures 2 and 3 show that the data can be obtained from the filtration process on the rating of books and authors, this helps the reader in searching based on the category he chooses. With this filter method, it is easier for readers and can find recommendations from the existing categories. In addition, this data filter process can also be done using the surprise library in the code to display more concise and neat results.

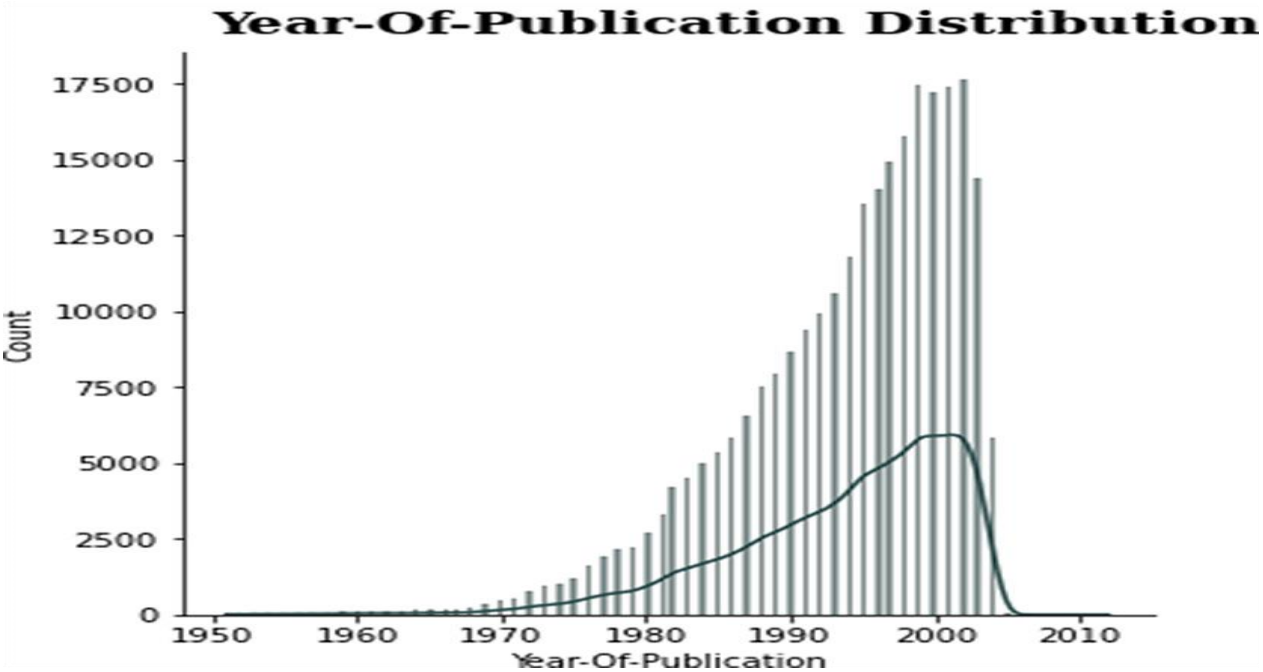

Fig. 5. Graph of distribution of book publications in years

From the graph in Figure 5, it shows that the number of book publications is increasing every year. As time progresses, old books are sometimes increasingly abandoned and therefore, so that the system is not burdened, books from 1950 and earlier will be deleted. This is intended so that there is not too much data in the system and this graph will continue to delete data for books that have low ratings and old publication years.

3.2 Discussion

From these results, it can be explained the dataset used along with the database in each table:

Dataset 1 – Rating.csv (11149780)

- User-ID – user ID
- ISBN – book ID
- Book-Rating – Rating given by user

Dataset 2 – Users.csv (278858)

- User-ID – user ID
- Location – location of user
- Age – age of users

Dataset 3 – Books.csv (271360)

- ISBN – book ID
- Book-Title – Book Name
- Book-Author
- Year-Of-Publication
- Publisher
- Image-URL-S
- Image-URL-M
- Image-URL-L

From the test results, the available book recommendations vary greatly depending on how the keywords and categories are chosen by the user, plus filter factors that can be selected based on the rating of the book title or author. This allows readers to easily choose literacy that is popular and relevant at that time, but a low rating does

not mean that literacy is not good, it's just that there are only a small number of people who read and see it. So the system reads the literacy with a low rating.

System *rating can* also be displayed based on the reader's willingness to seek literacy. From the examples in Figures 2 and 3, it shows the top 20 ranking in the book and its author. This of course can be modified by the reader according to their individual preferences.

4 Conclusion

This research provides a solution for book readers, with this research, book readers are facilitated with a technology Artificial Intelligence (AI) to make it easier to find the books they want based on keywords or book categories.

This research uses a machine learning approach and uses the recommendations for collaborative filtering and content based filtering that can search for data by analyzing user input into the database, the system analyzes data that matches user input, if a suitable data is found, the system will display the data to the user.

With this research, it is also easier for someone librarian, because with this research the task of a librarian is reduced because there is already an AI that helps book readers to find the books they want.

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