

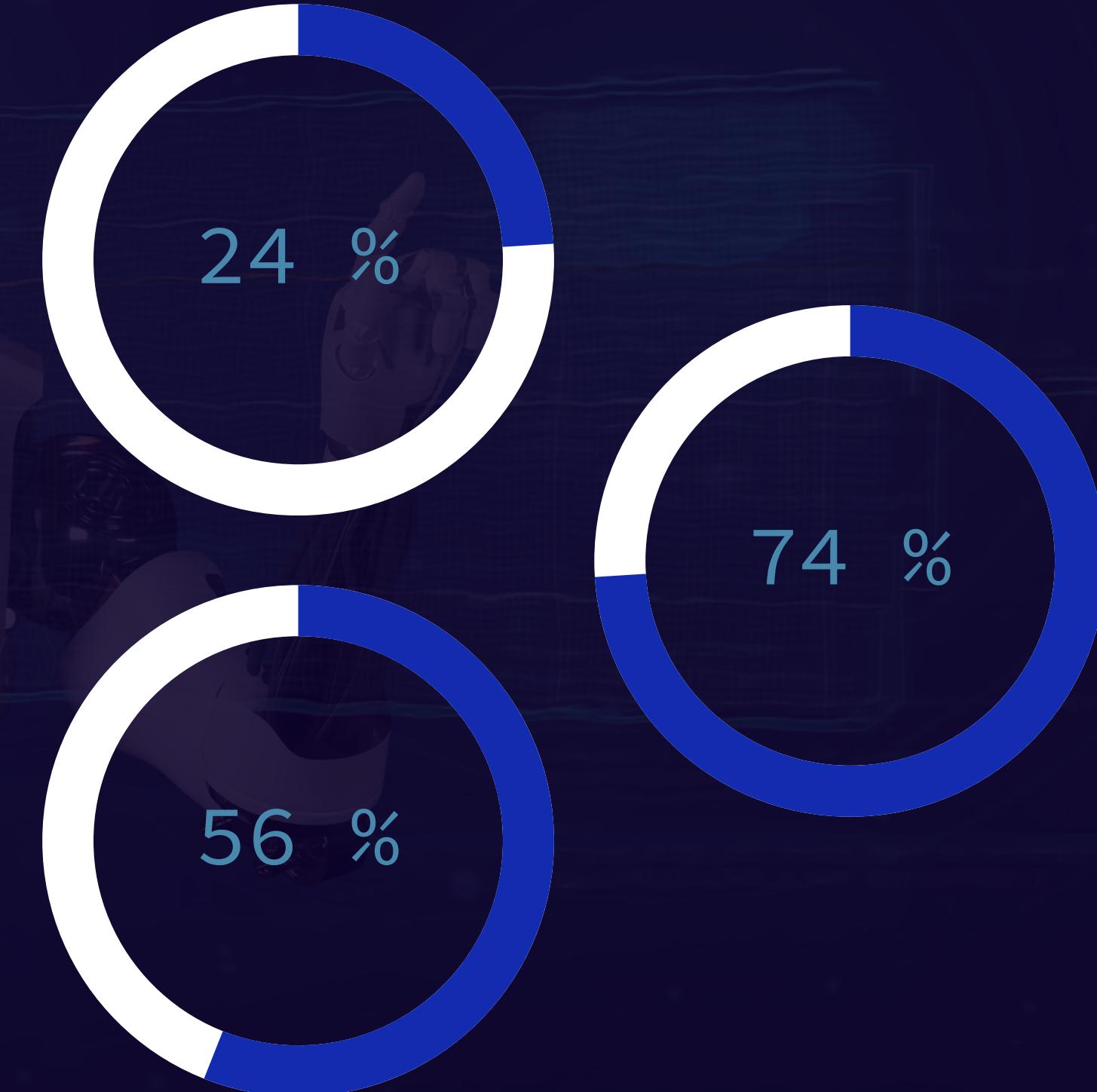
# Smart Book Recommendation System

Book recommendation system by using data big  
data mining techniques

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# Project Overview

The system aims to suggest books based on users' previous reviews and identify patterns to provide personalized recommendations. Recommendations help users discover new books, improve engagement, and increase revenue or borrowing rates in digital libraries and online book retailers.





# Problem Statement

Project addresses information overload and lack of personalized book recommendations by using advanced data mining techniques, providing tailored suggestions to users. This personalized system improves customer satisfaction, boosts engagement, and enhances data privacy through secure practices.

# Methodology



## FP-Growth

Gather relevant data from diverse sources.



## Association Rules

Clean, normalize, and engineer data.



## k-Nearest Neighbors (KNN)

The closest data points to a given point, often used for classification



# Data Collection and Preprocessing

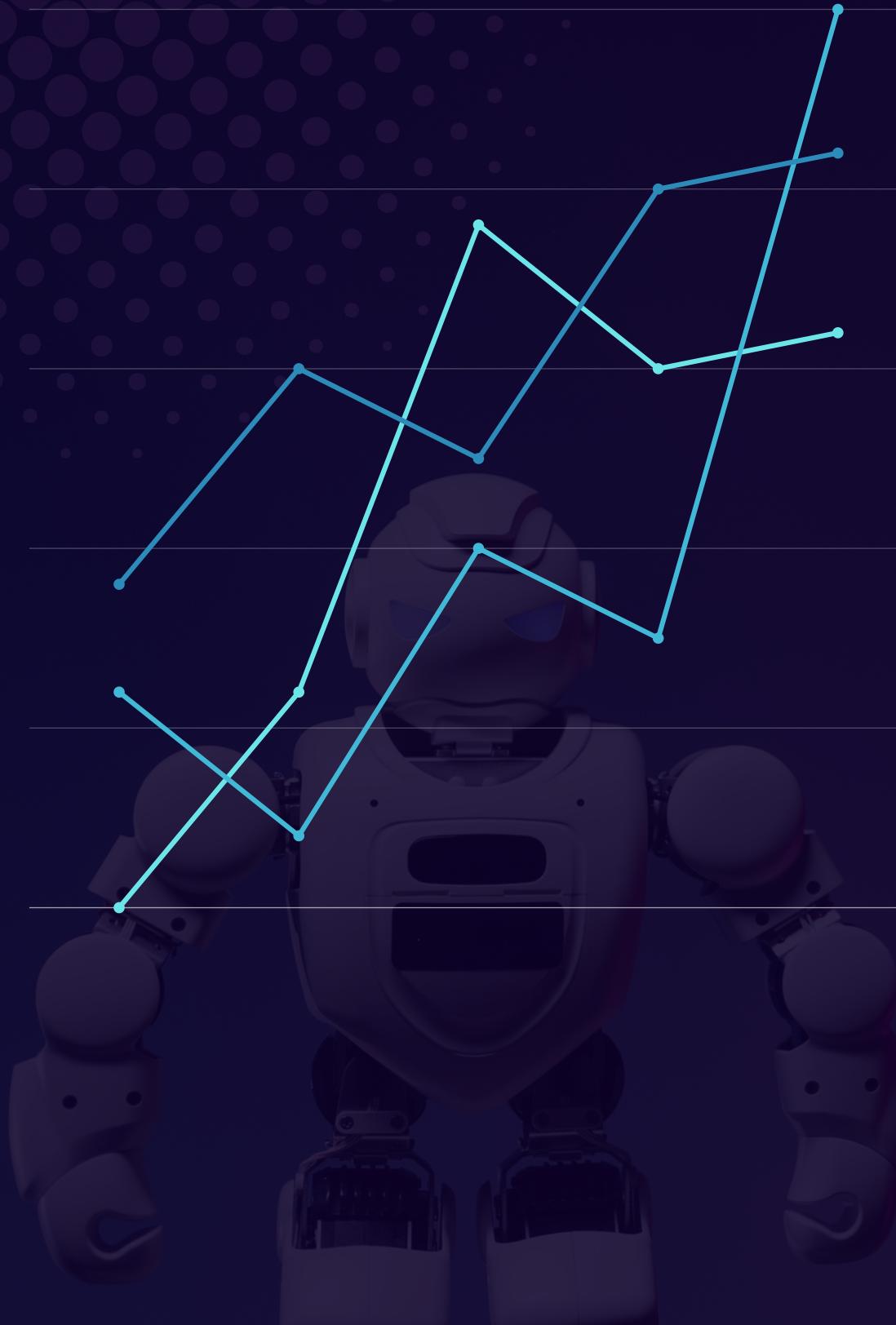
Data from Excel files, including book information, user reviews, and user demographics. Removed duplicates, filled in missing values, and ensured consistent data types.: Focused on users with a minimum number of transactions and limited analysis to top-rated books.



# Frequent Pattern Mining and Association Rules

- **FP-Growth Algorithm:** Used to find frequent itemsets among user reviews. "Support" indicates the frequency of itemsets in user transactions.
- **Association Rules:** Generated from frequent itemsets. Describe relationships between books. Key metrics are "confidence" and "lift."
- **Top Recommendations:** Derived by sorting association rules by "lift." Identified which books are closely related and likely to be recommended together.





# Evaluation Metrics

- **Data Visualization:** Bar charts to visualize support for frequent itemsets. Scatter plots to show confidence versus lift for association rules.
- **KNN for Nearest Book Recommendations:** KNN used to find books with similar features based on feature vectors. Applied to recommend similar books.

# Use Case:

## Personalized Book Recommendations

The personalized book recommendation system aims to suggest books that match individual users' tastes and reading preferences. By analyzing user data, such as previous book ratings and reading patterns, the system identifies common themes and relationships among different books. This allows it to recommend books that users are likely to enjoy, based on their unique interests. The goal is to enhance the user experience, making it easier for readers to discover new books they might not find otherwise. This personalized approach can increase user engagement, drive sales for online bookstores, or boost borrowing rates for digital libraries, while also improving customer satisfaction.

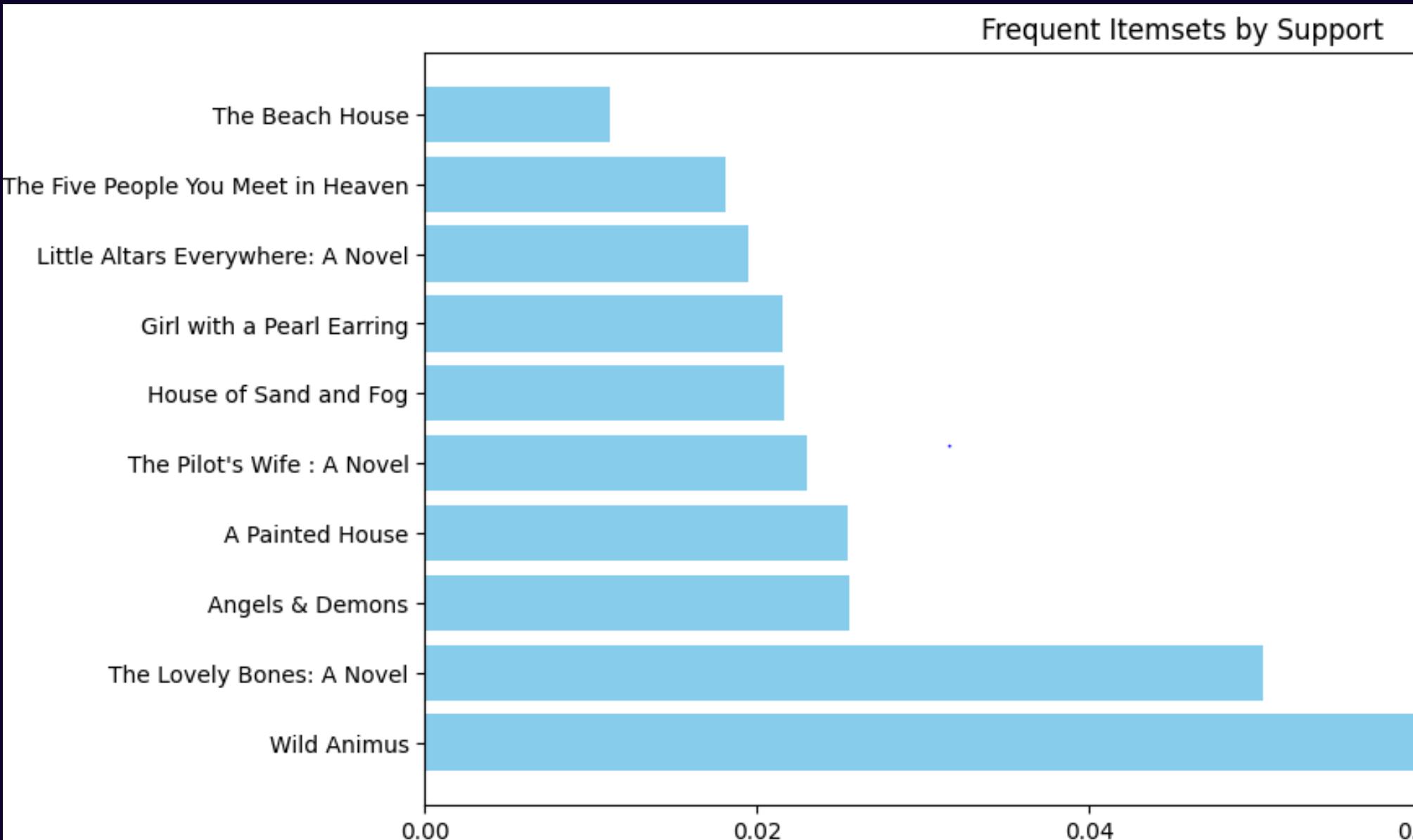


# Result and Impact

The project results in a personalized book recommendation system that provides tailored book suggestions based on frequent pattern mining, association rules, and K-Nearest Neighbors (KNN). This leads to improved user experience, boosting customer retention and engagement. The impact includes increased sales for online book retailers and higher borrowing rates for digital libraries, with additional marketing opportunities through targeted campaigns.

	ISBN	Book-Title	Book-Rating
4	000225056X	The International Garlic Cookbook	10.0
5	000255755X	Come Through Marjorie's Garden Gate: Spend a Y...	10.0
6	000599134X	Collins Bible Handbook	10.0
9	000639194X	Firewing	10.0
11	000648185X	Escape from the Big Muddy	10.0
12	000673765X	Apple Bough	10.0
13	000692347X	The Clue of the Broken Locket (The Nancy Drew ...	10.0
14	000710331X	Tarot	10.0
15	000710698X	Pagan Pathways, New Edition	10.0
16	000711365X	Central Fells: Lakeland Fellranger (Lakeland F...	10.0
18	000715111X	The Real Witches Book of Spells and Rituals (R...	10.0
20	002011690X	Complete How-To Book of Indiancraft: 68 Projec...	10.0
21	002028361X	Deathbird Stories (Collier nucleus fantasy &am...	10.0
22	002863196X	Complete Idiot's Guide to Getting Your Romance...	10.0
23	002934770X	Dearest Friend	10.0
24	003008539X	Three With a Bullet	10.0
25	006009298X	Temptation of a Proper Governess	10.0
26	006009608X	Princess in Waiting (The Princess Diaries, Vol...	10.0
27	006013738X	The survival of the wisest	10.0
28	006015425X	Illywhacker	10.0
30	006024416X	Betsy-Tacy and Tib	10.0
31	006026425X	Farmer Boy (Little House)	10.0
32	006039174X	Every Knee Shall Bow : The Truth & Tragedy...	10.0
34	006059330X	A Lady of His Own	10.0
35	006061272X	My angel's name is Fred: Tales of growing up C...	10.0
37	006091548X	Predictive astrology: Understanding transits a...	10.0
39	006093624X	The Adventures of Flash Jackson : A Novel	10.0
40	006095177X	The Holistic Pediatrician: A Parent's Comprehe...	10.0

## Top 50 Books by Average Rating



## Frequent Itemset by Support

```

book_features = np.array([
    [1, 0, 1],
    [0, 1, 1],
    [1, 1, 0]
])

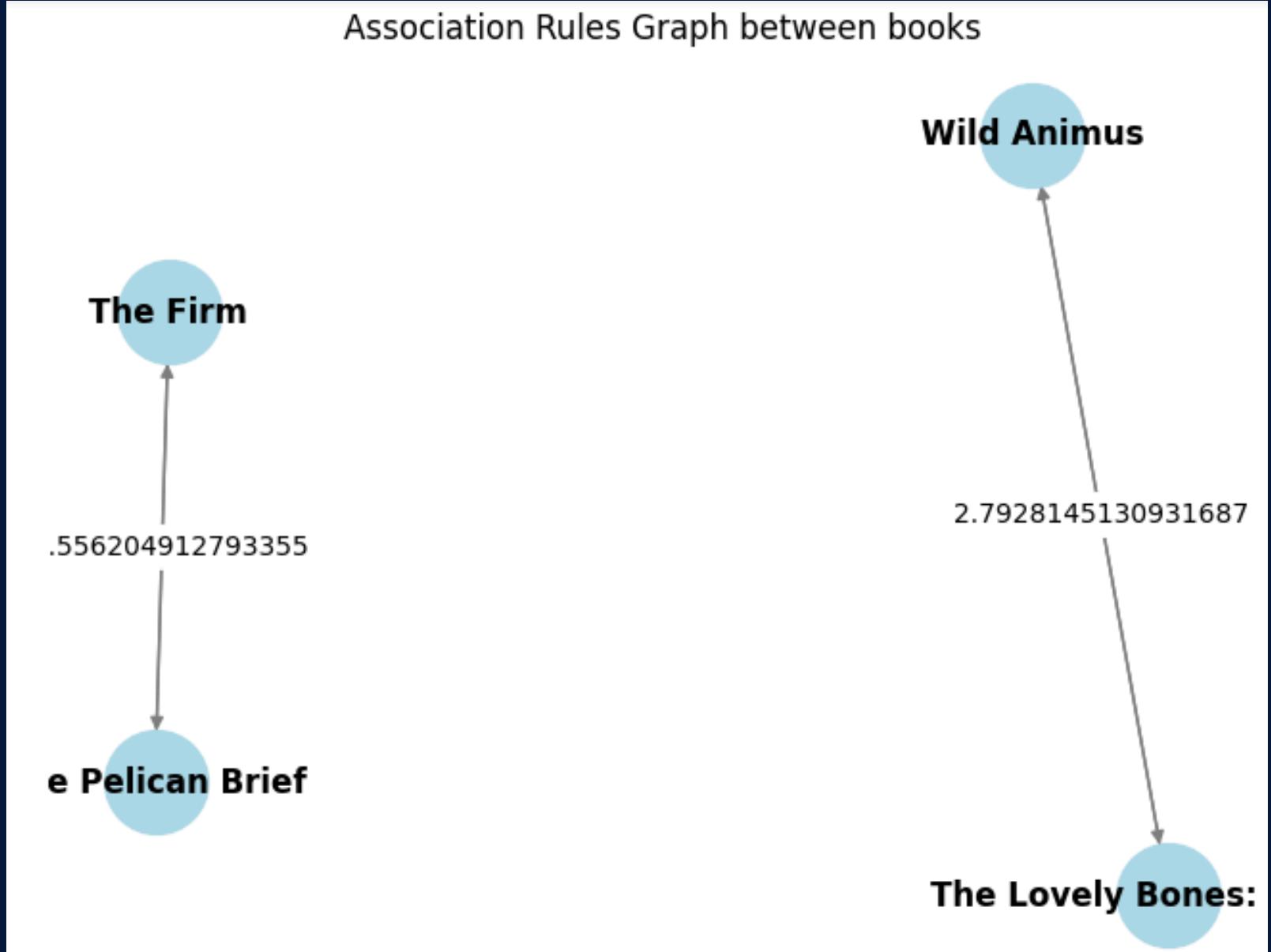
knn = NearestNeighbors(n_neighbors=2)
knn.fit(book_features)

query = np.array([[1, 1, 0]])
distances, indices = knn.kneighbors(query)

print("Nearest books based on KNN:")
print(indices)

Nearest books based on KNN:
[[2 1]]

```



## Apply KNN for Nearest Book Recommendations

## Visualize Association Rules with NetworkX



# Conclusion and Challenges

Personalized book recommendations significantly enhance user experience, driving higher engagement and increased sales or borrowing rates. The main challenges include data privacy, algorithm complexity, and diverse user preferences. These challenges are addressed by implementing robust data privacy measures, optimizing algorithms for efficiency, and creating a flexible recommendation system that adapts to various user needs.



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# Thank You!

ANY QUESTIONS PLEASE