Assignment No: 1

Topic: "Data Management and Operation Improvement For a Children Book Club with Digital Technologies"

For the Module: DIGITAL BUSINESS TECHNOLOGY AND MANAGEMENT (EBUS603)

BY,

NAME: BHUSHAN GHODKE

Id no: 201679994

MANAGEMENT SCHOOL,
UNIVERSITY OF LIVERPOOL.

Table Of Contents
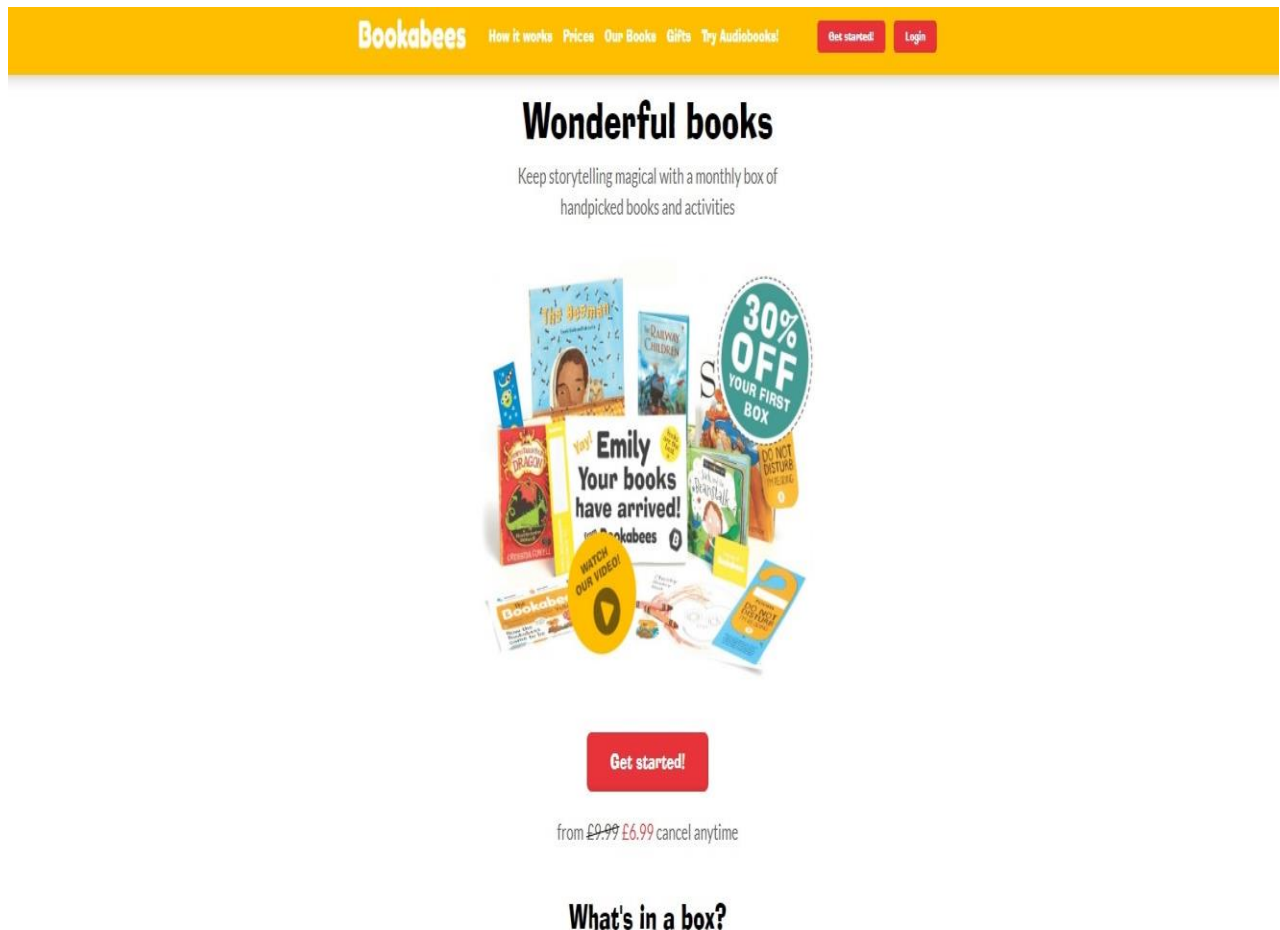
Table Of Figures

1. Introduction

Fig 1: Reference case of Bookabee.

The given business case of a Bookabees is the personalised book recommendation for children using semantic categorization of books which is mainly reader(children) cantered. This formidable task is done by Bookabees using its own digital service portal and free delivery of orders using the public post service for which customers should subscribe with direct debit facility. Customers may chose books from the recommendations given to them with respect to their interests shown, respective age's and educational needs as well.

Although, there are many concerns in this business case that should be discussed as well.

1.The First one would be the subscription types. Customers(children) can only avail the monthly subscription. Along with its monthly direct debit facility, some customers can also be given option of quarterly or six monthly subscription with extra advantages like extra books or extra days subscription. This will prevent monthly upgradation of database and add permanent database.

2. Next would upgradation of inventory or stock is another crucial actor to consider for. Cognitive science recommends that customer might often shift its preferences and hence it may lead to abandoned carts in online shopping (Rausch, Derra and Wolf, 2020)

3. With a continuous rise of data intensive science, there is a demand for data management in the companies for improved productivity (Ingram,2019). When industry experts suggest the books to customers specific to its choices, there might be an issue of repeating the storyline or context in the same genre. Hence, to avoid such duplication, short e-book reviews can be made available (Woeber, 2017).

2. **Database Design :**

Generally, database design can be defined as a way to determine the organization of database incorporating its edifice, contents and the required applications that are to be run. Database design plays a central role in the information resource management (Bartini, Ceri, Navathe 1992).
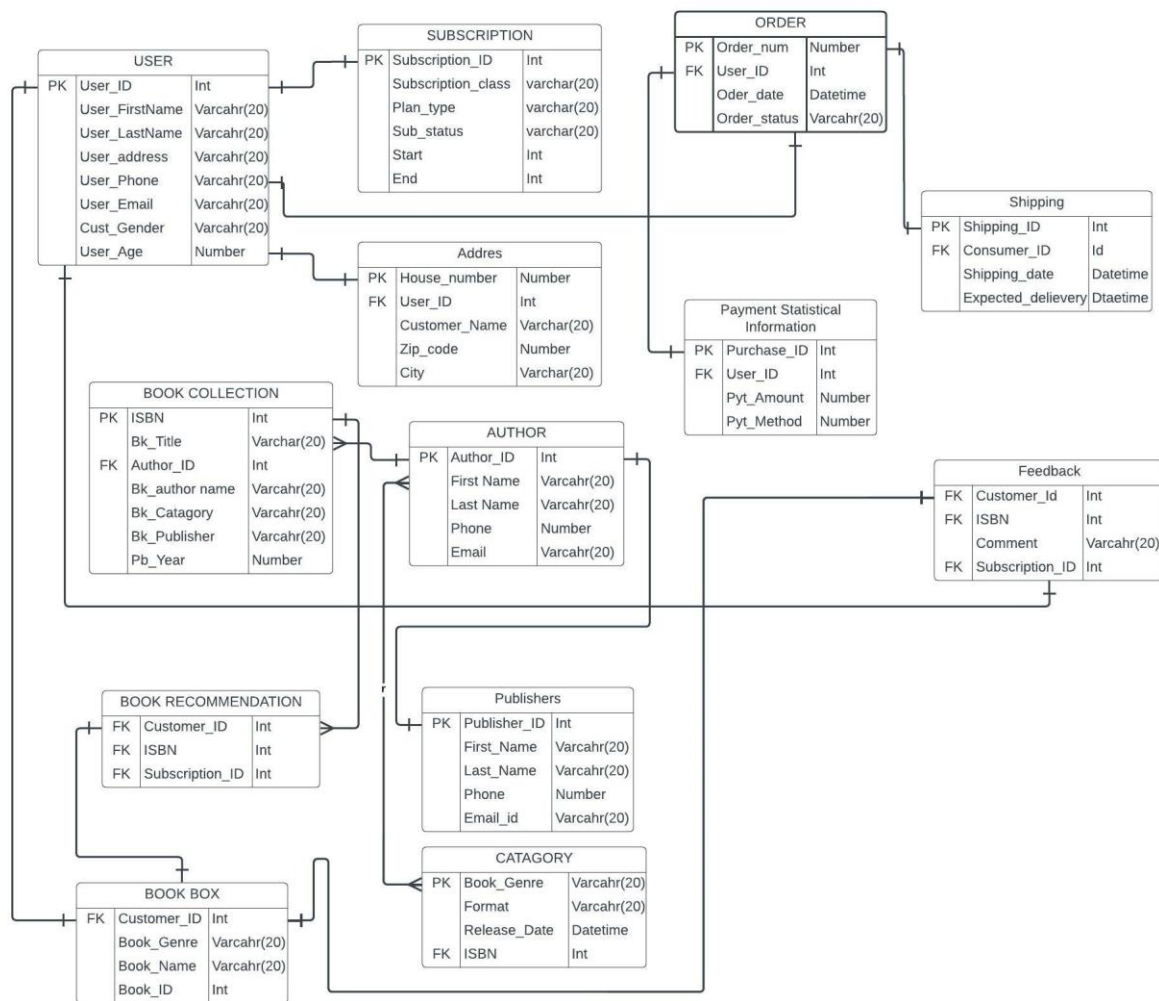

Figure 2: ER Diagram representing database for Bookabees

Entity Relationship model is the mostly used data model type across the world for the conceptual design databases. Introduced by Peter Chen in 1976, it has grown to be popular (Bartini, Ceri, Navathe 1992).

The above diagram explains the relationship between different tables of the given business case of Bookabees.

1. User Table: This table carries the information of the potential customers which are children. It is related all the other tables like address, book either 1:1 or N:N relationships.

2. Subscription Table: It contains the information regarding customers subscription such as subscription ID, subscription type and the status of its subscription like whether it is active or suspended or over. The relationship between the User table and the subscription table is 1:1.

3. Address Table: This table showcase the house address for the delivery of the Book Box. Since, each customer will have unique address, hence it is showcased by 1:1 Relationship.

4. Book Collection Table: This table refers to the total number of books available for the customers. It is related as N:N because customers can chose books from the collection as well.

5. Book Recommendation Table: This table represents the type of books recommended by the industry experts according to customers choice, age and other factors. It is related to the customer table using 1:1 relationship.

6. Book Box Table: It is a unique box that that contains details of the books chosen by customer. After the expert recommendations and their own choices, customers create list of books. Hence the relationship is 1:1.

7. Author Table: This table shows the information about the authors of the books, their name and other details like contact information. Since, one author can write many books hence the relationship is one to many.

8. Publisher Table: This table has the information about the publisher and the cardinality is many to many.

9. Category Table: This table represents the book genre and format of the books. It is related to the book collection as one to many and to author table as N:N.

10. Order Table: It contains the information about the orders placed by the users. Since, it is unique to the customer, hence the cardinality is 1:1.

11. Payment Statistical Information: The payment information includes the purchase ID, amount ND Payment method used by the customer. It is related to the order as 1:1.

12. Shipping Table: The table contains the information's about the shipping as shipping ID, date and expected delivery date.

13. Feedback Table: Each customers can give different feedbacks and each book can have feedback from multiple users. Hence, it is joined by the N:N cardinality.

3. Improvements

3.1. Data and Data Sources

1. The term 'Data' represents facts about something or someone exactly. The data can be collected, processed, analysed or generated completely for the process of getting desired outcomes (Sikha Bagui and Richard Earp 2012).

Data Structure: Data structures can be defined as the way of organizing the data and managing it along with storing it in a specific format which is chosen uniquely for the efficient access to data. Over the years the term and its connotations has been improved tremendously (Shaikh, S., Rathi, S. and Janrao, P, (2017).

Hence Collecting data has become an important part of the business because it will definitely improve the efficiency and productivity. Data can be collected from the customers regarding their real time search, web navigations and online choices. This data collection when collaborated with AI tools like DataRobot which will use this data information to generate and machine learning models. These models can be used in improving marketing strategies or crafting new business ideas.
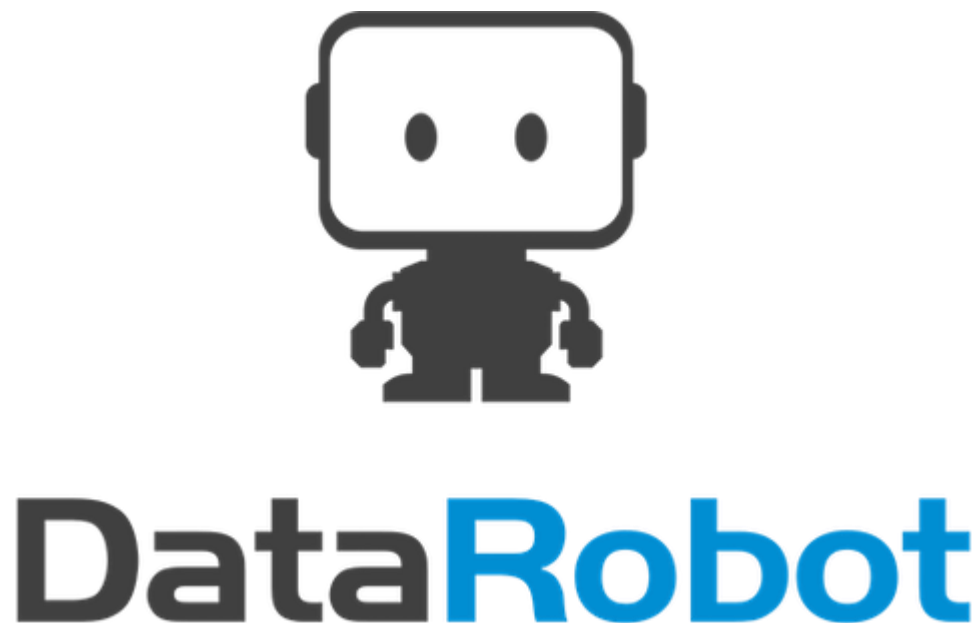

Fig 3: Explaining Data Robot.

2. With a continuous rise of data intensive science, there is a demand for data management in the companies for improved productivity (Ingram,2019). In Bookabees case the books for the customers i.e. children are specific. When industry experts suggest the books to customers

specific to its choices, there might be an issue of repeating the storyline or context in the same genre. This might lead to the repetition of the books or the context for the users. Hence, to avoid such duplication, short e-book reviews can be made available (Woeber, 2017).

Once the short book reviews are loaded into databases, then customers can go through them and chose the books accordingly. This avoids the same type of books though they belong to the same genre. This will eliminate the duplication possibility of search log as well as recommendation system.

3. Many small businesses use different types of metrics for the development of businesses. Some metrics like users feedback can be very crucial to understand the problems with current business model and help to provide some cognitive analysis. These type of cognitive analysis about the books genre, categories, price ranges and other facilities like book stickers will help to improve the responsive services to the stakeholders (Kumar, K.L.S., Desai, J. and Majumdar, J. (2016).

Hence the feedbacks can be put to good use and potentially be used for the improvements of Bookabees as:

- Improving the data collection

- Better marketing strategies

- Eliminating the problems in business model.

- Allure more customers to subscribe.

- In becoming more streamlined as a business

  To remain on the top of the competition

3.2 Relational Database purpose:

Relationship database was introduces by Codd (1970) to eliminating the drawbacks of the hierarchical and network models. But for the given case study of the Bookabees, the relational database management will not be appropriate because the data collection for the website is (i) massive as well as (ii) unstructured. Since the data is massive and not rule base, there might be issues in data storage and processing. Also, the data is unstructured and not rule based. Hence a traditional relational database management system(RDBMS) cannot be used to manage the unstructured data (Manning, A., 2015).

Apache Kafka is very useful to handle large amount of data which is untraditional, non-homogenous. Apache Kafka specifically addresses the general issues of accessing high volume of data to diverse consumers. The main benefit is that, it makes scaling easy. It helps effectively to store and process the streams of records. (Theofanis P. Raptis, Andrea Passarella).
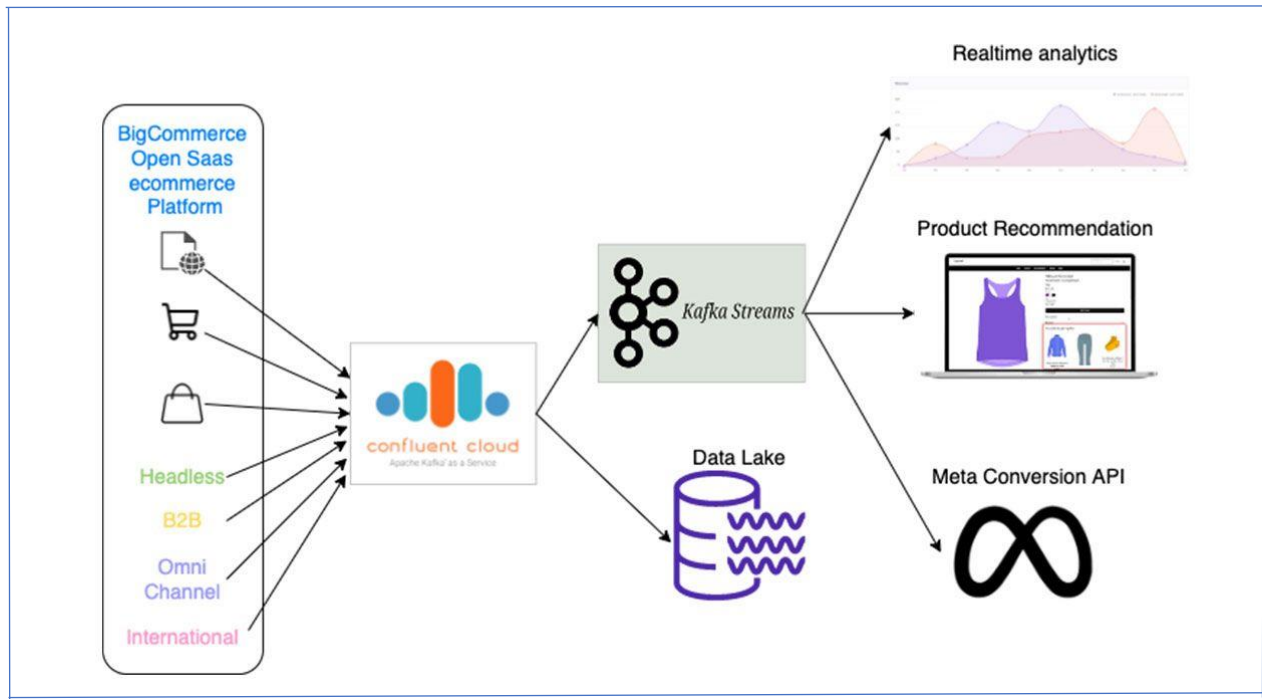

Fig 4: Using Kafka for Big Commerce

3.3 NoSQL database tools:

To manage such large and heterogeneous datasets, NoSQL like MongoDB will be crucial and very effective. MongoDB was released in 2009. It is relatively new and helps tremendously in archiving, creating repository and large storage of data. It offers accessibility flexibility, speedy processing and ease of access, consistency, durability. MongoDB is cross platform based database system which is open sourced and written in C++ that also allows document saving.

One of the positive attribute is that using MongoDB, upgradation with new records or entries can be very easy. Also, there are no relationship dependencies in the database hence, there are hardly any dependencies created in between the tables. The storage of MongoDB is off limits and has no definitive structure (Boicea, A., Radulescu, F. and Agapin, L.I. , 2012).

Fig 5: MongoDB

Citations

1) Batini, C., Stefano Ceri and Navathe, S.B. (1992). *Conceptual Database Design*. Addison-Wesley.
https://books.google.co.uk/books/about/Conceptual_Database_Design.html?id=HeFQAAAAMAAJ&redir_esc=y

2) Sikha Bagui and Earp, R. (2012). *Database design using entity-relationship diagrams*. Boca Raton, Fla.: Auerbach ; London. https://www.google.co.uk/books/edition/Database_Design_Using_Entity_Relationshi/KZKylX9oH8IC?hl=en&gbpv=1&dq=Sikha+Bagui+and+Earp,+R.+(2012).+Database+design+using+entity-relationship+diagrams.+Boca+Raton,+Fla.:+Auerbach+%3B+London.+%E2%80%8C&printsec=frontcover

3) Cormen, T.H., Leiserson, C.E., Rivest, R.L. and Stein, C. (2009). *Introduction to Algorithms, third edition*. MIT Press. https://www.google.co.uk/books/edition/Introduction_To_Algorithms/NLngYyWFl_YC?hl=en&gbpv=1&dq=Cormen,+T.H.,+Leiserson,+C.E.,+Rivest,+R.L.+and+Stein,+C.+(2009).+Introduction+to+Algorithms,+third+edition.+MIT+Press.+%E2%80%8C&printsec=frontcover

4) Rausch, T.M., Derra, N.D. and Wolf, L. (2020). Predicting online shopping cart abandonment with machine learning approaches. *International Journal of Market Research*, p.147078532097252. doi:10.1177/1470785320972526.

5) DataRobot. (n.d.). *Data Collection | DataRobot Artificial Intelligence Wiki*. [online] Available at: https://www.datarobot.com/wiki/data-collection/.

6) Google Cloud. (n.d.). *What Is A Relational Database*. [online] Available at: https://cloud.google.com/learn/what-is-a-relational-database#:~:text=A%20relational%20database%20is%20a.

7) Raptis, T.P. and Passarella, A. (2022). On Efficiently Partitioning a Topic in Apache Kafka. *2022 International Conference on Computer, Information and Telecommunication Systems (CITS)*, [online] pp.1–8. doi:10.1109/CITS55221.2022.9832981.

8) Boicea, A., Radulescu, F. and Agapin, L.I. (2012). MongoDB vs Oracle -- Database Comparison. *2012 Third International Conference on Emerging Intelligent Data and Web Technologies*. [online] doi:10.1109/eidwt.2012.32.

9) Rausch, T.M., Derra, N.D. and Wolf, L. (2020). Predicting online shopping cart abandonment with machine learning approaches. *International Journal of Market Research*, p.147078532097252. doi:10.1177/1470785320972526.

10) Manning, A. (2015). *Databases for small business : essentials of database management, data analysis, and staff training for entrepreneurs and professionals*. New York? Apress.

11) Shaikh, S., Rathi, S. and Janrao, P. (2017). *Recommendation System in E-Commerce Websites: A Graph Based Approached*. [online] IEEE Xplore. doi:10.1109/IACC.2017.0189.

12) Kumar, K.L.S., Desai, J. and Majumdar, J. (2016). Opinion mining and sentiment analysis on online customer review. [online] IEEE Xplore. doi:10.1109/ICCIC.2016.7919584.