Book-Mark Product Description (Lab 1)

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1. Introduction

The current Covid-19 pandemic has changed how humans work and meet with in larger group. World Health Organization states, 25 percent increase in mental illness triggered by pandemic (COVID-19, 2022). During this difficult time, people are looking for a sense of belonging, support of other human and happiness. The casual readers who would read during commute to work and in person book club members needs a new platform to continue their reading. A survey has shown 84 percent of readers in book club felt a sense of belonging and 71 percent saw improvement in mental wellness (Why join a reading group?, 2021). Book club itself is a niche hobby. It differs vastly by the amount of time they meet or kind of books the group reads. It is hard to find a book club that caters your needs and even harder to start and sustain it. There are online and mobile application that represent themselves as book club, but they lack the matching users according to their reading interest and are usually consists of thousands of members. There is a need for an application that can match readers to join an existing small size book club with capabilities of virtual communication and other enhancing features. Our solution to this societal issue is Book-Mark
2. **Product Description**

Book-Mark creates one online platform for searching, starting, and sustaining book clubs uniquely tuned to supporting the interests of members without the headache of switching between multiple platforms and clever use of AI to enhance user experience.

2.1. **Key Features and Capabilities**

Book-Mark will match the members based on data provided by new user during sign up process and user profile data from existing member. The AI will suggest book club to join that are looking for new members. The size of the book club is limited to 10 members since smaller groups enhance individuals learning experience and involvement (Lynn Stewart, 2009).

Book-Mark is created to provide a single platform to create, manage, and communicate within a singular application. It has the capability to schedule conference video calls, direct message with the member of the club and customized chat rooms. The member of the club can create their own chat rooms to talk about the book they are currently reading. Example of the custom chatroom may be a spoiler room, chatroom to talk about main characters, chatroom to discuss each chapter in a book, and many more.

Book-Mark will use AI for chapter summarization and discussion questions to start the conversion about each chapter. Application will have a database to store the summarization of chapters for each book. Members will also have the option of uploading chapters to generate summarization for books that are not in database. The AI will use the chapter summaries to generate discussion questions. The AI will also collect data from user engagement and chat rooms to suggest future books.

The discussion answers, direct chat message and chat room activities will be monitored by moderation bot. The bot will constantly monitor text to flag user account for inappropriate
contents. If some inappropriate content is not captured by bot, other members also have the capability to flag that content. All flagged message and user profile will be manually administered by Book-Mark auditor. Repeated offender profile will be deleted.

Another aspect of our application is to reward users for their involvement in Book-Mark. Each user profile will contain their achievement for number of days reading a book, number of book completion, correct answer to discussion questions, and others. The individual rewards are visible to other users. They can also be shared in other Social Media platform to share with friends and families.

The user matching capabilities based on their preference, one platform to communicate, customizable chatrooms and AI generated discussion topics are unique to Book-Mark. The above-mentioned features and small club size provides an application gives feelings of a shared community and belonging.

2.2. Major Components

Book-Mark will be developed for both Desktop and Mobile platform. It is a web-based application. User will need a stable internet connection, smart phone, computer with decent storage, processor, and input medium such as keyboard.

The application will use AWS IAM to enforce account verification using 2FA. The user signup data are stored in AWS RDS server. The user profile data will be used by AI to match user with appropriate clubs. The communication aspects such as video calls, chat and chatrooms are integrated with Mirror Fly API. User activities such as answering challenge question and number of books read will also be stored in AWS RDS server.
3. Identification of Case Study

This application is developed for book readers who want to join a book club based on their preference. The number of people reading books is small percentage compared to other hobbies. Finding a book club that matches user preferred genre that are less popular among other readers such as History or Astronomy becomes a difficult task to accomplish. Book-Club is entirely online, and each club has meta data such as genre and next book they will read. Such data will be used to match new users to current clubs or help them create a new club. The prototype can accomplish that using SQL queries whereas real world product can use AI to analyze user signup data and preference to give suggestion for book clubs.

It is also developed for in-person book clubs looking to transition into online platform. Book-Mark understand and takes care of creating, communicating, and sustaining book club. One platform removes the hassle of communicating through different mediums. Usually, book club organizer must create starter questions and keep the discussion interesting. Book-Mark takes the responsibility of generating such discussion with AI generated questions based on chapter summaries. The prototype will use free tier API for communication and will have limited number of hours for communication.

4. Prototype Description

The prototype main objective remains like real world. However, due to constrains, we will be making changes to hardware and API to demonstrate the prototype.
4.1. Prototype Architecture

- Hardware

The real-world prototype will use AWS platform to host database server. The prototype will use ODU provided server to host database. The prototype will support Android Smart phones and Desktop computers.

- Software

The prototype will use open-source API for 2FA, open-source API with limited capabilities for Video Calls and Chat Message. The prototype will not incorporate moderation bot and will rely solely on member flagging contents. The prototype will be developed only for Android and Desktop platform.

Figure 1

Book-Mark Major Functional Component Diagram
4.2. Prototype Features and Capabilities

The prototype will demonstrate the working solution without limited capabilities of AI and moderation bot implementation. The prototype will still show the key feature such as matching user profile to club profile, communication within members in reduced quantity, and reward system to track progress made by users. The AI will use simulated summaries to generate questions and application data will be hosted in ODU server rather than AWS servers.

Table 1

Table of Comparison between RWP and Prototype

<table>
<thead>
<tr>
<th>Feature</th>
<th>Prototype</th>
<th>Real World Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account Authentication</td>
<td>Open source 2FA API</td>
<td>AWS IAM</td>
</tr>
<tr>
<td>Club Profile</td>
<td>Same as RWP</td>
<td>Same as Prototype</td>
</tr>
<tr>
<td>User Profile</td>
<td>Same as RWP</td>
<td>Same as Prototype</td>
</tr>
<tr>
<td>Club Search</td>
<td>Using SQL queries</td>
<td>AI matching</td>
</tr>
<tr>
<td>Moderation Bot</td>
<td>Not implemented</td>
<td>Implemented</td>
</tr>
<tr>
<td>Video Calls</td>
<td>Implemented with limited capabilities</td>
<td>Fully Implemented</td>
</tr>
<tr>
<td>Customized Chat Room</td>
<td>Same as RWP</td>
<td>Same as Prototype</td>
</tr>
<tr>
<td>Chapter Summarization</td>
<td>Simulated</td>
<td>Generated from AI</td>
</tr>
<tr>
<td>Chapter Questions</td>
<td>Simulated</td>
<td>Generated from AI</td>
</tr>
<tr>
<td>Book Recommendation</td>
<td>Same as RWP</td>
<td>Same as Prototype</td>
</tr>
<tr>
<td>Rewards/Streak</td>
<td>Same as RWD</td>
<td>Same as Prototype</td>
</tr>
<tr>
<td>Database</td>
<td>MySql</td>
<td>Amazon RDS</td>
</tr>
<tr>
<td>Intrusion Detection System</td>
<td>Not Implemented</td>
<td>AWS Guardduty</td>
</tr>
</tbody>
</table>
The prototype is a success if the user can sign up and get matched to preferred genre club, login with 2FA, communicate with other club members, have AI generated questions and system to track their progress. These are the core functionality and prototype should be able to demonstrate it.

The prototype will use 2FA for authentical to block unauthorized access. The prototype will also limit database server access by creating DAO and DTO to limit direct access of database by users. Risk such as server availability will be dependent on ODU network.

4.3. **Prototype Development Challenges**

The implementation of third-party software/API can cause problem to integrate in the prototype application. There are very limited support and knowledge to implement them.
5. Glossary

**Android**: An operating system for mobile devices which operates on a modified Linux kernel and open source software and is commercially supported by Google.

**AWS**: *(Amazon Web Services)*: Cloud computing services that provide basic infrastructure and distributed computing tools on a pay-as-you-go basis.

**MFCD**: *(major functional component diagram)*: Shows what hardware and software are required by the system and how users can interact with the system.

**MySQL**: An open-source management system for relational databases which organizes data in one or more tables that are related to each other; commercially developed by Oracle. SQL is an abbreviation for Structured Query Language, which is a language designed to manage and use relational databases.

**MirrorFly**: Real-time messaging software that offers businesses the tool to create efficient text, audio, and video chat apps for mobile and web-based platform.
References

*COVID-19 pandemic triggers 25% increase in prevalence of anxiety and depression worldwide.*


*Why join a reading group?* (2021, September 14). From readinggroups.org:

https://readinggroups.org/news/why-join-a-reading-group