Bilkent University

Department of Computer Engineering

Senior Design Project

Project name: Vybe (Group T2306)

Project Specification Report

Group Members:

- Mehmet Berk Türkçapar (21902570)
- Oğuz Ata Çal (21903088)
- Yiğit Ekin (21901784)
- Harun Can Surav (21903452)
- Can Önal (21901658)

Supervisor: Cevdet Aykanat

Innovation Expert: Ümit Akkuş

1. Introduction **2**
1.1. Description 2
1.2. Innovation Specifications 3
1.3. Constraints 4
1.3.1. Implementation Constraints 4
1.3.2. Economic Constraints 5
1.3.3. Sustainability Constraints 5
1.3.4. Language Constraints 5
1.3.5. Ethical Constraints 6
1.3.6. Social Constraints 6
1.4. Professional and Ethical Issues 6
1.4.1. Professional Issues 6
1.4.2. Ethical Issues 6

2. Requirements **6**
2.1. Functional Requirements 6
2.1.1. Customer 6
2.1.2. Venue Personnel 7
2.2. Non-Functional Requirements 7
2.2.1. Performance 7
2.2.2. Usability 8
2.2.3. Security 8

3. Ongoing Discussions **8**

4. References **9**

1. Introduction

As the COVID-19 pandemic is coming to an end with the help of vaccines, people are returning back to their normal lives. Restaurants and bars are getting more crowded and people are eager to end their long-lasting starvation of socializing. People are going to these venues not only for food or drinks, but also for the atmosphere these places provide. The most significant factor which determines the quality and style of this atmosphere are the songs played in these venues. According to a study, when music that matches the concept of a venue is played, a 9% increase has been observed in the sales of a restaurant [1]. Thus, background music is a crucial factor which enhances the experience of customers. However, customers usually do not have a word on which music is played at a venue. Therefore, users are stuck with the queue played.

Back in the 1950s jukeboxes were very popular amongst bars and restaurants and they solved this issue by enabling users to play songs they wish by inserting coins [2]. However, nowadays jukeboxes became history. There is not a similar medium in which people are able to request and play songs in the venues they are. This problem is what our application will solve. Vybe will offer a similar experience for customers by creating a platform in which users will be able to request tracks from a predefined playlist of the venue. It will enable a new way of interaction for customers and create a unique experience for them. Also, businesses will be able to offer a more engaging and dynamic environment which will attract new customers. For these reasons, Vybe will transform the whole experience of going to bars, restaurants or cafes by enabling them to become vivid and alive with the help of its customers.

1.1. Description

In its core, Vybe will be an application designed to liven up and bring character to venues by bringing interactivity to music playing and listening. Instead of listening to the same static playlists everyday, users will be able to control the music and dynamically affect the mood of the venue by adding their preferred tracks through a queue system.

Vybe will consist of a web application for venue owners and a mobile application for other users. After scanning the QR code placed on the venues, users will be able to check-in to the session of that venue. After checking in users will have the option to see the music that is currently playing, see the current queue and request tracks to be put on the queue. All users will be given an amount of free requests, decided by the venue, and the subsequent requests will be paid with some amount going to the venue owners. By making this interactivity convenient and easy to use, we aim to bring the venue and its customers closer together.

The web application will serve the venue owners. It will be the platform where the venue owners and designated personnel will be able to control the music by adding tracks and predefined playlists to play when there are no requests. Venue owners will also be able to create restricted playlists for customers to choose their requests from using genres or other parameters. The system will also have the option of generating playlists based on the previous user requests.

The mobile application will also contain social media features designed to increase customer engagement and provide additional features to attract customers to venues. Users will be able to see the venues on a map, inspect the venues, see details about the music played and see the rating/comments regarding the venue's music. Users will also be able to earn badges and keep track of other statistics in their profile page according to various activities like going to the same venue for consecutive days. These achievements will also be visible to the user's friends. We believe that these features will incentivize users to use our app more and as a result we hope to bring more business to the venues.

1.2. Innovation Specifications

Vybe is an innovative application which aims to transform customer engagement in venues. It creates a whole new aspect for customers to interact with their surrounding environments by giving them the ability to control the atmosphere they are in. With Vybe, businesses are able to offer a memorable and interactive experience for users. Also, it creates a sense of community by enabling inter-customer interactions by creating polls. In addition, it enables users to interact with each other by adding each other friends and seeing where they are and what they are listening to from the map. Moreover, users will be able to have a preview of the atmosphere of a venue prior to visiting it by checking out the ratings and comments of other users. For these reasons, Vybe falls into the category of a Customer Engagement innovation. It builds a meaningful connection between customers and businesses.

On the other hand, Vybe offers an incremental innovation. There is already a similar product in the market called Touchtunes which aims to create a similar experience for users. However, this product requires hardware installation which is inconvenient in this digital era. Also, it does not offer the ability to interact with your friends.

1.3. Constraints

1.3.1. Implementation Constraints

- Mobile for customers will be written in React Native for Android and iOS; and the web-application will be written React.js.
- Server application will be written in Java using Springboot framework.
- Git with GitHub Project will be used for version control.
- TypeScript and Java will be used for implementation.
- Object Oriented Programming will be the leading paradigm.
- Relational database (PostgreSQL) will be the main means of storing data; with MongoDB used for non-regular data types.
- Zustand will be used for state management on the client side.
- Expo will be used to maintain the project architecture for the client side.
- Expo Platform will be used to create responsive layouts for different device sizes and to create layout that are adaptive to landscape and portrait modes.
- React Navigation will be used to create Stack-based rerouting and navigation for the entire application.
- Axios will be used to send HTTP requests and intercept them to prevent unwanted behavior when needed.
- Expo-camera will be used to implement QR code reading in the application
- Expo-ImagePicker will be used when users want to add a profile picture to their profiles.
- Expo-location will be used to access the location of the user for security purposes
- SQLite will be used to implement local storage on the client side
- Expo-notification will be used to push notifications to the customer.
- VerifyKit will be used to authenticate users via SMS.
- React.js will be used to implement the business-side web application.
- React-router will be used to implement navigation in business-side web application.

- Ant design will be used as the component library for the user interface.
- Slf4j will be used for logging server activity.
- GraphQL will be used for accessing SoundtrackYourBrand API.
- Hibernate ORM will be used to ease database CRUD operations.

1.3.2. Economic Constraints

- Apple App Store requires a developer fee
- Google Play Store application publishment fee
- Google Maps API Fee
- Server hosting fee
- Domain fee
- SoundtrackYourBrand fee for each venue
- There will be no fee for component libraries
- The application will be free to download for the users however, adding songs to the queue will require additional payment or watching reward-based ads.
- VerifyKit 2FA SignUp via SMS fee per SMS.

1.3.3. Sustainability Constraints

- The system will be maintained periodically.
- Any found bugs will be fixed in the next updates.

1.3.4. Language Constraints

- As Vybe is a universal application, the main language will be English. However, there may be additional language options.

1.3.5. Ethical Constraints

- User's data will not be shared with any 3rd party users.

1.3.6. Social Constraints

- Users will be only able to see the locations of their friends.
- In order to prevent decreasing the quality of the environment, users can only add music to the queue that are only approved by the venue (pre-defined playlist or matching genre).

1.4. Professional and Ethical Issues

1.4.1. Professional Issues

- Source code has to be kept private.
- Decisions will be made in a democratic manner where the ideas that are agreed on by the majority will be accepted.
- There will be meetings about the project once a week.

1.4.2. Ethical Issues

- The data of the users will be kept private and will not be shared with any 3rd party libraries.
- User's data will not be collected without the consent of the user

2. Requirements

2.1. Functional Requirements

2.1.1. Customer

- Users will register using 2-Factor Authorization using SMS.
- Users can check-in to venues by scanning the QR code.
- Users can automatically check-out of venues by location-based verification.
- Users can check-out of venues in-app.

- Users will be able to rate and comment on businesses regarding their music and atmosphere.
- Users can add other users to their friend list.
- Users who checked in a venue can have a free vote (left up to venue) that can be used to enqueue a new track or move up a track in the queue.
- Users can buy coins in-app.
- Additional votes can be purchased by spending coins.
- Coins will be transferred to the venue's wallet, which can be checked out.
- Users can check out venues from the in-app map. From this interface, users can see frequently played tracks, popular genres, current track, comments, and ratings of the venue.
- Users will collect badges per vote spent.
- Users can check their badges and statistics from their profiles.
- Users can check other users' badges from their profiles.
- By visiting a venue regularly, users can collect streaks with venues.
- Users can check their streaks.

2.1.2. Venue Personnel

- Venue personnel can play playlists created by Vybe based on previously played music; if the queue is empty.
- Venue personnel can limit the tracks played based on genres of tracks frequently played in the venue.
- Venue personnel can add tracks to the aforementioned list if they see fit.
- Venue personnel can grant discounts or votes to customers who frequent the venue.

2.2. Non-Functional Requirements

2.2.1. Performance

- The application and all systems should start in under 1 second.
- Adding a new song to the music queue should take less than 2 seconds.
- Looking up to friend-ed users on the in-app map should take less than 1 second.
- The latency between the music playing and its representation in the mobile app should be less than 2 seconds.
- Coin transfers should get executed within 1 second of transactions.

2.2.2. Usability

- User-friendly UI components will be used such as understandable short texts, big buttons with ripple effect and easy-to-find navigators.
- A predefined color palette will be used to help distinguish the primary and secondary components in the user interface.
- The application will be responsive with regards to the dimension of the device. Also, it will support landscape and portrait modes.
- The application will use the native built-in component according to the operating system that the application runs in. This will make the user use the components that he/she is familiar with.

2.2.3. Security

- User credentials should be stored encrypted.
- Cash transfers should be executed in a secure manner.
- Location information should be encrypted.
- 2FA with SMS verification will be used for restraining malicious users.
- Location-based verification will be used to prevent malicious users from crowding the track queue of the venue.

3. Ongoing Discussions

- There is an ongoing discussion about adding friends. Although it is currently listed as a feature, it may not be implemented. This is because being able to see other friends' locations can cause potential security and privacy problems.
- The coin-based transaction is an ongoing discussion. This is because displaying ads, tracking them, transferring them to the venue's wallet, and checking them out can be problematic to implement. There is still the possibility of turning the transaction logic to a direct payment system like Stripe.
- Although currently, SoundtrackYourBrand API does the work intended, there is still a search for a cheaper and more developer-friendly alternative. SoundtrackYourBrand only supports GraphQL and in order to enhance the developer experience, a library with REST support is preferred.

4. References

[1] D. Zymeri, “9 ways background music can influence your restaurant's customers,” *Backbar Academy*. [Online]. Available: https://academy.getbackbar.com/9-ways-background-music-can-influence-your-restaurants-customers. [Accessed: 17-Oct-2022].

[2] Victrola, “Jukebox history: The evolution of the Jukebox,” *Victrola*, 09-Dec-2020. [Online]. Available: https://victrola.com/blogs/articles/jukebox-history-the-evolution-of-the-jukebox. [Accessed: 17-Oct-2022].