Group 11's

DJ48

Requirements Analysis

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Project Description

Our project is a free web-based DJ application that allows users to upload, save, retrieve audio, mix two audio files and shows the user the speed of the track (Beats Per Minute) and a spectrogram, which is a visualization of the frequencies of the audio file. Features of the application include matching the track speeds and modifying the speed of a track. Users can seek through positions in a track, as well as add effects, such as distortion or delays, to modify the song. This application is intended for users to modify and play sound files.

Vision

Problem:
Sound analysis and sound mixing tools are lacking on web platforms. In addition, most applications cost money. This application will be free and accessible to any user with a web browser and Internet access.

Goals:
High-Level goals: The application will provide a way to mix and analyze sounds for any user.
User-Level goals: This application is for anyone who aims to be a future DJ. It provides an easy way for them to start their career with mixing music and beats.

System Features:

- Produces BPM for any audio file
- Produces a spectrogram that represent the frequencies of any audio file
- Allows for the mixing of at most two audio files
- Allows DJ functions provided by the Pizzicato library
- Allows for the slowing down or speeding up of any audio files using BPM
- Allows the uploading and saving of audio files

Other Requirements and Constraints:

- This application is free to use
- There is a lot of room to add new DJ features
- Uploading speed is within 2 seconds for a regular audio file

User Stories

1. As a user, I want to be able to upload, save, and retrieve audio files from the application.
   Acceptance case: I should be able to download a file I have uploaded and it should be the same file.

2. As a user, I want to be able to see the frequencies of the tracks I'm playing.
   Acceptance case: When a track is playing, a spectrogram should show up where on pauses in the song, the frequencies overall should be lower, and on high intensity moments, the frequencies overall should be higher.

3. As a user, I want to be able to see the BPM of a track.
   Acceptance case: when a track is playing, a number should be displayed representing the BPM of the corresponding track. It should relatively match spotify's reading of the beats per minute.

4. As a user, I want to be able to modify the speed of a track.
   Acceptance case: The user uploads a track and is given the option to adjust the speed of a track. The user should see the beats per minute of the track to increase or decrease, and the song itself should song sped up.

5. As a user, I want to be able to sync two tracks together.
   Acceptance case: The user uploads two tracks with different BPM and is given the option to sync them together. Using the BPM of each track, the tracks are slowed/sped up to sync to each other and are played back to the user.

6. As a user, I want to be able to be able to seek the tracks independently
   Acceptance case: The UI presents two tracks either as virtual turntables or as linear timelines. On devices with a mouse+keyboard the user can click and drag the seek head in each track independently of the other. On devices with multi-touch displays, the user may seek both tracks, but may seek them independently simultaneously.

7. As a user, I want to be able to seek one track to a specific position often.
   Acceptance case: The UI should allow setting cue points on both tracks, where on a single button press, the track corresponding to the cue button is seeked to the cue point.

Schedule

Development Iteration 1:
By the end of development Iteration 1, we want to complete the following use cases:

As a user, I want to be able to modify the speed of the track. (User Story #4)

- Taking the beats per minute from the API, we should be able to adjust the beats per minute to a speed that the users wants of test songs.

As a user, I want to be able to sync two tracks together. (User Story #5)

- The user should also be able to play two songs at once, and use the previously sped up or slowed down song to sync two tracks together. This involves keeping track of the speed of the tracks (beats per minute) and perhaps even the individual beats themselves.

Development Iteration 2:
By the end of development Iteration 2, we want to complete the following use cases:

As a user, I want to be able to seek one track to a specific position often. (User Story #7)

- The user should be able to save specific locations to play over and over again. A number of breakpoints should be added for a user to play at that location. These breakpoints should be adjustable and easy for the user to add or modify.

As a user, I want to be able to upload and play multiple audio files. (User Story #1)

- The user should be able to upload their own audio files instead of using test files. It follows that the user should be able to retrieve his or her files and play them.

Glossary

Revision History

Version	Date	Description
1.0	01/31/2018	First, initial draft.
2.0	02/01/2018	Second draft. Fill in information as needed for requirements analysis.
2.1	02/02/2018	Refined sections based on feedback from April.

Definitions

Term	Definition and Information	Aliases
Frequency	Property of the sound that determines pitch	
Spectrogram	A visualization of audio frequencies	
BPM	A measure of beats per minute in an audio track	beats per minute
Mix	To combine and modify sounds	
Track	A single stream of audio	
Sync	To match two tracks so that they harmonize together	
Seek	To change or adjust the current position of the audio playback	