Music World

Vrushank Mali and Billy Gauldin

Abstract

Music World is an easy-to-use software that allows you to listen to audio files. Music World allows the user to add and remove audio files individually, or by selecting a folder containing audio files. Music World also allows the user to play, pause, and repeat an audio file, shuffle between all audio files in a list, and change the current volume of all audio files. Music World also allows the user to create playlists. The user will be able to view the progress of the audio file that is currently playing, as well as view the list of songs being played if the user is listening to multiple songs. Music World is aimed toward people who enjoy listening to music.

1. Introduction

Music World is an easy-to-use music playing software that allows the user to add audio files by selecting them individually, or by selecting a folder containing audio files. The user can create playlists, or a collection of audio files, in order to store lists of music. Music World will allow the user to play an audio file or files, pause the audio file that is currently being played, repeat a single audio file, repeat a list of audio files, shuffle the order that audio files in a list of audio files is being played, and adjust the volume of their audio files. The user will be able to view the audio file(s) playing as well as the progress of the audio file that is currently being played. Music World will allow the user to add and listen to their own songs, unlike iTunes which forces you to buy songs stored on their platform. The supported types will be .mp3 and .wav. It will be easy and free to use, and will contain no ads. Our target audience is anyone who enjoys listening to music, but wants a simpler and easier to use software.

1.1. Background

We decided to make a music player because Spotify contains lots of ads and forces you to pay to listen ad-free, and because iTunes makes you buy the songs you want to listen to. We also wanted a simpler software made specifically for audio files. An audio file is any file containing audio data, with the currently supported extensions. A playlist is a collection of audio files.

1.2. Impacts

Music World will be easy to use, allowing the user to add their own songs instead of needing to buy a song from the iTunes store. It also allows the user to listen to music without ads interrupting them, as with Spotify and YouTube.

1.3. Challenges

- We believe that making the Music Player work smoothly and truly ”easy-to-use” will be difficult to do. **Update:** We decided to make our layout simple and easy to recognize, so that anyone who uses the program would know what each item does at first glance.
- Another challenge will be properly implementing the GUI for the project. **Update:** The GUI was not very hard to make. The hardest part was redesigning the layout of the GUI so that the main screen and side menu were encapsulated into different objects using DockPanels. Moving items around in a DockPanel was difficult, so in the end we decided to switch the main DockPanel for a Grid instead, allowing easier development and use.
- A different challenge will be allowing the user to differentiate audio files between non-audio files. **Update:** We did not get to implement this feature, sadly. We ran out of time before we were able to figure out how to add folders, so the only way the Music Player can differentiate audio files from non-audio files is whether it can play it or not (Windows Media Player does not recognize Ogg Vorbis for example, so in the program's eyes it is not an audio file).
- Another challenge will be adding support for multiple types of audio files. I don't want to limit the user to only one type of file. **Update:** This turned out to not be a problem, because of the way the MediaPlayer class works. It derives from Windows Media Player, so .wav and .mp3 files can be automatically played.

2. Scope

Music World will be finished when it is able to add and remove audio files individually and by folder, list the song's progress, list the audio file queue, change the audio file's volume, and create playlists. Our stretch goals include a timer the user could set that would pause the current song and tell the user that they've been listening to music for too long. Another stretch goal would allow you to import playlists from iTunes.

2.1. Requirements

These are some basic and standard requirements which you can find on any typical music player.

2.1.1. Functional.

- Music World will play .mp3 and .wav audio files.
- The user will be able to click on the play or pause button to play or pause the current audio file. The previous and next buttons will change the audio file to the audio file before or after it, respectively.
- Music World will allow the user to play a single audio file on repeat or allow user to shuffle or repeat a list of audio files.
- The user can add or remove individual audio files and/or folders of audio files.

2.1.2. Non-Functional.

- Music World should load within a few seconds.

2.2. Use Cases

Listed below are the use cases for Music World and how it is supposed to work. Use Case Index can be seen in Table 1.

Use Case ID	Use Case Name	Primary Actor	Complexity	Priority
1	Play an audio file	User	Med	2
2	Pause	User	Med	3
3	Add an audio file	User	Med	1
4	Remove an audio file	User	Med	4
5	Create a playlist	User	High	10
6	Remove a playlist	User	Med	11
7	Swap between playlists	User	Med	13
8	Add audio file to playlist	User	Med	12
9	Repeat an audio file	User	Low	5
10	Shuffle between audio files	User	Med	6
11	Move to previous audio file	User	Low	7
12	Move to next audio file	User	Low	8
13	Change Volume	User	Low	9

TABLE 1. MUSIC WORLD USE CASE TABLE

Use Case Number: 1
Use Case Name: Play an audio file
Description: The user wants to play an audio file. The user will double click the audio file they wish to play. This will start playing the selected audio file in Music World.

1) The user loads Music World.
2) The user double clicks the audio file to play or selects the audio file and right clicks and selects "Play".
3) The program takes a second or two to load and then it starts playing the audio file.

Use Case Number: 2
Use Case Name: Pause
Description: The user wants to pause the audio file. They will click on the pause/play button. This will pause the current playing music.

1) The user is listening to an audio file and wants to pause the audio file.
2) The user left clicks on the pause/play button.
3) This pauses the current playing audio file.

Use Case Number: 3

Use Case Name: Add an audio file

Description: The user wants to add an audio file. They will left click the ”Add/Create” button from menu and left click the ”Add Song” option from the menu. They will browse through the files in their device, will select the audio file and add it.

1) The user wants to add an audio file.
2) The user left clicks the ”Add/Create” button from the menu.
3) The user left clicks on the ”Add Song” button from the resulting drop-down menu.
4) This opens another window which allows the user to browse through the files in their device.
5) They select the audio file in the new window and left click ”Open”.
6) This will add an audio file in Music World.

Use Case Number: 4

Use Case Name: Remove an audio file

Description: The user wants to remove an audio file. They will left click the ”Remove” button from the menu and left click the ”Remove Audio File” button. They will select an audio file to remove from a menu containing all audio files by left clicking the audio file they wish to remove.

1) The user wants to remove an audio file.
2) The user left clicks on the ”Remove” button from the menu.
3) The user left clicks on the ”Remove Audio File” button from the resulting drop-down menu.
4) This creates a menu which allows the user to select an audio file to remove.
5) The user selects the audio file they wish to remove.
6) This will remove the selected audio file.

Use Case Number: 5

Use Case Name: Create a playlist

Description: The user wants to create a playlist. They will left click the ”Add/Create” button from menu and left click the ”Create Playlist” button. They will enter the desired name into a pop-up box and press enter.

1) The user wants to create a playlist.
2) The user left clicks on the ”Add/Create” button from the menu.
3) The user left clicks on the ”Create Playlist” button from the resulting drop-down menu.
4) This creates a text box which allows the user to enter their desired playlist name.
5) The user presses enter to create the playlist with the name they entered in the textbox.
6) This will create a playlist with the entered playlist name.

Use Case Number: 6

Use Case Name: Remove a playlist

Description: The user wants to remove a playlist. They will left click the ”Remove” button from menu and left click the ”Remove Playlist” button. They will select a playlist to remove from a menu containing all playlists by left clicking the playlist they wish to remove.

1) The user wants to remove a playlist.
2) The user left clicks on the ”Remove” button from the menu.
3) The user left clicks on the ”Remove Playlist” button from the resulting drop-down menu.
4) This creates a menu which allows the user to select a playlist to remove.
5) The user selects the audio playlist they wish to remove.
6) This will remove the selected playlist.

Use Case Number: 7

Use Case Name: Swap between playlists

Description: The user wants to swap to another playlist. They will left click the ”View” button from the menu and left click the playlist they wish to swap to.

1) The user wants to swap to another playlist.
2) The user left clicks the ”View” button from the menu.
3) The user left clicks the name of the playlist they wish to swap to from the resulting drop-down menu.
4) This will swap between the current playlist and the selected playlist.

Use Case Number: 8

Use Case Name: Add audio file to playlist

Description: The user wants to add an audio file to the current playlist. They will left click the ”Add/Create” button from the menu and left click the ”Add Song to Playlist” button. They will select an audio file to add from a menu containing all audio files by left clicking the audio file they wish to add.

1) The user wants to add an audio file to the current playlist.

2) The user will left click the ”Add/Create” button from the menu.
3) The user will left click the ”Add Song to Playlist” button from the resulting drop-down menu.
4) This creates a menu which allows the user to select an audio file to add.
5) The user selects the audio file they wish to add.
6) This will add the selected audio file to the current playlist.

Use Case Number: 9
Use Case Name: Repeat an audio file
Description: The user wants to repeat an audio file. They will left click the ”Repeat” button.

1) The user wants to repeat an audio file.
2) The user left clicks the ”Repeat” button.
3) This will turn on the repeat feature, and all audio files they play will repeat until the feature is turned off.

Use Case Number: 10
Use Case Name: Shuffle between audio files
Description: The user wants to shuffle between audio files. They will left click the ”Shuffle” button.

1) The user wants to shuffle between audio files.
2) The user left clicks the ”Shuffle” button.
3) This will turn on the shuffle feature, and all playlists will shuffle until the feature is turned off.

Use Case Number: 11
Use Case Name: Move to previous audio file
Description: The user wants to move to the previous audio file. They will left click on the ”Previous” button.

1) The user wants to play the audio file before the currently playing audio file.
2) The user will left click the ”Previous” button.
3) This will play the audio file before the currently playing audio file.

Use Case Number: 12
Use Case Name: Move to next audio file
Description: The user wants to move to the next audio file. They will left click on the ”Next” button.

1) The user wants to play the audio file after the currently playing audio file.
2) The user will left click the ”Next” button.
3) This will play the audio file after the currently playing audio file.

Use Case Number: 13
Use Case Name: Change volume
Description: The user wants to change the volume. They will move the volume slider to the volume they wish to listen at.

1) The user wants to change the volume.
2) The user moves the volume slider’s position to the volume they wish to listen to their music at.
3) This will change the volume to the position of the slider.

2.3. Interface Mockups

These are basic images of what our program will look like. The main portion of the program contains a ”Play” button at the bottom of the screen, that switches to the ”Playing” or ”Paused” state depending on whether Music World is currently playing an audio file or not. To the left of the ”Play button” is the ”Previous” button, and to the right is the ”Next” button. To the left of the ”Previous” button is the ”Shuffle” button, which toggles whether or not Music World will shuffle the currently playing playlist. To the right of the ”Next” button is the ”Repeat” button, which toggles whether or not Music World will repeat a playing audio file. At the very left of the program is the ”Volume” slider, which allows the user to control the volume the audio files play it.
To the right of the program is a sidebar containing a list of audio files, as well as options to interact with the audio files. The left option in the sidebar is the ”Add/Create” button, which allows you to add an audio file to the program, create a playlist, and add an existing audio file to a playlist. The middle dropdown menu is the ”Remove” button, which allows you to remove an audio file or a playlist from the program. Removing an audio file removes the audio file from all playlists as well. The right dropdown menu is the ”View” button, which shows a list of existing playlists, allowing the user to select these playlist to view and interact with the audio files stored in them.

Figure 1. Use Case 1, Play

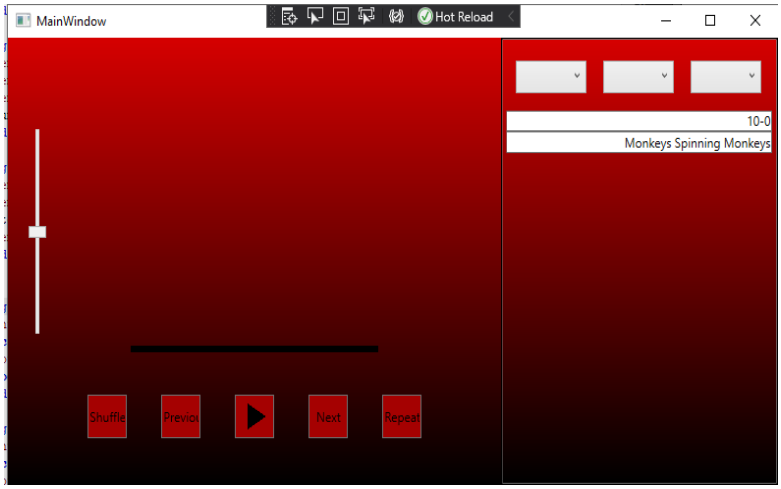

Figure 2. Use Case 2, Pause

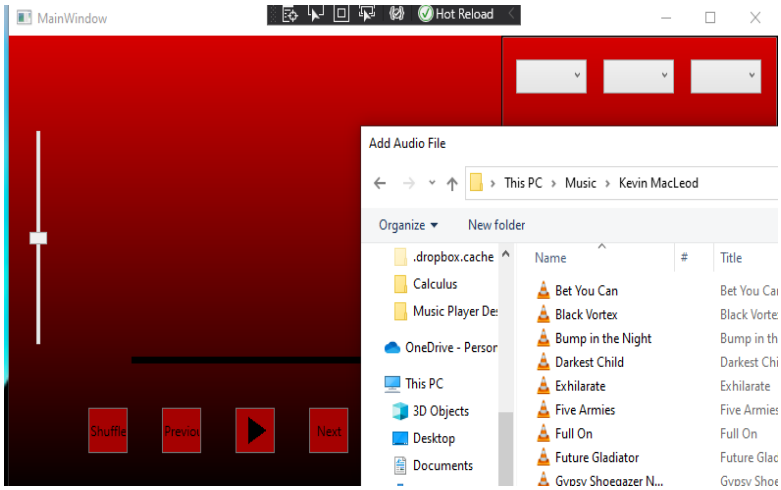

Figure 3. Use Case 3, Add an audio file

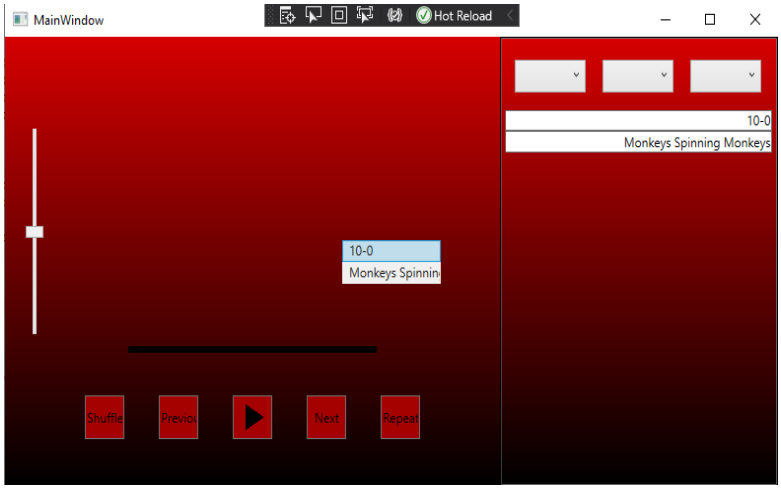

Figure 4. Use Case 4, Remove an audio file

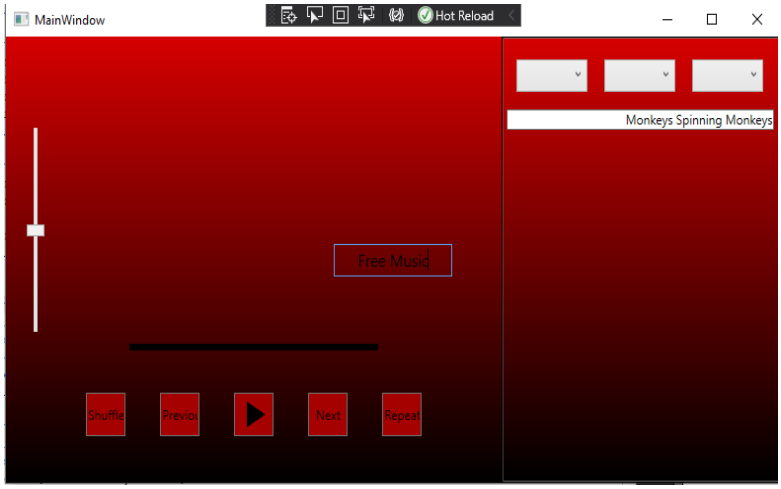

Figure 5. Use Case 5, Create a playlist

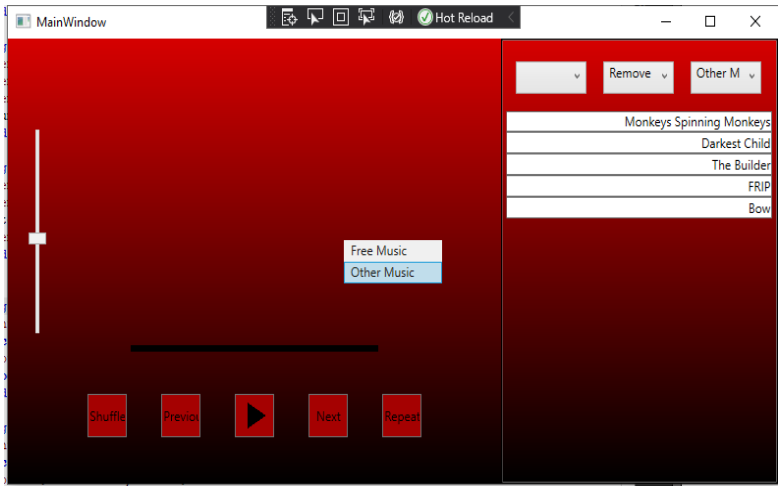

Figure 6. Use Case 6, Remove a playlist

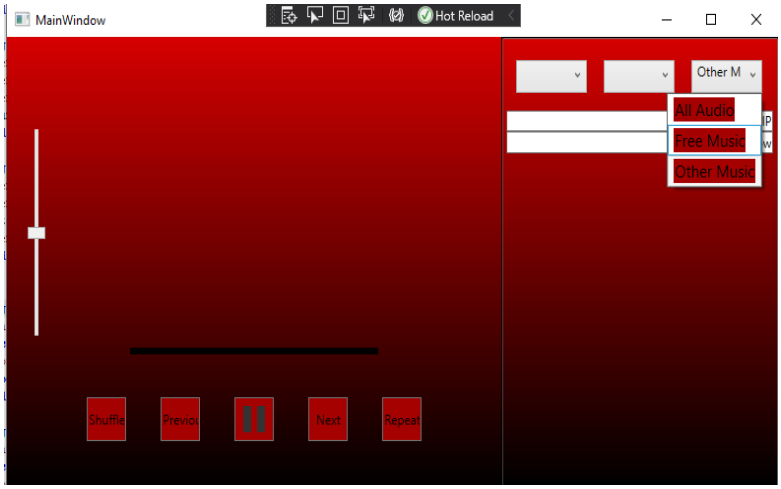

Figure 7. Use Case 7, Swap between playlists

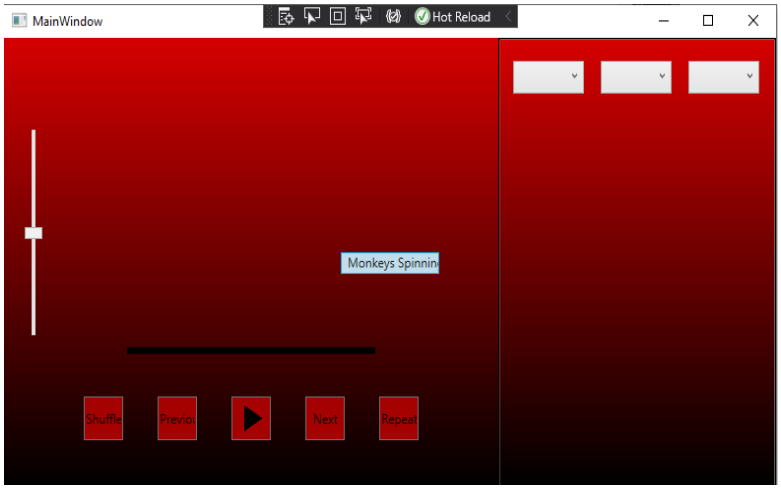

Figure 8. Use Case 8, Add audio file to playlist

3. Project Timeline

- Date 09/13/21, We submitted our group project idea, a brief introduction, a background, its social and global impacts, challenges, and the project's scope
- Date 09/27/21, In this update, we rewrote our proposal to make it look better. We also worked on interface mock-ups, use cases, and functional and non-functional requirements.
- Date 10/14/21, We successfully planned the final mock-up designs. We may make some slight changes in the future but otherwise the mock-ups are ready.
- Date 10/27/21, We worked on the timeline, the project's structure, came up with some names, and designed the basic UML structure.
- Date 10/31/21, We will finish the UML structure if we need to make changes, and will start implementing the project. **Update:** We didn't finished UML structure nor had we started implementing the project until 11/08/21. We finished the UML structure on 11/17/21.
- Date 11/15/21, We will have 50% of the project implemented. **Update:** This wasn't ready.
- Date 11/23/21, We will be almost done with the project, with most of the project being functional. **Update:** Less things were functional than intended.
- Date 11/30/21, The project will be successfully working, meeting all of its basic requirements. **Update** We did not meet all of the basic requirements until 12/2/21.

4. Project Structure

Music World uses a Factory Pattern to load each audio file. The pattern loads each file separately, creating the audio file and returning it. Music World supports .mp3 and .wav files. Music World also uses a composite pattern in order to contain each audio file inside playlists.

4.1. UML Outline

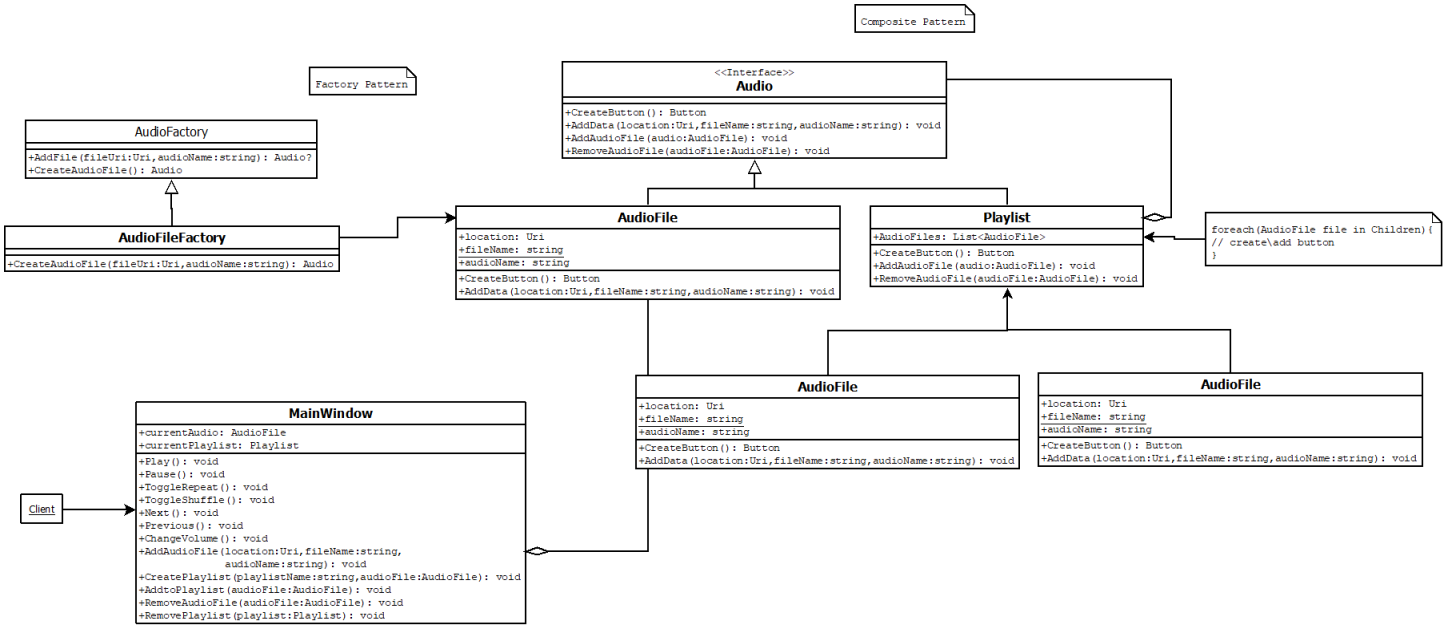

Figure 9. UML design for Music World

4.2. Design Patterns Used

We are using the Factory design pattern to create and load each audio file (top-left) and a Composite design pattern to store each audio file in a playlist (top-right).

5. Results

Currently, you can add and remove one audio file at a time and view a list of all added audio files. Furthermore, you can create, remove, and switch between playlists, as well as add audio files added to Music World to the currently viewed playlist. You can click the play button to play the first audio file in the list or double click to play a specific audio file. You can repeat an audio file and shuffle between all audio files in the currently viewed playlist. Additionally, you can use the next and previous buttons to play the audio file after and before the currently playing audio file respectively, and can listen to all audio files after the currently selected audio file in a playlist if repeat and shuffle are turned off. Lastly, you can control the volume of all currently playing audio files.

5.1. Future Work

For our next step, we plan to implement the progress bar, a timer, an option to import playlists from iTunes, and a Visualizer and an Equalizer. In the future, we will work on the project if we have free time.