

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING  
THE UNIVERSITY OF TEXAS AT ARLINGTON**

**SYSTEM REQUIREMENTS SPECIFICATION  
CSE 4316: SENIOR DESIGN I  
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**MELODY MASTERS  
SOUNDSYNC**

**ANGEL AGUIRRE  
BENJAMIN FARMER  
PATRICK FERGUSON  
EDGAR HERNANDEZ  
ADRIAN RAMOS**

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# 1 PRODUCT CONCEPT

This section describes the purpose, use, and intended user audience for SoundSync. SoundSync is a system that utilizes an audio input to follow along with a musician, keeping track of where they are on a given sheet, and then turning the page for them on a digital version of it. Users of SoundSync will be able to upload physical copies of their sheet music to our mobile application. Using either our given ADC or using any audio input device, users will be then able to use our application to follow along with their playing on the digital sheet music, indicating where they are at all times, and even turning the page when they are close to finishing the current one. Users will also have the option of using our given foot pedal to manually turn the page if they so wish.

## 1.1 PURPOSE AND USE

SoundSync will be able to automatically turn a sheet music page for a musician. This product will be used in situations where a musician would prioritize concentration over page-turning, such as concerts and practice sessions. With planned additional features, this product will also serve as a valuable tool for learning how to play a piece and enhancing self-improvement in musicians.

## 1.2 INTENDED AUDIENCE

SoundSync is meant to be used by any music enthusiast who plays instruments. Whether you are a concert-playing classical musician, or someone picking up the guitar for the first time, SoundSync provides its users the freedom to focus on their playing.

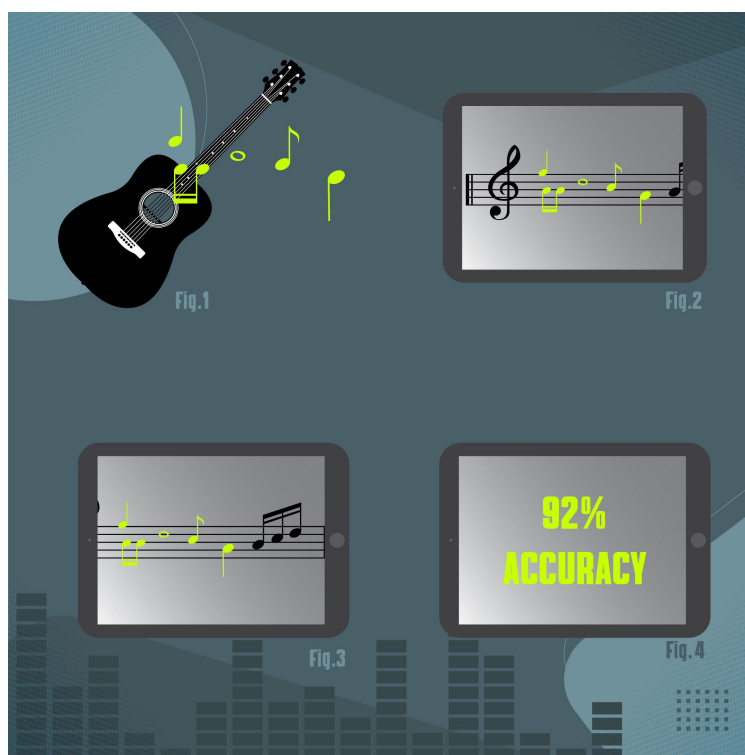


Figure 1: SoundSync conceptual drawing



## **2 PRODUCT DESCRIPTION**

This section provides the reader with an overview of the music turning page app features and functions. The end user of this product will be able to scan a music sheet into the app and have it displayed on their tablet or phone. The end user will then be able to play music and as they do the app will follow along and turn the pages automatically. If the user wishes they can also turn the page manually using a pedal provided with the product. An accuracy score will also be given for how well the user plays so they can improve their skills. Account functionality will be provided so the user can load previously scanned music sheets to save time and effort. Maintainers will use this app to determine if everything is functioning properly. They can do this by testing to see if the app reads music sheet correctly and display them without error. They will also make sure the app turns the pages at the appropriate time. As well as make sure the accuracy score is being rated correctly. They can test this by playing a song incorrectly to see if the app is properly picking up mistakes. Administrators will use the app to see if the customer is getting the desired product. Checking all feedback on the app store and improving on features that have bad reviews.

### **2.1 FEATURES & FUNCTIONS**

The product will allow the user to scan a music sheet with their phone or tablet. This will only be done with mobile devices. Any other devices will not be supported. The product will display the music sheet that was scanned or a previously scanned music sheet if the user has logged in with an account. If the user is not logged in when scanning a music sheet then that sheet wont be saved to the database. The user will play music from their desired instrument and the app will automatically turn the pages of the music sheet as music is being played. A pedal will also be provided for manual page turning. At the moment only an electric guitar is supported for the list of instruments. An ADC analog converter will be provided so music can be fed directly to the user device. The user can receive an accuracy score on how well they played a song. The user can also make an account so all their scanned music sheets can be saved.

## 2.2 EXTERNAL INPUTS & OUTPUTS

Data	Input	Output	Source	Description
Music Sheet Scanning	Music Sheet	Display music sheet	End User	The user will scan a music sheet using the app. That music sheet will be displayed on their mobile device.
Manual Page Turning	Human Interaction/Bluetooth	Goes to Next Page	End User	The user can press on a pedal that wirelessly connected to the app on their mobile device. This will manually turn the page.
Automatic Page Turning	Instrument	Auto page turning	End User/Instrument	The user can play music and the app will automatically turn the page.
Create Account	User Info	Account Creation	End user/Database	The user can create their own account. They provide an email and password as well some other basic info. An account will be created in a database so all music sheets can be saved.
Load Scanned Music Sheet	User Input	Display music sheet	End User/Database	A user with an account can select from a previously scanned music sheet. This will be retrieved from a database and displayed on their mobile device.

## 2.3 PRODUCT INTERFACES

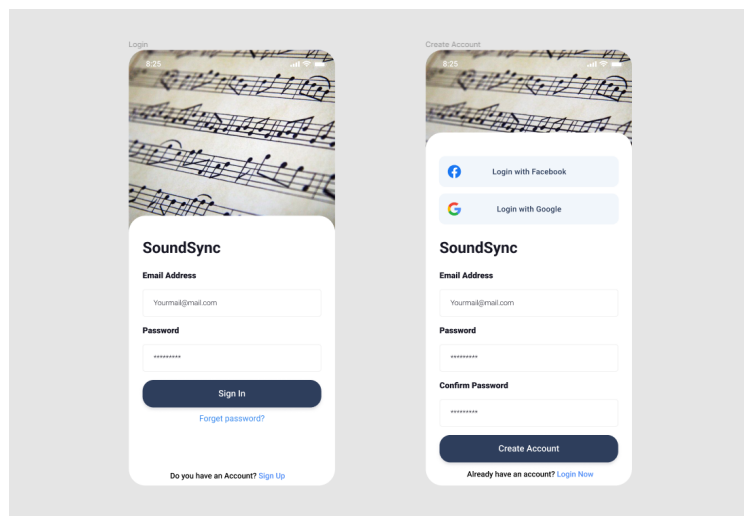


Figure 2: Login and Create Account Screen

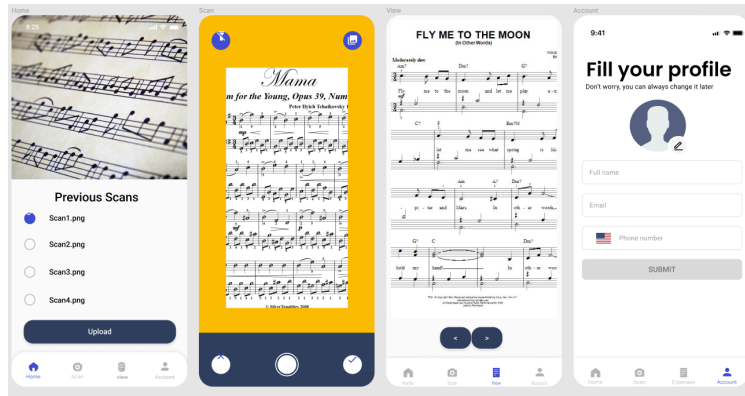


Figure 3: Home page

### 3 CUSTOMER REQUIREMENTS

These are the planned features of SoundSync. In this section we discuss what the feature is designed to do, why this feature is required in the functionality of the project, and potential constraints that might prohibit the feature from working optimally. These features we believe are necessary to create a user friendly experience with our app. The requirements that are labeled future priority do not have to be implemented to meet our vision on how SoundSync is intended to work as a product.

#### 3.1 SHEET MUSIC SCANNING

##### 3.1.1 DESCRIPTION

The app will be able to scan music sheets on paper using the camera of the mobile device. The app will then display these music sheets so the user can play a song and follow along with the music sheet.

##### 3.1.2 SOURCE

The sponsor

##### 3.1.3 CONSTRAINTS

The lighting in the room can be a possible constraint to this feature. Many times apps that allow you to scan papers often have problems saving it without having parts of the paper cut out due to lighting. So making sure our app can filter out bad lighting when scanning is essential. Also asking permission to use the user camera on their mobile device can be a possible constraint. Some users may not feel comfortable doing that.

##### 3.1.4 STANDARDS

This feature will require a private policy to be created. Since we are using the camera on the user mobile device which can be seen as an invasion of privacy. As such a private policy must be made to ensure the user information is protected. [3]

##### 3.1.5 PRIORITY

Critical

#### 3.2 LIVE NOTE DETECTION

### **3.2.1 DESCRIPTION**

The app will be able to recognize different notes being played by the user so it knows when to turn the music sheet page being displayed.

### **3.2.2 SOURCE**

The sponsor

### **3.2.3 CONSTRAINTS**

Because this app will need to listen to the user playing music, any kind of sound interference could create problems. As such the app will need to be able to filter out any sound interference and only pick up musical notes. The app will also be limited to the user mobile device microphone specification as that what it will be using to record sound. As well as privacy as the app will need permission to use the user microphone.

### **3.2.4 STANDARDS**

This feature will require consent from the user. Since we are using the microphone on the user mobile device which can be seen as an invasion of privacy. As such a private policy must be made to ensure the user information is protected./Section 16.02 Texas Penal Code [1]

### **3.2.5 PRIORITY**

Critical

## **3.3 ACCURACY RATING**

### **3.3.1 DESCRIPTION**

A feature in which the user will be given an accuracy rating as they are playing notes in a song. This can be done with a percentage number above each musical note that been passed or color coding it. An overall accuracy rating of the song will be given when the user finishes. They can then look back at all the notes they played and figure out which ones they struggled on.

### **3.3.2 SOURCE**

MelodyMasters team

### **3.3.3 CONSTRAINTS**

This feature will have the same constraints as the live note detection feature as it will also need to use the microphone to listen for sound. But with an added constraint of having an algorithm that can distinguish how accurately a note is being played. We will need to figure out a way to distinguish the difference between a bad note and a good note.

### **3.3.4 STANDARDS**

This feature will require consent from the user. Since we are using the microphone on the user mobile device which can be seen as an invasion of privacy. As such a private policy must be made to ensure the user information is protected./Section 16.02 Texas Penal Code [1]

### **3.3.5 PRIORITY**

Moderate

## **3.4 PAGE TURNING/SLIDING ON PAGE END**

### **3.4.1 DESCRIPTION**

This feature will automatically turn the page of the music sheet being displayed so the user can keep playing without taking their hands off their instrument. It will also do this before the user reaches the end of the page so the page transition doesn't cause a gap in time were the user is waiting to see the next note they need to play.

### **3.4.2 SOURCE**

The sponsor

### **3.4.3 CONSTRAINTS**

The view being shown will be constrained by the size of the mobile device screen. As such we need to make sure our app can be resized based on the device being used.

### **3.4.4 STANDARDS**

Minimum margin of 8pt, 44pt for buttons, 12pt for small text, 17pt for body text, 20pt for titles/IOS [4]

### **3.4.5 PRIORITY**

Critical

## **3.5 NOTE HIGHLIGHTING THAT FOLLOWS THE USER'S PLAYING**

### **3.5.1 DESCRIPTION**

This feature will highlight the current note the user is on so they know where they are in a song.

### **3.5.2 SOURCE**

MelodyMasters team

### **3.5.3 CONSTRAINTS**

This feature will be constrained by how accurately each note is being recorded by the microphone. If the audio interference is too great then the note may not be picked up properly and the user will get an incorrect positioning in the music sheet.

### **3.5.4 STANDARDS**

This feature will require consent from the user. Since we are using the microphone on the user mobile device which can be seen as an invasion of privacy. As such a private policy must be made to ensure the user information is protected./Section 16.02 Texas Penal Code [1]

### **3.5.5 PRIORITY**

High

## **3.6 PEDAL FOR MANUAL PAGE TURNING/SLIDING**

### **3.6.1 DESCRIPTION**

This feature will have a pedal connected by Bluetooth to the mobile device. The user can press this pedal to manually turn the page of the music sheet.

### **3.6.2 SOURCE**

MelodyMasters team

### **3.6.3 CONSTRAINTS**

This feature will be constrained by how good the WiFi is for the user since it using Bluetooth to connect. Also the input delay between the pedal and the page turning may not be quick enough for certain songs.

### **3.6.4 STANDARDS**

The app will require a Bluetooth device to be connected to the user device and as such this can be seen as an invasion of privacy. So a private policy will be developed to ensure the user privacy is secure. [3]

### **3.6.5 PRIORITY**

Critical

## **3.7 ACCOUNT FUNCTIONALITY**

### **3.7.1 DESCRIPTION**

The application will allow the user to sign up/sign into an account that will then act as a personal database/inventory of the user's previously scanned sheet music as well as their past performance statistics.

### **3.7.2 SOURCE**

MelodyMasters team

### **3.7.3 CONSTRAINTS**

The application must prioritize the security and privacy of user data. It should incorporate a secure authentication mechanism, such as usernames, passwords, and potentially two-factor authentication, to verify the identity of users during sign-up/sign-in and prevent unauthorized access.

### **3.7.4 STANDARDS**

This requirement will confidential information from the user, such as a secure password. It might also require a user's phone number and email address if 2-factor authentication is implemented.

### **3.7.5 PRIORITY**

High

## **3.8 STATISTICS ON USER PLAYING HISTORY**

### **3.8.1 DESCRIPTION**

This feature will compare the detected score to the user's playing, keeping track of multiple data points related to the user, such as accuracy, precision, completed pieces, etc. This data will then be compiled and displayed to the user as a UI element to be accessed.

### **3.8.2 SOURCE**

MelodyMasters team

### **3.8.3 CONSTRAINTS**

This feature will only be able to properly display the user's accuracy if the accuracy detection itself is working without fault. If the application cannot keep track of the user's accuracy, it will give false information, and therefore be useless.

### **3.8.4 STANDARDS**

This feature will require consent from the user. Since we are using the microphone on the user's mobile device it can be seen as an invasion of privacy. As such a private policy must be made to ensure the user information is protected./Section 16.02 Texas Penal Code

### **3.8.5 PRIORITY**

Moderate

## **3.9 ACCOUNT STORAGE FOR PREVIOUSLY SCANNED SHEET MUSIC**

### **3.9.1 DESCRIPTION**

This feature will allow the user to save scanned sheet music in a user-friendly location on the application that can then be retrieved for reuse. This data will be saved in a database that only the user can access.

### **3.9.2 SOURCE**

MelodyMasters team

### **3.9.3 CONSTRAINTS**

This feature requires coordination with the account feature in order to ensure that the user saves this data in a secure location that only they can access.

### **3.9.4 STANDARDS**

The feature should integrate with the application's user authentication system, enforcing secure access to the saved sheet music. It should follow standard authentication standards and protocols to verify the user's identity and restrict access to their stored data appropriately.

### **3.9.5 PRIORITY**

Moderate

## **3.10 PERFORMANCE MODE/PRACTICE MODE**

### **3.10.1 DESCRIPTION**

This feature will allow the user to use their scanned sheet music in either a 'practice' mode or a 'performance' mode. The practice mode will allow the user to observe real-time accuracy metrics related to their playing. This mode will also consider the musical score's time accuracy, letting the user know if they are rushing or dragging a specific musical piece. The performance mode will be a minimalist view of the sheet music, ensuring that the user will have no distractions. This mode will only consider the order of notes played when considering the automatic page turning. Accuracy metrics will be available post-play for the user.

### **3.10.2 SOURCE**

MelodyMasters team

### **3.10.3 CONSTRAINTS**

This feature's implementation may be constrained by the need for efficient real-time processing of the user's performance data, particularly in the practice mode. The application should be able to handle the computational load required for analyzing accuracy metrics and providing timely feedback to the user.

### **3.10.4 STANDARDS**

The application should aim to provide meaningful and informative metrics that can help the user assess their performance and identify areas for improvement.

### **3.10.5 PRIORITY**

Future

## **3.11 AUTOMATIC MUSIC SHEET SEARCHING**

#### **3.11.1 DESCRIPTION**

This feature will be able to detect the scanned sheet music that the user is feeding into the system. It will then compare the initial pages to a larger database of already-digital sheet music and recommend to the user its successful matches. If the user selects a match, it will replace the user's scans and allow the user to retrieve and use this already-created sheet music for their piece.

#### **3.11.2 SOURCE**

MelodyMasters team

#### **3.11.3 CONSTRAINTS**

This feature's implementation will be constrained by the available sheet music database that we can use to compare the scanned sheet music. If the database is limited, this feature might not appear to the user as a useful one.

#### **3.11.4 STANDARDS**

This feature should utilize a comprehensive sheet music database. The matching algorithm employed should follow established best practices in the field of symbol recognition and matching, ensuring accurate and relevant recommendations to the user.

#### **3.11.5 PRIORITY**

Future

### **3.12 USER TUTORIAL**

#### **3.12.1 DESCRIPTION**

This feature will provide the user with a brief visual tutorial on account creation that will inform the user on how to use the application. This tutorial will also have the ability to be re-accessed if needed.

#### **3.12.2 SOURCE**

MelodyMasters team

#### **3.12.3 CONSTRAINTS**

This feature's implementation may be constrained by the available resources and time for creating and maintaining the tutorial content. Ensuring the tutorial remains up-to-date with any changes or updates to the application may also pose a constraint.

#### **3.12.4 STANDARDS**

The user tutorial should follow user interface design principles to provide a clear and intuitive learning experience. It should present information in a visually appealing and organized manner.

#### **3.12.5 PRIORITY**

Moderate



## **4 PACKAGING REQUIREMENTS**

This section proves the reader with an overview of the hardware and software components that will require packaging. This section will also the different sources, constraints, standards and the priority of each component. The SoundSync app will not have a package as it will be a digital medium. The Analog to Digital Converter and pedal will have their own package.

### **4.1 ADC AND PEDAL PACKAGING**

#### **4.1.1 DESCRIPTION**

The ADC and pedal will be pre-assembled and will need to be connected to the user device. The packaging will be non-discrete with each component being inside a single new plastic bag.

#### **4.1.2 SOURCE**

MelodyMasters team

#### **4.1.3 CONSTRAINTS**

ADC and pedal may be too bulky for a single package and may need to be split into two separate packages to avoid damage.

#### **4.1.4 STANDARDS**

Packaging will consist of ADC and Pedal in a single bag with quick read manuals for each component and the package will have the SoundSync Logo.

#### **4.1.5 PRIORITY**

Low

### **4.2 SOFTWARE INSTALLATION**

#### **4.2.1 DESCRIPTION**

SoundSync will be packaged as an apk and will be put on the app store. The user will then download and install on a device.

#### **4.2.2 SOURCE**

MelodyMasters team

#### **4.2.3 CONSTRAINTS**

Constraints will consist of different supported device models and/or supported device firmware.

#### **4.2.4 STANDARDS**

App store will generally support a wide variety of models and firmware. In supported regions, the app will readily be available for download.

#### **4.2.5 PRIORITY**

Critical

## **5 PERFORMANCE REQUIREMENTS**

This section will include performance requirements of note detection speed as well as sheet music scanning and generating speed. The length of time it takes to start and stop these operations.

### **5.1 NOTE DETECTION SPEED**

#### **5.1.1 DESCRIPTION**

The app will include a functionality that will detect the speed of the music being played by the user. The app will continuously follow along with the frequency of the notes being played and guide the user toward the next notes.

#### **5.1.2 SOURCE**

MelodyMasters team

#### **5.1.3 CONSTRAINTS**

Constraints will consist of ADC detection failure and possible software bugs. The ADC may fail to detect the correct note if a single or multiple notes are played in succession. Software may hang or delay while processing computations.

#### **5.1.4 STANDARDS**

The app will detect a note being played on instruments connected to the ADC and properly track and progress the music on the music sheet.

#### **5.1.5 PRIORITY**

Medium

### **5.2 SHEET MUSIC SCANNING/GENERATION SPEED**

#### **5.2.1 DESCRIPTION**

This functionality will allow users to scan music sheets that will be generated as a playable online version for the user to follow along without the need for the physical copy and stored for future sessions.

#### **5.2.2 SOURCE**

MelodyMasters team

#### **5.2.3 CONSTRAINTS**

Sheet music may not be readable enough depending on age of paper or type. The sheet music may not detect all the notes on the paper correctly due to scanning feature error or scanning angle. Scanning conditions may not be suitable enough for accurate scanning.

#### **5.2.4 STANDARDS**

The sheet music scanning should scan any music sheet that the user scans with little to no error in music note detection. The sheet scanning should be a fast feature with an average scanning time of no more than 5 minutes with an average time of two to three minutes.

#### **5.2.5 PRIORITY**

Critical

## 6 SAFETY REQUIREMENTS

This section includes potential safety hazards and the corresponding safety measures to avoid them. Because this project is mostly software based, there are only a few concerns regarding the hardware that will be used with the SoundSync application - namely the audio interface, instrument, and tablet.

### 6.1 WIRING TRIP SAFETY

#### 6.1.1 DESCRIPTION

All cords will be put out of the way when testing hardware components. This will be done by securing excess cable near the instrument or tablet.

#### 6.1.2 SOURCE

Melody Masters team

#### 6.1.3 CONSTRAINTS

This will add setup time when testing to ensure no cords are left on the workspace floor.

#### 6.1.4 STANDARDS

Occupational Safety and Health Administration 1926.416(b)(2) [5]

#### 6.1.5 MODERATE

### 6.2 WATER HAZARD

#### 6.2.1 DESCRIPTION

When working with hardware components, the team must be mindful of open liquid containers to avoid electrical hazards

#### 6.2.2 SOURCE

Melody Masters team

#### 6.2.3 CONSTRAINTS

This will add setup time during testing to ensure no liquid containers could reach the hardware components (Audio interface, instrument, or tablet).

#### 6.2.4 STANDARDS

N/A

#### 6.2.5 PRIORITY

High

## 7 SECURITY REQUIREMENTS

This section will cover the security surrounding the encryption of account information and a password strength checker to ensure a sufficient password combination has been entered. This will also provide detail on the description, the source, standards, and priority for each of the security requirements.

### 7.1 PROPER ENCRYPTION OF ACCOUNT INFORMATION

#### 7.1.1 DESCRIPTION

User-sensitive information such as passwords will be appropriately encrypted.

#### 7.1.2 SOURCE

Melody Masters team

#### 7.1.3 CONSTRAINTS

Our encryption service will be controlled by what our database provider (firebase) provides.

#### 7.1.4 STANDARDS

Firebase uses the 256-bit Advanced Encryption Standard [6]

#### 7.1.5 PRIORITY

High

### 7.2 PASSWORD STRENGTH CHECKER

#### 7.2.1 DESCRIPTION

In order to avoid users losing their accounts, we will have password strength requirements. This will check for a minimum of 8 characters, a capital letter, and a special character.

#### 7.2.2 SOURCE

Melody Masters team

#### 7.2.3 CONSTRAINTS

Adding a password strength checker will take some extra time to implement, as well as add time to account registration for users.

#### 7.2.4 STANDARDS

N/A

#### 7.2.5 PRIORITY

moderate

## **8 MAINTENANCE & SUPPORT REQUIREMENTS**

This section covers what will be provided to the user from delivery onward. We will include materials that will show the user how to use the delivered product as well as support to add usability later on.

### **8.1 REGULAR UPDATE OF SHEET MUSIC DATABASE**

#### **8.1.1 DESCRIPTION**

After delivery, the team will continue updating the sheet music database to expand the catalogue of songs to practice and track.

#### **8.1.2 SOURCE**

Melody Masters team

#### **8.1.3 CONSTRAINTS**

Music selection will be limited by copyrights. It will have to be licensed if the music is not public domain.

#### **8.1.4 STANDARDS**

N/A

#### **8.1.5 PRIORITY**

Future

### **8.2 USER MANUAL PROVIDED ON INSTALLATION**

#### **8.2.1 DESCRIPTION**

A printed pamphlet will be provided to walk the user through the setup of the hardware components. It will be step-by-step and include figures to make it easy to follow.

#### **8.2.2 SOURCE**

Melody Masters team

#### **8.2.3 CONSTRAINTS**

This manual will be a one-off and will only be provided to the project sponsor. Any following installations from an app store will not include this manual.

#### **8.2.4 STANDARDS**

N/A

#### **8.2.5 PRIORITY**

Moderate

### **8.3 USER TUTORIAL PROVIDED ON APPLICATION LAUNCH**

#### **8.3.1 DESCRIPTION**

When launched for the first time, the app will give the user a tutorial to show them how to navigate the it and use its features. It will be re-accessible afterwards if needed.

#### **8.3.2 SOURCE**

Melody Masters team

### **8.3.3 CONSTRAINTS**

The provided tutorial will only highlight the features included on delivery. The tutorial may have to be changed for any features or changes added after delivery.

### **8.3.4 STANDARDS**

N/A

### **8.3.5 PRIORITY**

High

## 9 OTHER REQUIREMENTS

This section we have listed some requirements that do not fit in other areas in this document. These requirements include a software framework that we will use to develop SoundSync and a hardware component that is used as a potential backup feature.

### 9.1 REACT NATIVE FOR CROSS-PLATFORM FUNCTIONALITY

#### 9.1.1 DESCRIPTION

React Native as our choice for the software framework that will allow SoundSync to be on IOS and Play Store. This will enable a wider customer base at release.

#### 9.1.2 SOURCE

This was a decision that was recommended by Adrian Ramos and our sponsor, Shawn Gieser.

#### 9.1.3 CONSTRAINTS

Some constraints of using react native as our framework could include, learning the framework as we develop this app, libraries not working as intended, and hardware components not working as intended.

#### 9.1.4 STANDARDS

N/A

#### 9.1.5 PRIORITY

High

### 9.2 BLUETOOTH PEDAL

#### 9.2.1 DESCRIPTION

A bluetooth pedal that will allow for wireless connection to device. The pedal can be used to turn turn/slide to the next page of sheet music in case the detection of notes being played is not working as intended.

#### 9.2.2 SOURCE

This was recommended as a potential hardware component by our Sponsor, Shawn Gieser

#### 9.2.3 CONSTRAINTS

The bluetooth pedal will not work if the app does not have the implementation of a pedal to turn/slide to the next page. SoundSync not recognizing a bluetooth pedal connected to the device.

#### 9.2.4 STANDARDS

Any bluetooth pedal that is used with the app must meet Bluetooth SIG standards for proper compatibility with the device and the app. [2]

#### 9.2.5 PRIORITY

Low

## **10 FUTURE ITEMS**

### **10.1 AUTOMATIC MUSIC SHEET SEARCHING**

#### **10.1.1 DESCRIPTION**

This feature will be able to detect the scanned sheet music that the user is feeding into the system. It will then compare the initial pages to a larger database of already-digital sheet music and recommend to the user its successful matches. If the user selects a match, it will replace the user's scans and allow the user to retrieve and use this already-created sheet music for their piece.

#### **10.1.2 SOURCE**

MelodyMasters team

#### **10.1.3 CONSTRAINTS**

This feature's implementation will be constrained by the available sheet music database that we can use to compare the scanned sheet music. If the database is limited, this feature might not appear to the user as a useful one.

#### **10.1.4 STANDARDS**

This feature should utilize a comprehensive sheet music database. The matching algorithm employed should follow established best practices in the field of symbol recognition and matching, ensuring accurate and relevant recommendations to the user.

#### **10.1.5 PRIORITY**

Future

### **10.2 PERFORMANCE MODE/PRACTICE MODE**

#### **10.2.1 DESCRIPTION**

This feature will allow the user to use their scanned sheet music in either a 'practice' mode or a 'performance' mode. The practice mode will allow the user to observe real-time accuracy metrics related to their playing. This mode will also consider the musical score's time accuracy, letting the user know if they are rushing or dragging a specific musical piece. The performance mode will be a minimalist view of the sheet music, ensuring that the user will have no distractions. This mode will only consider the order of notes played when considering the automatic page turning. Accuracy metrics will be available post-play for the user.

#### **10.2.2 SOURCE**

MelodyMasters team

#### **10.2.3 CONSTRAINTS**

This feature's implementation may be constrained by the need for efficient real-time processing of the user's performance data, particularly in the practice mode. The application should be able to handle the computational load required for analyzing accuracy metrics and providing timely feedback to the user.

#### **10.2.4 STANDARDS**

The application should aim to provide meaningful and informative metrics that can help the user assess their performance and identify areas for improvement.

#### **10.2.5 PRIORITY**

Future



## REFERENCES

- [1] Audio recording.
- [2] A/v remote control profile.
- [3] Privacy and security policies.
- [4] Understanding scanning requirements.
- [5] General requirements, 1996.
- [6] Server-side encryption | google cloud services, Jul 2023.