

Milestone 4 Progress Evaluation (Feb. 17)

The Music Assistant

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2. Faculty Sponsor: Dr. Thomas Eskridge, teskridge@fit.edu

3. Client: Professor Elizabeth Dopira, Director of Choral and String Studies at FIT

4. Progress of current Milestone (progress matrix)

Task	Completion %	Daniel Griessler	Dan Levy	Javier Muñoz	Todo
Authentication	100%	10%	90%	0%	None.
Set up AWS RDS w/ MySQL	100%	0%	100%	0%	After testing, the database needs to be restricted to just the EC2 instance.
AlphaTab Customizations	0%	0%	0%	0%	Adding options and adding calls to AlphaTab API
Flow from performance to exercises	80%	30%	20%	30%	Implement flow from performance to seeing exercises
Verify Accuracy of Analysis	90%	10%	0%	80%	Verify that we can detect two successive notes with the same pitch (rather than one long note).
Generate Exercise based off Analysis	90%	20%	0%	70%	Refine measure ranking algorithm.

5. Discussion (at least a few sentences, ie a paragraph) of each accomplished task (and obstacles) for the current Milestone:

- Authentication
 - Both the sign up flow and sign in flow are completed. For now, we only offer email/password authentication. When the user signs up, they are also required to provide their first and last name. Optionally, they can add a profile picture. If they add a picture, it is resized server-side to 200px by 200px to save space. This is achieved using a pre-built Firebase Cloud Function. The authentication is handled by Firebase Auth. We store the profile picture in Firebase Storage. We store a corresponding user in our MySQL database on AWS. Database requests are handled through API endpoints on our AWS server and the user provides a id token in order to authenticate server-side. Firebase Admin is used on the server to authenticate a user using the id token. It is also important to note that a user must verify their email before they can use the web app. We have a check on startup to confirm that the user has verified their email (otherwise we show a warning page).
- Set up AWS RDS w/ MySQL
 - A MySQL database has been successfully set up on AWS RDS. Using the MySQL Workbench app, we can connect to the database and see the data via a GUI. Our server has also been set up to connect to the database and handle requests. A database design was created and all members had a look before it was coded up.
- AlphaTab Customizations
 - Due to complications with getting the main components working, this task was put on the back burner. As the final pieces are coming together for the authentication flow and performance flow, this task will be completed to start user testing before Milestone 5.
- Flow from performance to exercises
 - The pieces are all complete and all that is left is integration. The front end can record a performance and package it. The exercise generation was recently completed and ready to be integrated. All that is left is to receive the performance encapsulation on the back end, send it to the exercise generator, send back the generated exercise, and display it for the user.
- Verify Accuracy of Analysis
 - We have generally seen that the analysis performs well, it just needs to be formally organized and presentable with some minor additional test cases (distinguishing consecutive notes with the same pitch)
- Generate Exercise based off Analysis
 - Given the analysis of a performance, we can return an ordered list of measures by deviation from a perfect performance. Given a measure, we can produce an exercise. We just need these two parts to talk to each other and to determine the best way to rank the measures. I currently have this in python, but will be working on transferring it to javascript.

6. Discussion (at least a few sentences, ie a paragraph) of contribution of each team member to the current Milestone:

- Daniel Griessler: I worked primarily on the back end server getting routers in place to move information into and out of our database. I worked with Dan Levy to develop the SQL queries for the server. I set up HTTPS for our server and worked with Dan Levy to ensure the authentication sent information to the back end for storage in the database. I assisted Javier in automated testing of our front end and back end tools used for audio analysis and helped brainstorm techniques for exercise generation. I created automated tools for

transforming AlphaTex into a comparable structure for exercise generation and for transforming the exercise measures back into AlphaTex.

- Dan Levy: My primary goals were to complete the authentication flows and get the database up and running. The authentication flows required me to learn React Router (routing for a React single-page-app) and Redux (web app global state management). I had to integrate Firebase Auth, Firebase Storage, and Firebase Cloud Functions, as well as connect to the server via API endpoints. As Daniel Griessler mentioned, we worked together to build the needed SQL queries.
- Javier Muñoz: I worked mostly on the analysis and exercise generation. I had some minor struggles with the testing process because I forgot to make sure that the automated test was playing the input file at the correct speed, but once that was done, everything else has been falling into place. I'm currently working with Daniel to get my stuff to communicate with the web app so that everything flows correctly.

7. Plan for the next Milestone (task matrix)

Task	Daniel Griessler	Dan Levy	Javier Muñoz
Complete a Cycle of User Testing	33%	33%	33%
Create Poster	33%	33%	33%
Design and Code the Home Page	0%	100%	0%
Design and Code the Music Selection Page	0%	100%	0%
Design and Code the Exercise Practice Page	10%	80%	10%
Design and Code the Choir Page	0%	100%	0%
Design and Code the Member Accept/Reject Page	0%	100%	0%
Design and Code the Add/Join Choir Flow	0%	100%	0%
Finalize Exercise Generation	0%	0%	100%
Finalize Analysis Verification	0%	0%	100%

8. Discussion (at least a few sentences, ie a paragraph) of each planned task for the next Milestone or "Lessons Learned" if this is for Milestone 6

- Complete a Cycle of User Testing
 - Finish the few outstanding tasks for user testing and give tool to students in the Client's choir to gather data about effectiveness of our tool and feedback on its performance.
- Create Poster
 - Create our poster for Senior Design Showcase.
- Design and Code the Home Page
 - The home page will display the choirs that the user is a part of. It will also have an option to join a choir or create a new choir.
- Design and Code the Music Selection Page
 - The music selection page will be displayed when a user selects a choir. This page will display all available pieces of sheet music (and the associated exercises).
- Design and Code the Exercise Practice Page
 - Similar to the existing practice page where the user can sing along with a piece of sheet music, we need to show a practice page for the generated exercises.
- Design and Code the Choir Page
 - The choir page will show all choir members (name, profile picture, etc.). Admins can select a user and change their role or type, and even remove the user from the choir.
- Design and Code the Member Accept/Reject Page
 - Admins will be shown a page to accept or reject members who asked to join the choir.
- Design and Code the Add/Join Choir Flow
 - On the home page, if a user selects the option to add/join a choir, this flow will pop up. The user will enter their user role (i.e. admin or student) and user type (e.g. director or alto) for the choir. If the user elects to create a new choir, they will provide a choir name, description, and picture. If the user elects to join an existing choir, they will need to enter the choir code (a 6-character unique code) given to the admin who created the choir. If they want to join a choir, they will need to wait for an admin to accept them (the admin can also reject them).
- Finalize Exercise Generation
 - I need to allow for track selection in the sheet music so that we can allow the students to practice different parts.
- Finalize Verification of Analysis
 - I need to verify that consecutive same pitch notes are distinguishable from each other.

9. Date(s) of meeting(s) with Client during the current milestone:

2/10/2020 - Showed the current progress on the integrated website and real-time feedback UI. Got feedback on Project Plan and outlined tasks for coming milestone.

10. Client feedback on the current milestone

- Client did not suggest any edits to the Project Plan.
- Client will provide sheet music for user testing.
- Client agreed to let us test her students with the music assistant tool once we have a working prototype.

11. Date(s) of meeting(s) with Faculty Sponsor during the current milestone:

2/13/2020 - Discussed progress so far and got feedback on milestone.

12. Faculty Sponsor feedback on each task for the current Milestone

- Authentication: This looks good. Keeping it simple will be the best way to go.
- Set up AWS RDS w/ MySQL: n/c
- AlphaTab Customizations: AlphaTab seems to be a major difficulty with the project, and I would again suggest that the development there be limited to just what is necessary to bring the system to a test group.
- Flow from performance to exercises: looks good
- Verify Accuracy of Analysis: I think your approach seems sound
- Generate Exercise based off Analysis: One question that needs to be tested in experimentation is if the simple exercise generation will produce more rapid learning of the song or if additional exercises are needed.

Faculty Sponsor Signature: _____ Date: _____