EE / CPR E/ SE 491 - Weekly Report #2

*Dates:* 2/3/2020 - 2/16/2020

*Group Number:* sddec20-13

*Project Title:* My (Musical) Life

*Client & Advisor:* Dr. Henry Duwe

*Team Members:*

Christian Hernandez - Project Manager

Chaz Clark - iOS Developer

Daksh Goel - Backend Developer

Vatsal Bhatt - Backend Developer

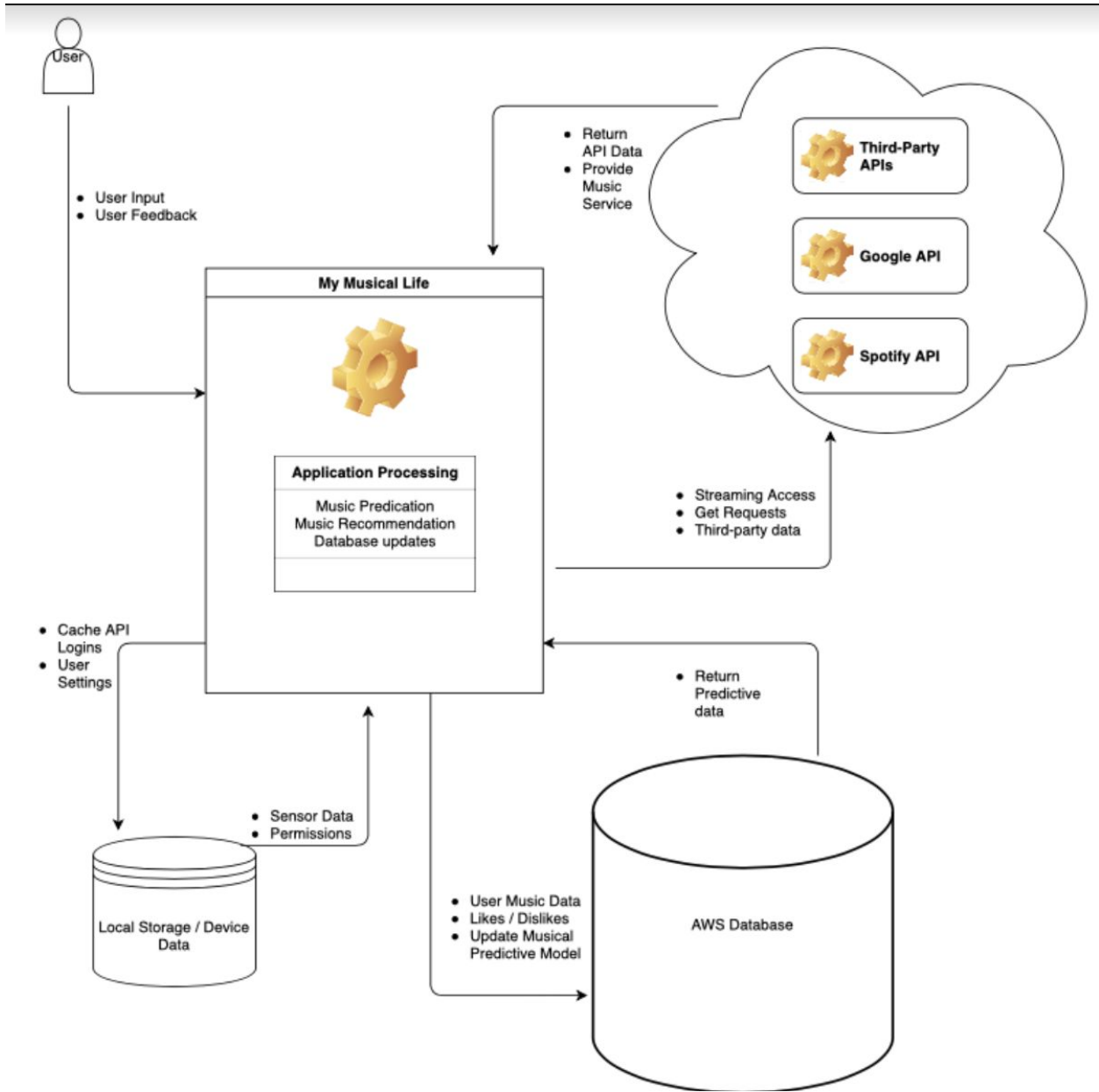Vignesh Krishnan - Frontend Developer

---

## Weekly Summary

During the reporting period, the group accomplished quite a bit. The team goes into more detail about the team's accomplishments and individual accomplishments "Past Week Accomplishments," but the accomplishments include creating a high-level system diagram, a use case diagram, more research to help the team get started with the app, etc. Additionally, the team has a website that now consists of some design documents, the project description, reports, and the team member info. The team has been meeting outside of class and communicating via Slack throughout the reporting period. Overall, the team is still in the research/planning phase. We plan on moving out of that phase for the next reporting period.

## Past Week Accomplishments

First, the two diagrams pictured below are the result of the team working together to develop these diagrams. Dr. Duwe requested the team to create these two diagrams to help with making defining the use cases better, and Dr. Duwe wanted the team to create a high-level system diagram.
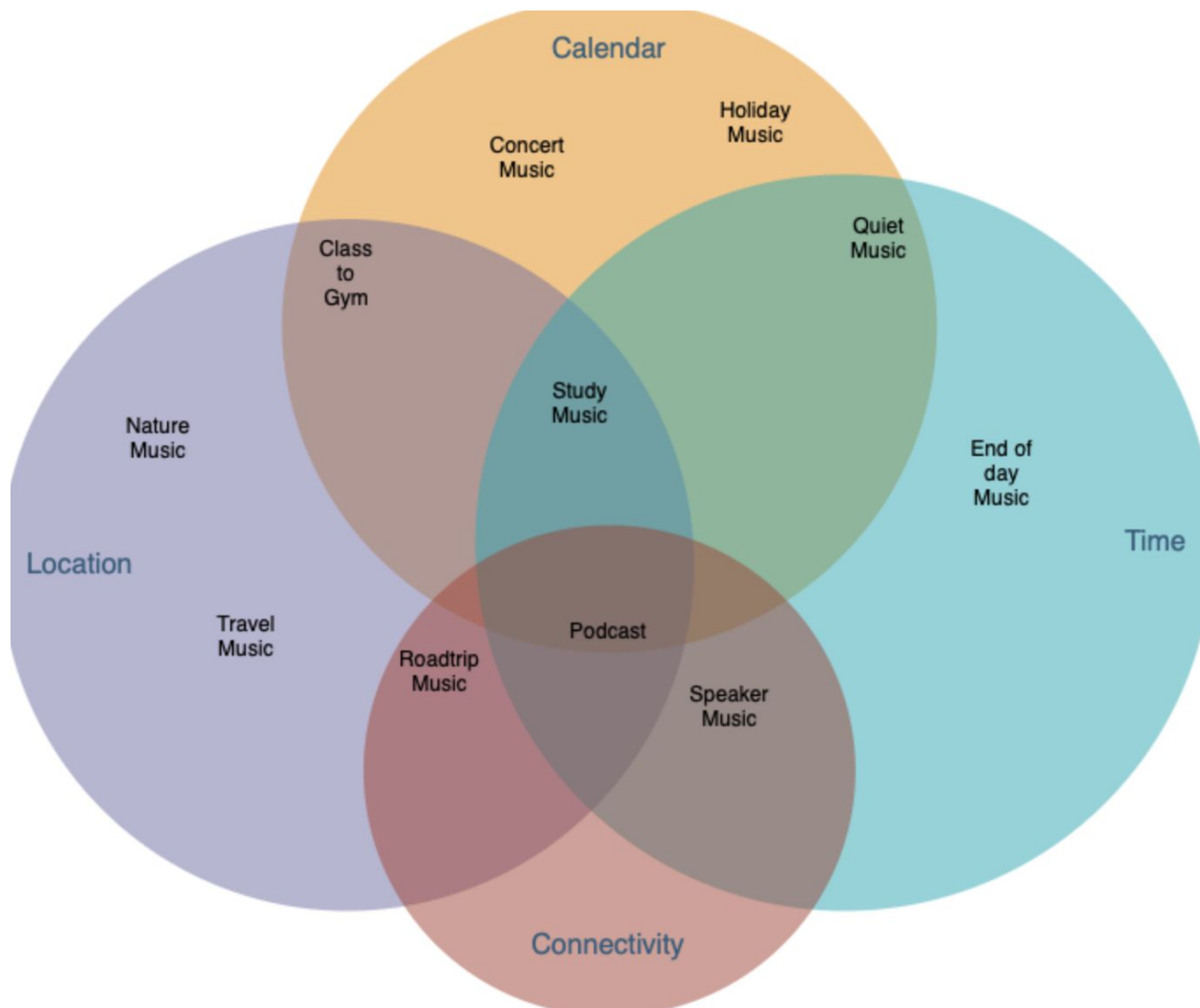


This is a Venn diagram displaying our use cases. The diagram consists of four categories: Location, Connectivity, Time, and Calendar. Some of the use cases share multiple categories, as seen above. As the app is developed, more use cases will be discovered.

User

- User Input
- User Feedback

My Musical Life

**Application Processing**

Music Predication
Music Recommendation
Database updates

- Return API Data
- Provide Music Service

**Third-Party APIs**

**Google API**

**Spotify API**

- Streaming Access
- Get Requests
- Third-party data

- Cache API Logins
- User Settings

- Sensor Data
- Permissions

- Return Predictive data

Local Storage / Device Data

- User Music Data
- Likes / Dislikes
- Update Musical Predictive Model

AWS Database

This is the high-level system diagram created for Dr. Duwe. Ultimately, this task was given to the team to help with thinking about how the app will be designed. What kind of APIs will be needed? Will a database such as AWS be needed? These are just some sample questions the team was answering as the team developed the diagram. This is helpful for the team to get a nice idea of where to start with the development of the app.

Now, as for individual accomplishments for this time period:

- Christian

    - Set up GitLab Issues tab to help us keep track of our current issues. Currently, we have issues set up on our board. There are multiple issues that have been completed already.

    - As mentioned above, assisted with the development of the use case Venn diagram and the high-level system diagram

    - Discovered potential competitors for our app. Dr. Duwe wanted us to see if there are any apps or software that has a similar idea to the app he wants us to create. Additionally, Songza and Musicovery were discovered. Songza is integrated within Google Play music, and Muscovery has a website.

        - Songza: This seems to be the most similar to our app. Songza used "information like date, time, and past listening history, Songza offered up expertly curated playlists based on predictions about the user's mood and/or activity at the time" (Crook). However, as mentioned this has been integrated into Google Play Music. Yes, Google Play Music has similar features, but it is not all that similar to our app. Our app will use sensor data and other types of data to determine one's mood and play a playlist relating to your mood.

        - Musicovery: This software "measures the quality of recommendations and playlists with an analytic tool that optimizes recommendations and playlists to each listener" ("Musicovery B2B"). Then, the software will

recommend playlists, artists, tracks, etc. based on music preferences,

listening behavior, and listening history ("Musicovery B2B"). However,

Musicovery does not seem to do what our app will do. Based on an

individual's mood, the app will generate a playlist, track, etc. for the user

to here. Musicovery does not seem to do that.

- Updated website to include background information of the project
- Learned more about AWS, Swift, and AlamoFire due to unfamiliarity with all

  three

  - *Swift:* Practice will be needed to develop the application in Swift.

    Ultimately, Swift is the programming language used to develop an iOS

    app. Chaz provided the team with some resources with learning how to

    program in Swift. These resources will be helpful as the semester goes on.

    - This is related to the project since the app will be an iOS app.

      Thus, Swift is required

  - *AWS:* AWS is a cloud platform that the team is leaning towards using for

    the app. AWS has technologies such as "compute, storage, and

    databases–to emerging technologies, such as machine learning and

    artificial intelligence, data lakes and analytics, and Internet of Things"

    ("Cloud Computing with AWS") The machine learning, AI, and storage

    may be really helpful for the app.

- As noted, this is relevant to the project because we will be using AWS to store data and possibly do some computation. The team has not decided on whether or not we want to do that yet.
      - *AlamoFire:* This is a "Swift-based HTTP networking library for iOS and macOS" (Kliffer). Ultimately, this will simplify network tasks that our group will need to do in the background. There are tutorials that exist online, and Daksh provided the team with a nice YouTube tutorial using AlamoFire. Christian watched this tutorial to become more familiar with AlamoFire.
        - This is relevant to the project because we will be using AlamoFire in the backend
- Chaz
  - Use case diagrams
    - Helped design and develop use case diagrams. We decided to split up the diagram up into 4 major sensor components. Connectivity, Location, Calendar, and Time are our major components.
  - Swift research
    - Testing third party api integrations and limitations using swift. Apple software ecosystem is centered around user privacy. This application will need a vast amount of data from the user and identifying privacy roadblocks ahead of time will be great for design
  - Sensor data research

- ■ Looking into what levels of data Apple allows developers to access from a users device. Some of this data included the users health data, which consists of their heart rate, steps, and noise levels.
- ● Daksh
  - ○ Develop diagrams
    - ■ Worked with the rest of the team to develop a high-level system diagram (posted above)
    - ■ Worked with the rest of the team to develop a use case venn diagram based on our parameters (posted above)
  - ○ Learning Swift
    - ■ Continue to watch tutorials and learn Swift.
    - ■ Learning about how to connect our application to third party APIs using Alamofire, an IOS networking library.
  - ○ Spotify API Research
    - ■ Looked into how we can use spotify's recommendations api to generate music that our users would like to listen to.
- ● Vignesh
  - ○ Developing diagrams
    - ■ Helped the rest of the team develop our use case venn diagram and system level diagram. Discussed what the overall layout of our application is with respect to frontend and backend interactions.
  - ○ Researching AWS services

- ■ Looked into S3 and Lambda services for storage and data processing

- ■ Researched about machine learning prediction services to see if our model will match with the constraints of those services

  - ○ Swift Tutorials

    - ■ Continued on Swift tutorials for how object oriented design works in Swift

  - ○ Google API

    - ■ Looked into how we can incorporate Google's API into Swift for location and calendar data

- ● Vatsal

  - ○ Use case diagrams

    - ■ Came up with use cases for our application and documented them to create venn diagrams to have a broader vision.

    - ■ Worked with the team to design a system diagram and the overall layout of our application to give us a higher level understanding of our requirements and implementation.

  - ○ Learning Swift

    - ■ Started doing app development tutorials in swift to get used to the language and Xcode software.

  - ○ Researched into cloud and database requirements

    - ■ Looked into and compared Amazon Web Services and Google Cloud Platform to decide on which service to use for our project.

- Deep dove into AWS to learn about some services including S3, Lambda, and DynamoDB.
    - Recommendation algorithms
        - Looked into different recommendation algorithms and how they are incorporated into applications
    - Spotify and Google API
        - Looked into how we can incorporate Spotify's API into Swift for personal user data
        - Researched into Gmail and Google Calendar to find out more about how to get user's schedules for data points through Google's API.

**Pending Issues**

This is not applicable to the team yet. The team has not encountered any issues yet.

**Individual Contributions**

| NAME | INDIVIDUAL CONTRIBUTIONS | HOURS THIS WEEK | HOURS CUMULATIVE |
| --- | --- | --- | --- |
| Christian Hernandez | 1. GitLab updates, <br> 2. Assisted with use case diagram and high-level system diagram <br> 3. Researched Swift and Alamofire <br> 4. Discovered potential competitors to | 6 | 12 |

| | | | |
|---|---|---|---|
| | our app<br>5. Updated website | | |
| Chaz Clark | 1. Help develop and design system level diagram<br>2. Develop and design use case diagram<br>3. Research in third party apis<br>4. Update website | 6 | 12 |
| Daksh Goel | 1. Helped develop use case venn diagram<br>2. Helped develop system level diagram<br>3. Updated Website<br>4. Researched Spotify recommendations | 6 | 12 |
| Vatsal Bhatt | 1. Helped with use case diagram and high-level system diagram<br>2. Developed Swift skills by doing online tutorials.<br>3. Researched into third party API's including Google and Spotify<br>4. Looked into | 6 | 12 |

| | | | |
|---|---|---|---|
| | Recommendation algorithms online | | |
| Vignesh Krishnan | 1. Helped develop use case venn diagram<br>2. Helped develop system level diagram<br>3. Updated personal info on website<br>4. Researched AWS Machine Learning services | 6 | 12 |

**Comments and extended discussions (Optional)**

N/A

**Plans for the Upcoming Week**

- Christian

  - Adding on to the high-level system diagram with the team

  - Continue to learn more about Swift and install XCode

  - Allocated tasks to individual and make those changes in GitLab

- Chaz

  - Identify iOS capabilities and limitations

  - Test AWS platforms and processing

  - Start developing Design Document

- Daksh

    - Research Machine Learning tools that we may use

    - Continue to learn Swift and frameworks such as Alamofire

    - Start developing Design Document

- Vatsal

    - Assist with design document

    - Research possible tools to use for machine learning

    - Begin to learn Alamofire

- Vignesh

    - Continue research on machine learning tools in AWS

    - Look at machine learning tools outside of AWS too

    - Start developing design document

## Summary of Weekly Advisor Meeting

During our meeting with Dr. Duwe, we displayed our use cases by displaying them in a Venn diagram. Dr. Duwe requested that we do this by categorizing our use cases and displaying them in a Venn diagram. Next, Dr. Duwe requested we design a high-level system diagram for him. Thus, we created one for him, and we presented that to him during our meeting. Overall, he was pretty satisfied and pleased with the use cases in the Venn diagram and our high-level system diagram.

To go more in-depth, for the system level diagram, he posed us with many questions to help us begin to think. Dr. Duwe asked, "Where will the bulk of the prediction be? Where will we be doing computation? What kind of prediction model?" Along with many other questions.

He also wants us to know what is feasible for us as a team. For example, do we have to use the cloud, or can we do all of our data storage and computation locally? Ultimately, he doesn't want us to go beyond the scope of Senior Design.

Next, by the end of the semester, he wants us to make a claim in regards to how we will be making the music prediction. Whether it is an algorithm we develop or machine learning, he wants us to be set on one for the presentation at the end of the semester.

Lastly, he wants us to begin to allocate tasks to individuals in order for him to keep track of what we are doing. Therefore, we will begin to have assigned tasks for each of us by next week.

References

"Cloud Computing with AWS." *Amazon*, Amazon, aws.amazon.com/what-is-aws/.

Crook, Jordan. "Google Will Shut Down Songza App, Songza.com To Fold Into Google Play

Music." *TechCrunch*, TechCrunch, 2 Dec. 2015,

techcrunch.com/2015/12/02/google-will-shut-down-songza-app-songza-com-to-fold-into-

google-play-music/.

Kliffer, Ron. "Alamofire Tutorial: Getting Started." *Raywenderlich.com*, Razeware LLC,

www.raywenderlich.com/35-alamofire-tutorial-getting-started.

"Musicovery B2B." *Musicovery B2B*, b2b.musicovery.com/#what-we-do.