Project Charter

October 3rd, 2021

Sponsor: Darren Sholes

Team: Ara Anner
Megan McGinnis
Liam Nestelroad
Justin Murillo
Filip Nedelkov
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Austin Ritz

1. Introduction

Background Information

LoopSketch is a collaborative software platform that makes it easy for musicians, producers and beat makers all over the world to connect, create music together, and publish content to a central marketplace. LoopSketch will be part of a new category of music collaboration software, filling the gap between traditional recording software and real-time jamming applications. Users build songs together remotely by recording, sharing and layering loops of music with each other in real-time, capturing the feeling and flow of an in-person session, without having to worry about latency.

Business Needs/Opportunities

Most of the music collaboration software currently available does not allow users record audio from their own Digital Audio Workspace (DAW). LoopSketch aims to be an improved music collaboration software where musicians can easily collaborate using a DAW of their choice. With a user interface that is easy to navigate, LoopSketch aims to be a music collaboration software that brings people together all around the world who share a passion for music.

There is also a large market for loops and using them to create songs. Eventually, LoopSketch would allow people to buy and sell loops on a large marketplace and use them to create their own music.

As part of the Senior Capstone, our team will be developing a functional prototype matching the requirements listed in this document. Because of the time restraints associated with the course and other obligations, these requirements are subject to change as the application is developed. These changes will be agreed on by both the team and the project sponsor.

2. Objectives and Scope

High Level Requirements

- Jam Mode
  - Record audio
  - Playback audio
  - Trim audio
  - View WAV of recorded tracks
- Mix Mode
  - View and use loops made in Jam Mode

  - Arrange and stack loops in a timeline
  - Collaborators get real time updates of changes being made
- Login/Home Screen

Project Scope

In Scope

- A working prototype that satisfies the high level requirements
- Audio pipeline from a DAW directly into LoopSketch
- Projects are stored in the cloud so collaborators can see changes in real time
- Basic mixing features within Jam mode (trimming audio, syncing audio to set time signature)
- Low-latency audio monitoring
- Functional mix mode with basic user interface
- Basic user interface for the entire project flow

Out of Scope

- In-app loop marketplace
- Ability to save and use kits (collections of loops)
- Advanced mixing features within Jam mode (anything beyond trimming/resizing tracks)
- Undo, redo, and version control functionality in mix mode
- Automatic time stretching of loops if timing is off in jam mode
- Chatting features (Audio and Video)
- Polished user interface
- Mobile app for basic recording functionality

3. Project Approach

General Approach – Solution Delivery Process

The Senior Capstone team will be utilizing an AGILE methodology, completing one task at a time and testing it (see timeline).

Assumptions

- The Senior Capstone team will not be expected to provide funding for any part of the project. This includes any AWS credits needed to run the application.
- The Senior Capstone team will not be expected to provide any support for the project beyond the end of the Senior Capstone class.
- Each individual member of the Senior Capstone team will not be expected to regularly exceed 12-16 hours of work on the project per week.

Constraints

- Our team is composed of 7 developers with limited project experience.
- The project must be completed by the end of April 2022.
- Each developer has limited time to dedicate each week (12-16 hours).
- Each developer has limited experience in the libraries and methodologies being utilized.

Project Changes

All changes to project scope and requirements will be reviewed by the project team. Approval for these changes will be discussed with the Project Sponsor and ultimately be made at the discretion of the project team based upon the potential impact to the project timeline and resources.

4. Project Plan

Key Deliverables

- Installers or executable for MacOS and Windows
- Code in remote Git repositories
- Documentation
  - Design and Architecture
  - Source Code Documentation
  - QA
    - Description of test plan and results
    - Known issues and how to deal with malfunction states
  - System Administration
    - Any Login / Administration information needed to manage project infrastructure

        * Description of how new releases / changes are deployed
    - Summary of lessons learned and recommendations for future work

Timeline

10/11/21 - 11/01/21

- Front-end:
    - Home screen
    - Login/Sign Up
- Back-end (audio):
    - Ability to record and save audio locally
    - Trim audio to selected region
    - Loop recorded audio
    - Begin syncing loops to time signature
- Back-end (server):
    - Begin setting up user authentication
    - Set up infrastructure for using Boto3
    - Set up basic automated unit testing pipeline
- Other:
    - Ensure everyone can setup and run front-end/back-end code

11-01-21 - Thanksgiving Break

- Front-end:
    - Finalize Home and Login
    - New project screen - Transitional pages/pop-ups
    - Create rough framework of jam-mode page
    - Link to back-end using FastAPI
- Back-end (audio):
    - Play multiple selected tracks simultaneously
    - Add/delete tracks without interrupting playback
    - Mute tracks and change individual track volume
- Back-end (server):

  - Complete setting up database for users/authentication
  - Basic functionality for sending audio to the server

11-29-21 - End of Fall Semester

- Front-end:
  - Focus on functionality of jam-mode page
  - Create rough framework of mix-mode page
- Back-end (audio):
  - Set different start points for loop
  - Metronome
  - Begin looking at routing audio from DAW
- Back-end (server):
  - Begin functionality for users joining a shared session
  - Users can share loops (WAV files) with each other

The rest of the timeline will consist of broader milestones since it is difficult to plan that far in advance.

Mid-February

- Jam mode is complete, beginning work on mix mode.

End of March

- Mix mode is mostly functional with the UI nearing completion.

End of April

- Final deliverable due with all tasks in the backlog completed/resolved. If time permits, out of scope items will be completed.

5. Resources

Labor Costs

Due to the nature of the course, there will be no associated labor costs with the project.

Hardware/Software Costs

The development of the application will utilize open source software. If software is required to be purchased for the development for the application, it will be the responsibility of the Project Sponsor to purchase said software.

Software and Libraries

Software to be utilized (subject to change):

- Back-end
  - **Pyo**: dedicated Python module for digital signal processing
  - **FastAPI**: Web framework for building APIs with Python
  - **Node.js**: JavaScript runtime environment
  - **Conda**: Package/environment management system
  - **SQLite3**: Relational database management system
  - **Boto3**: AWS SDK for Python
  - **Y.js**: CRDT implementation for shared types
- Front-end
  - **Electron**: Framework for creating desktop apps with web technologies
  - **React**: JavaScript library for building user interfaces
  - **WebRTC**: Real-time communication for applications and websites

All python code will follow the PEP 8 style guide.

6. Roles and Responsibilities

Our team will be split up into 3 teams:

- Front-end Team
  - Justin Murillo
  - Megan McGinnis
  - Gabriela Tolosa Ramirez
- Back-end Audio Team
  - Austin Ritz
  - Filip Nedelkov
- Back-end Server Team
  - Ara Anner
  - Liam Nestelroad

The team will follow the following steps for team assignments:

- Break into 3 smaller Teams (two teams of two people and one team of three people)

- Each team will work towards a 3 week sprint goal within the scope of their team's assigned project part (Back-end, Front-end, etc.)
- After 3 week sprint is finished, one team member will rotate to a new team, one team member will stay. The team member that stays is responsible for on-boarding new team member.
- Then teams work towards new 3 weeks sprint goal
- After 3 week sprint is finished, the team member that originally stayed rotates to a new team, and the process is repeated.

7. Authorization

Approved By 

Date: October 15, 2021

Project Sponsor's Name