Problem Statement and Goals
ScoreGen

Team #7, Tune Goons
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Table 1: Revision History

Date	Developer(s)	Change
Date1	Name(s)	Description of changes
Date2	Name(s)	Description of changes
...	...	...

1 Problem Statement

1.1 Problem

Musicians often improvise or develop complex pieces, but have difficulty sharing, expanding on, or documenting their progress. Manual note-taking is also time-consuming and prone to errors.

1.2 Inputs and Outputs

The product aims to take in audio from a singular musical instrument, and after processing the data, output the sheet music representative of the audio provided. The sheet music will contain the notes, note duration, and overall time signature of the piece.

1.3 Stakeholders

The product is largely aimed at helping aspiring musicians who either lack the time or the theory background to document their work in a tangible written form. It may be useful for collaborating artists who need a quick way to communicate suggestions or potential melodies.

1.4 Environment

To use this product the user simply has to download the desktop application associated with the product, and a high-quality microphone attachment to their computer

2 Goals

1. The resulting product can handle monophonic and polyphonic input from a musical instrument.
    - The core function of the product.
    - Elements such as note pitch, note length, rhythm, and tempo are essential for creating sheet music.
2. The resulting product can generate a readable and usable score that reasonably matches the audio input.
    - These are the minimum qualities such that the score can be played to recreate the original input.
3. The resulting product's digitized audio and generated scores are exportable to standard file formats.
    - To improve portability and user accessibility.
    - Maximizes the types of devices a user may use to read their transcriptions.
4. The resulting product provides a graphical user interface (GUI) that adheres to human-centred design principles.
    - Puts the user needs, capabilities, and behaviours first, which helps achieve usability goals such as learnability.
    - Enhances overall user experience.
5. The resulting product is downloadable and easily installed by the user.
    - Essential for usability.
    - Broadens the number of users that the product can reach. A product that is difficult to install easily deters users.

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3 Stretch Goals

1. Available on different platforms and devices.
2. Allows for real-time transcription to provide user feedback while they are playing an instrument.
3. Detailed and improved transcription by expanding musical context and structure identification (elements such as dynamics, expression, modulations, etc.).
4. Provides optimal instrument fingering tablature for fretted stringed instruments.
5. The resulting product is available without an internet connection.

4 Challenge Level and Extras

A general challenge level is expected for this project. The rationale behind this selected level is due to the limited domain knowledge required to successfully achieve the goals of this project. There are two main aspects of knowledge needed: music theory and signals and systems. Much of the necessary knowledge of the latter topic has been discussed in multiple junior level undergraduate courses and the former is either already known by multiple members of the team or can easily be researched and understood. As a result of the expected challenge level, two extras have been chosen:

1. Design thinking.
2. Usability testing.

Appendix — Reflection

[Not required for CAS 741 —SS]

The purpose of reflection questions is to give you a chance to assess your own learning and that of your group as a whole, and to find ways to improve in the future. Reflection is an important part of the learning process. Reflection is also an essential component of a successful software development process.

Reflections are most interesting and useful when they're honest, even if the stories they tell are imperfect. You will be marked based on your depth of thought and analysis, and not based on the content of the reflections themselves. Thus, for full marks we encourage you to answer openly and honestly and to avoid simply writing "what you think the evaluator wants to hear."

Please answer the following questions. Some questions can be answered on the team level, but where appropriate, each team member should write their own response:

1. What went well while writing this deliverable?
   Emily: While writing this deliverable we were able to solidify our understanding of the scope of our project, and how we can best leverage it to gain specific skills we'd like to have for future careers in industry. I think we did a great job of introducing the right amount of complexity to the project, without being overly ambitious in what we'll be able to get done.
   Ian:
   Jackson:
   Mark:

2. What pain points did you experience during this deliverable, and how did you resolve them?
   Emily: One main pain point that we experienced was using GitHub for collaboration on the document, since we're all used to being able to see each other's edits in real time using either google docs or Microsoft Word. This led to a bit of a disjointed feeling between the individual work that had been taken on. It ultimately led to us increasing collaboration and overall communication, and we discovered that our group meetings were vital for hosting brainstorming sessions and getting us all on the same page.
   Ian:
   Jackson:
   Mark:

3. How did you and your team adjust the scope of your goals to ensure they are suitable for a Capstone project (not overly ambitious but also of appropriate complexity for a senior design project)?