# Tensor Hero Frontend

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## Introduction

Guitar Hero is a console game letting players without music expertise play guitar in a fun way. The original creators, Harmonix, do not produce Guitar Hero anymore and so instead Clone Hero, an open-source alternative to Guitar Hero, has sprouted up and gained a lot of popularity. Yet, creating new Guitar Hero charts is tedious. Thus, came about the idea to build a website that lets anyone upload their favorite songs (e.g. mp3, ogg) and receive the Guitar Hero charts in return: The idea of Tensor Hero was born.

## Proposed project

Tensor Hero has two main technical elements: the frontend and the backend, the machine learning model. In our project we would like to tackle the frontend. More specifically, we are setting out to build a frontend for users that achieves the following outcomes:

- An *intuitive* frontend that allows users to upload their song and receive the Guitar Hero charts playable on Clone Hero
- Frontend that hosts the ML model converting audio to Guitar Hero charts

Important to note is that we are *not* implementing the ML model ourselves, rather we will be hosting the model trained by the Tensor Hero backend team. Thus, while our capstone goals and responsibilities are clearly separated, we will be working towards a common goal and have interaction points.

Expanding on the outcomes detailed above, we will explore further questions to enrich our website and the experience of converting one's audio file to a guitar hero file. Specifically, we are considering the following explorations:

- How might we animate and visualize the conversion progress? In general, how might we visualize the forward pass of a multi-stage ML model or ML pipeline? Tensor Hero is a huge multi-stage ML model and it takes roughly as long as the audio file to complete the conversion.
- How might we visualize the Guitar Hero charts the user receives?
- How might we incorporate user input to control the output of the model? For example, changing the difficulty of the charts, style of the charts ("feel"), variability of notes, etc.
- How might community building be relevant for our website? How might we embed our website into the already existing and very active online community?

## Rationale for capstone project: How is it integrative?

We are very motivated by this project as it brings together many different aspects: Firstly, the project is very **technical** and allows us to learn and practice web development hands-on (engineering). Additionally, we will need to learn how to embed the productionized machine learning model in the backend for this website and host it. Secondly, this project incorporates **design** aspects very strongly. The layout of the website, the design of the user interaction, animations, and visualizations (slightly more technical in nature) each require strong UX design skills. Third, this project will require a lot of ***user research***.

Specifically, for our explorations in the beginning and for iterating our designs to make it intuitive and interesting we will be continually interviewing users from the active Clone Hero community, whom we hope to reach and recruit over channels like Reddit and Discord. Finally, since our project will be linked to the backend team this will also be practice for larger-scale / cross-team collaboration as it often is in companies, which requires ***product management*** skills, something some of our team members are also keen to learn. In summary, we believe this project touches on all the key components of information management while furthering accessibility in how information is being disseminated to the community.

**Member roles**
Claire Zhu is responsible for conducting desktop and user research to acquire user insights and develop feature designs for the Tensor Hero front-end web experience. She will be working closely with Junyi, Forrest, and Sam on web development and generating UI assets.
Junyi Cheng will take the lead on the technical side, working with Forrest and Sam to deliver a functional web-based experience for Tensor Hero. He aims to develop engineering and team management skills, and to learn to translate user needs from Claire's side to engineering requirements and decompose problems into smaller tacklable sub-pieces.
Forrest Brandt is aiming to build on the skills he learned in Frontend and Backend Web Architecture by focusing on frontend development with Junyi. He also aims to gain user research skills by supporting Claire.
Sam Stromberg is aiming to learn product management skills, user research skills and engineering skills in supporting Junyi as technical lead in the frontend development.

**Further contributors**
In addition to having Coye Cheshire and Niloufar Salehi as our faculty advisors, Kay Ashaolu who is the lecturer for Frontend and Backend Web Architecture will be our co-advisor for questions relating to determining the architecture, choosing the right frameworks and frontend technologies, etc.