Automatic Music Transcription for the Harmonica

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# Project Description

This project came into being from my interest in Automatic Music Transcription services (AMTs) that take an audio input for a specific instrument and convert it into a sheet music notation. When looking into these I found many AMTs for popular instruments like the guitar and piano, but very few for more niche instruments. I chose to base my project around the harmonica as it is niche enough that there is not an AMT already created for it, as well as the fact that the harmonica has enough unique aspects to it that a tailored solution would offer more to a user compared to a general use AMT (e.g. specific tunings, blow direction, etc.)

The intended user base for this would be people who play the harmonica and either want to:

1. Find the notes to a song they are listening to
2. Create sheet music for a song they have come up with to share with others

# Project Aims

This project aims to create a machine learning product that will ‘listen’ to music passed to it and gather information on:

* tempo (speed at which music is played),
* note length (how long a note is held / a silence lasts)
* pitch of note (which note is being played)
* key (the tuning of the instrument)
* blow direction (is the musician sucking or blowing into the harmonica)

the AMT will then piece these together with a renderer to generate sheet music in the notation of a harmonicas playstyle and return it to the user who provided the song.

The software would be created in jupyter notebook and potentially packaged into a website or application once AMT has been completed

# Commercial Sensitivity

The main issue of commercial sensitivity for this project is with music that has already been licenced, since the original song creator has rights to the song, meaning that if this product were to be sold, it may break copyright laws as reselling someone else’s work.

Songs in the public domain can be transcribed without worry and distributed, but non-public domain work cannot be transcribed and sold without express permission from the owner.

A potential workaround would be to have this software be available for educational purposes only.

# Indicative Hardware and Software Resources

For this project my personal computer is needed for creating, hosting and testing the project deliverable, and a harmonica would greatly help for testing the software created. For software I would use jupyter notebook for programming the AMT and Trello to track progress of the project.

# References

<https://www.riaa.com/resources-learning/about-piracy/> - laws on copying and distributing of copyrighted music.

<https://piano2notes.com/> - AMT created for specific use by piano

<https://melodyscanner.com/> - AMT created for general instruments