

Music and AI

Hi

- Who am I?
 - Senior, computer science
 - Music production, audio engineering, film scoring
- What is this project?
 - Explore the cutting edge in algorithmic music generation
 - Develop new techniques
 - Unified framework can serve as a platform for future research

Existing Projects

- Google's Magenta
- iZotope Plugins
- WavNet
- Old uninteresting projects

Problems with existing projects

- There aren't any true frameworks that are modular and expandable
 - All established techniques need to be in a single place
- Rarely are they packaged in a form usable by a musician (except magenta)
- Many projects are old and outdated
- Insufficient research in combining different techniques
- No one is applying what we know now about the cognitive science of music

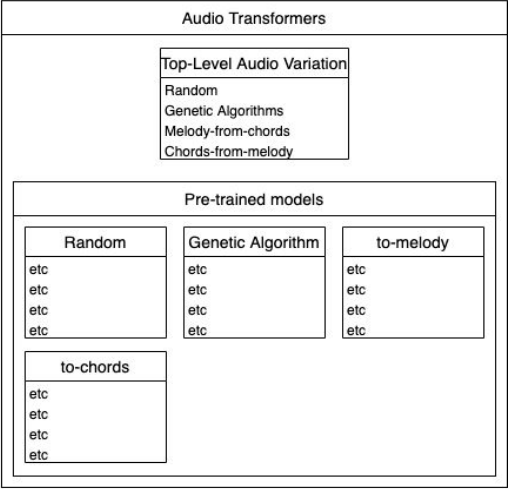
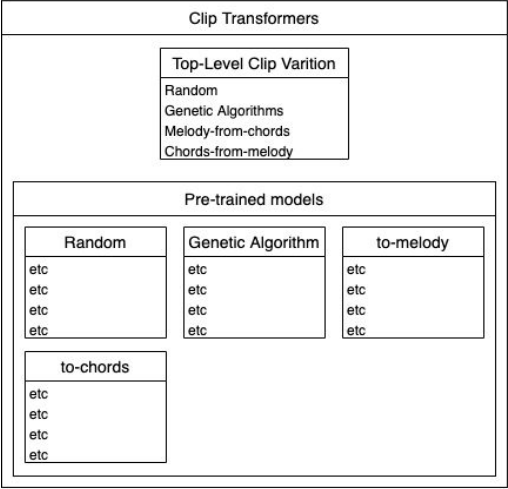
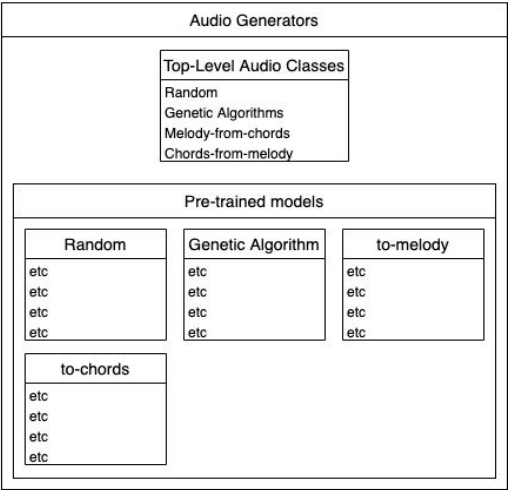
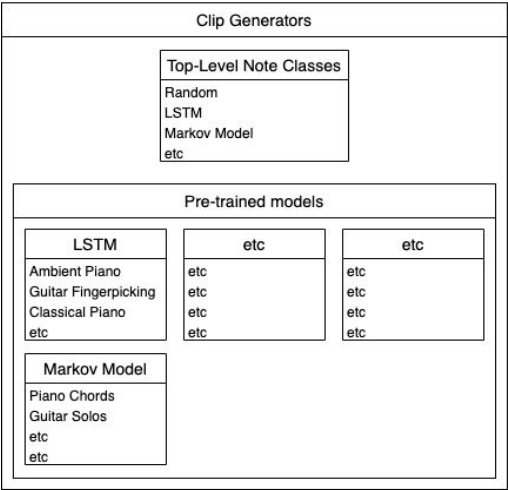
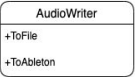
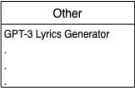
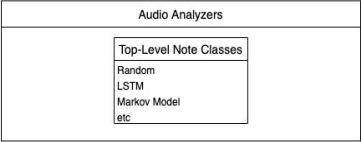
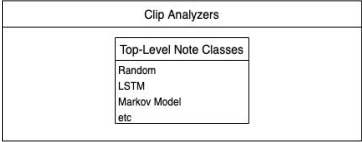
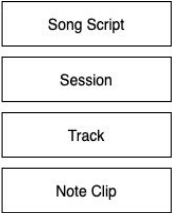
Project Overview

- Able to do things like
 - Generate note information (e.g. compose piano piece)
 - Transform note information (e.g. generate variation on a piano piece)
 - Analyze note information (e.g. sentiment analysis, map onto cognitive science research)
 - Generate audio information (e.g. nsynth by google)
 - Transform audio information (e.g. a GAN to generate violin from piano sounds)
 - Analyze note information (e.g. turn audio into midi)
- Also utilities like
 - A high level scripting interface so someone can mix and match algorithms
 - Write the data to an Ableton or Max 8 session

Project Ideas

- Framework will support things like
 - Deep learning model to generate ambient piano music
 - GAN to generate realistic violin sounds from MIDI
 - Scripting language that can generate entire songs
 - Generate music that adapts to your brainwaves
 - Generate infinite variations on a piece that's used in a game
 - Game composer builds objects using our top level class, then this is used to generate new, non-repeating music indefinitely, that adapts to the current game situation

Project Design



Cognitive Science

- A note on creativity
 - Creativity is easy, it's controlling it that's easy
- Use this research to motivate the models we construct
- Use this research to analyze generated music, extract high level semantics and sentiments, and feed this back into the models

Development Details

- Mostly in python
- Audio and game plugins in C++
- Leaning towards pytorch
- Code on github
 - <https://github.com/0xchase/music-ai>
 - Tour the github

First Projects

- Best existing book is probably *Algorithmic Composition: Paradigms of Automated Music Generation* by Gerhard Nierhaus
- Develop each algorithm in the book as we get the high-level design worked out
- Then we move onto new techniques
- Pick project from the list in `src/basic-algorithms/`
- Relevant chapter is scanned in each
- I'll work on
 - Writing the initial classes
 - Getting the code structured correctly for others to fill in

Questions