CS280r Final Project Report
Αρμονία (Harmonia): A System for Collaborative Music Composition

Mark Goldstein, David Wihl

{*markgoldstein,davidwihl*}*@g.harvard.edu*

Abstract

Increasing productivity of music composition has many positive benefits. Listeners would appreciate individually tailored music to their emotional needs and context. Composers would be facilitated by greater and more diverse cooperation yielding more innovative music. Composition agents could assist in the generation of repetitive or experimental musical forms. Therapists can use music as part of a treatment plan for autism and many other disorders. The system we propose attempts to address these myriad needs by offering two key innovations: a SharedPlan with collaborative versioning to mediate the workflow of a composition, an algorithmic evaluation of a composition against the intention of the SharedPlan to provide guidance to both human and agent composers.

1. Introduction

TODO Should contain an overview of the problem to be addressed, the approach taken to address that problem, and the results of that approach. Should provide the reader with a road map for how your argument will be developed in the other sections of the paper.

RESEARCH TODO

- Mark: talk to composers and incorporate their feedback and UI suggestions
- David: speak to David Greenberg to incorporate feedback and UI

2. Related Work

TODO Discussion of previous important, similar work in the area with comparison to the particular approach taken and results of the paper. Avoid simply providing a laundry list of other work that is somehow related to the subject of the paper. This section should contain brief, in depth discussions of the work most similar to your project, i.e., to research that takes an approach to the problem or produces results with which your project should be compared. As is always the case with written work, throughout the paper you should have citations to work that you draw on. For

example, if you have adapted a system, include a citation to the system when you first mention it; if you are extending a formalization, include a citation to the original on first mention. If you are unclear about whether a simple citation suffices or an extended discussion is needed in the Related Work section, look at the papers read for class this semester for models. If you are still unsure, check with the teaching staff.

3. Workflow Overview

git + intention + algorithmic eval
incorporate SharedPlans
Current git / music solutions

4. Algorithmic Evaluator

Current design
MIDI
entropy discussion
KL Divergence

5. Use Cases

5.1. Individual User, Individual Composer

5.2. Multiple Composers

TODO: include failure modes

5.3. Therapist with Agent - Human Composition Team

high volume necessity

6. Discussion

6.1. Enhancing or Stifling Creativity

Notes: evaluation is optional. Can be ignored by committer.

6.2. Limitations

Collaboration is offline, not real-time

Current music representation is discrete MIDI, not audio. Limits for vocals, ocean sounds

Presume that reliable corpus-based genre and mood classification solutions exist, particularly information retrieval procedures

7. Conclusion

Two Novel Contributions:

- Collaborative music composition system Intentionality, SharedPlan and Agents
- Algorithmic evaluation of composition against intention

8. Future work

- Improved agent composition
- Intelligent ad hoc composition
- Facilitator of scalable music composition
- improved evaluator, possibly RNN based