Winter Term Project Proposal 2016-17

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Introduction

For Winter Term 2016-17, we will build a neural network that will attempt to generate music based on a data flow graph, as defined through the Google open-source program TensorFlow. This project will include research into the implementations of AI neural networks, as well as tutorials in using TensorFlow effectively. The end goal is to create an engine which can generate and evaluate simple compositions by comparison to known works, translated into a machine-readable form. This project will take place on campus.

Materials Used

Research

For research, we will begin with two AI texts used in the Oberlin CS department: Russell and Norvig's *Artifical Intelligence: Modern Approach*, and Coppen's *Artificial Intelligence Illuminated*. Both of these books are available in the Science Library, or in e-version. We will decide from there which resources will prove the most useful in continuing our research.

We will also be reading TensorFlow's associated manuals and materials to learn the library. We also plan to examine materials from the MIT Media Lab, as well as from Stanford's CCRMA. Algomusic.com also has many resources and previous work done in this area that we can use as a model.

Software

TensorFlow is an open source library for the development of neural networks via a data flow graph. It is designed to be beginner level, and is implemented largely in python, with the option to modify further using C++. We plan to use all of the features in the basic library and further modify as we see fit. (The TensorFlow documentation comes with help sections for both, of course.) Our hope is that the project will be small and efficient enough such that it can be contained on personal computers, and TensorFlow is built flexibly to sustain this. We plan to use GitHub to maintain a repository of our work, and as a platform for collaboration.

Deliverable

By the end of the project, we hope to have a working software model that can produce and evaluate short compositions based on learned rules of music theory, or at the very least the framework for such a model. We will deliver our code in the form of a GitHub repository. In addition, we will deliver retrospective write-ups, summarizing our research and the capabilities of our network.