Queen Mary, University of London
School of Electronic Engineering and Computer Science

Project Proposal

ECS7022P - Computational Creativity

Mughees Asif | 180288337

Due: 04 March 2022

Introduction

The aim of the project will be to develop a musical style transfer framework to enable cross-pollination of differing musical genres.

Methodology

The project aims to leverage Generative Adversarial Networks (GANs) with Cycle Consistency Loss (CCL) in the symbolic music domain.

GANs are an unsupervised method that use two sub-models to discern regularities or patterns in input data and apply the gained information to unseen examples to derive a new output. The modelling requires two different supervised networks: a generator model to produce new outputs, and a discriminator model that allows classification of the output as either real or fake. The networks are designed to compete with eachother in a zero-sum game, where training continues "... until the discriminator model is fooled about half the time, meaning the generator model is generating plausible examples."[1]

"The problem with only using adversarial loss is that the network can map the same set of input images to any random permutation of images in the target domain. Any of the learned mappings can, therefore, learn an output distribution that is similar to the target distribution. There can be many possible mapping functions between x_i and y_i. CCL overcomes this problem by reducing the number of possible mappings."[2]

Symbolic music representations are described as "... any kind of score representation(s) with an explicit encoding of notes or other musical events. These include machine-readable data formats such as MIDI. Any kind of digital data format may be regarded as symbolic since it is based on a finite alphabet of letters or symbols."[3]

Project Type

The project will utilise Google Colab as the main development tool.

Extra Information

The research paper that constitutes as the main motivation for this project is Symbolic Music Genre Transfer with CycleGAN by Gino et al. (2018).

[1] Notes on Music Information Retrieval. <Link>
[2] A Gentle Introduction to Generative Adversarial Networks (GANs). <Link>
[3] Cycle Consistency Loss. <Link>