# Music Classification & Creation:

## From Zero to Hero

Group 6

# Overview

Humans have mastered the skill to create unique visual and audio experiences through composing of both art and music. For the truly successful artists both in the art world and the music world, each one has his or her own unique 'style'. Style is uniquely human trait and one artist's style is usually different from the next artist's style, even though both artists might be creating work under the same genre. This is true for visual artists and musicians. With advances in information technology, and for the first time in history, a number of tools exist that can enable machines to be to learn and create art with the same feel as the original composer.

The current technological advancements have transformed the way we produce music, listen, and work with music. With the advent of deep learning, it has now become possible to generate music without the need for working with instruments artists may not have had access to or the skills to use previously. This offers artists more creative freedom and ability to explore different domains of music.

In this project we will attempt to create new music using neural networks and under the keras platform.

# Goals

1. Use deep learning techniques to learn the compositional styles of selected genre.
2. Use deep learning techniques to learn how to generate music using the genre that we learnt above.

# Dataset

We use GTZAN music genre dataset. This dataset has 1,000 different songs from 10 different genres, with 100 songs per genre and each song is about 30 seconds long.

Source:
http://opihi.cs.uvic.ca/sound/genres.tar.gz

```
[ ]    genres/
       genres/blues/
       genres/blues/blues.00000.au
       genres/blues/blues.00001.au
       genres/blues/blues.00002.au
       genres/blues/blues.00003.au
       genres/blues/blues.00004.au
       genres/blues/blues.00005.au
       genres/blues/blues.00006.au
       genres/blues/blues.00007.au
       genres/blues/blues.00008.au
       genres/blues/blues.00009.au
       genres/blues/blues.00010.au
       genres/blues/blues.00011.au
       genres/blues/blues.00012.au
       genres/blues/blues.00013.au
       genres/blues/blues.00014.au
       genres/blues/blues.00015.au
       genres/blues/blues.00016.au
       genres/blues/blues.00017.au
       genres/blues/blues.00018.au
       genres/blues/blues.00019.au
       genres/blues/blues.00020.au
```

# Process Outline

1. Data Preprocessing
2. Exploratory Data Analysis and data cleaning.
3. Using transfer learning and fine tuning to build the best model for prediction.
4. Build model to randomly create piece of music and combine it with the previous model.
5. Design of a pipeline and system to implement this approach and discussion on the system's capabilities
6. Deploy the Model on AWS

# Timetable

| Timeframe | Delivery |
|---|---|
| Day 1-2 | Data Preprocessing and Exploratory Data Analysis |
| Day 3-9 | Models Building, Training and Tuning |
| Day 10-11 | Music creation using the model |
| Day 12-13 | System integration and documentation |

# Deployment Details

1) Language: Python, Java
2) Music21
3) Keras
4) Cloud Tools/Platforms: AWS (Amazon WEb Services) EC2
5) Other Considerations: Flask

# Reference and Sources

https://medium.com/@navdeepsingh_2336/identifying-the-genre-of-a-song-with-neural-networks-851db89c42f0

http://blog.sina.com.cn/s/blog_40793e970102w3m2.html

https://www.youtube.com/watch?v=pg9apmwf7og

https://cs224d.stanford.edu/reports/allenh.pdf