# Auto music generation

TAKUTO NAMBA

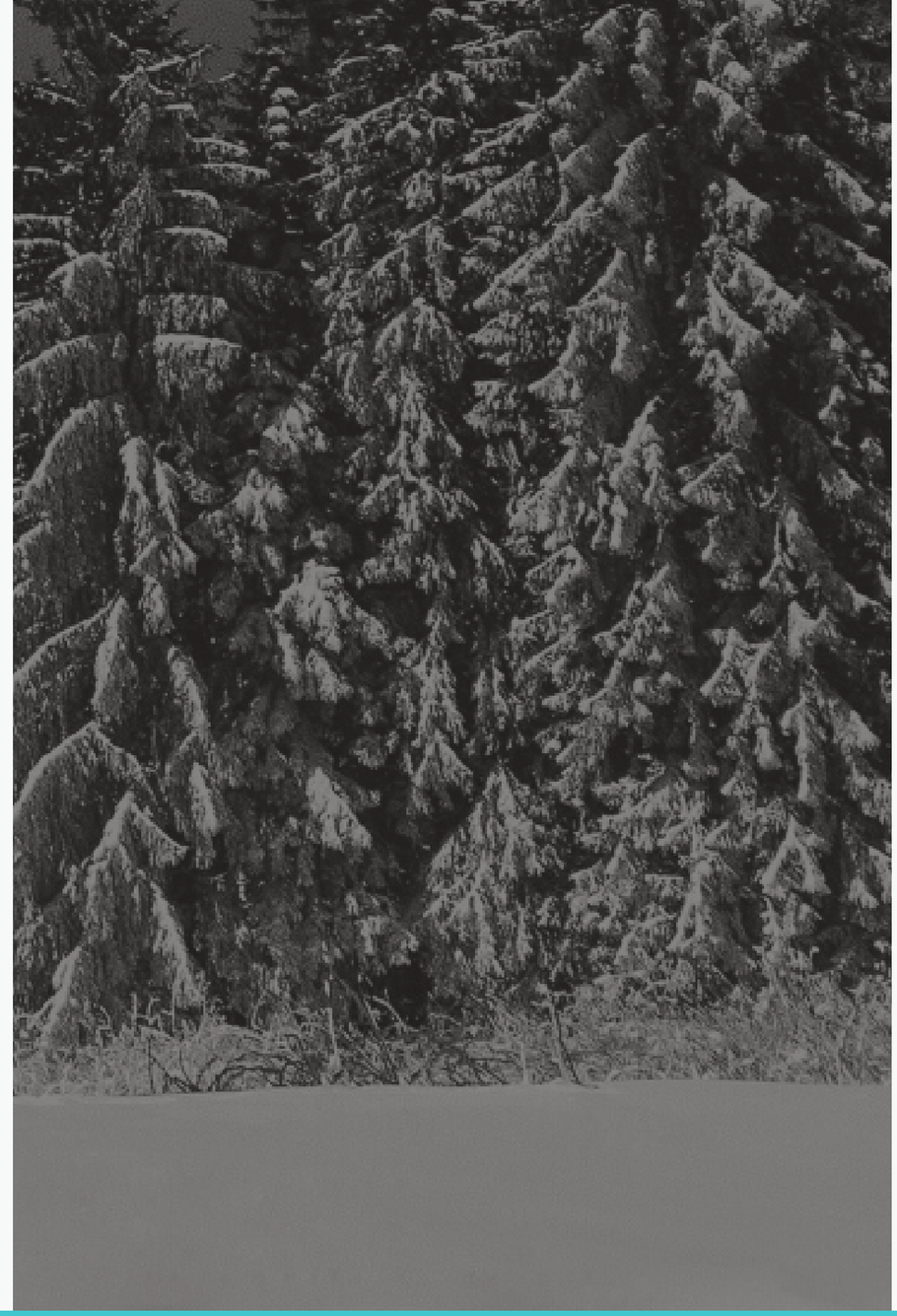
# Introduction

## (AUTO) MUSIC GENERATION

A process of composing short pieces of music with the training model defined by Deep Learning

Goal : Define the target(test) set, and train the model with two approaches and see what model is suitable to generate the music from the existing one

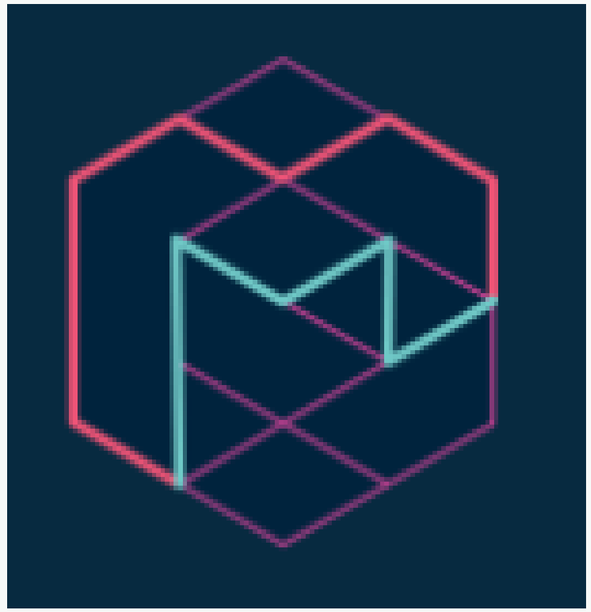
Music - composed of Notes and Chords



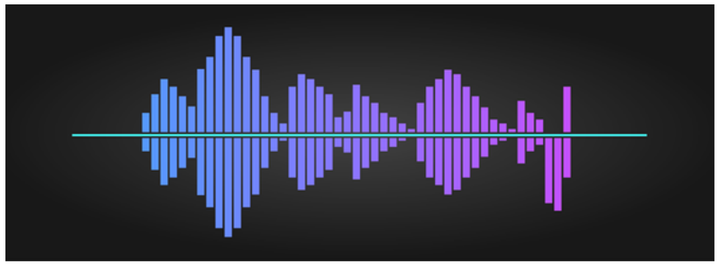
# Dataset

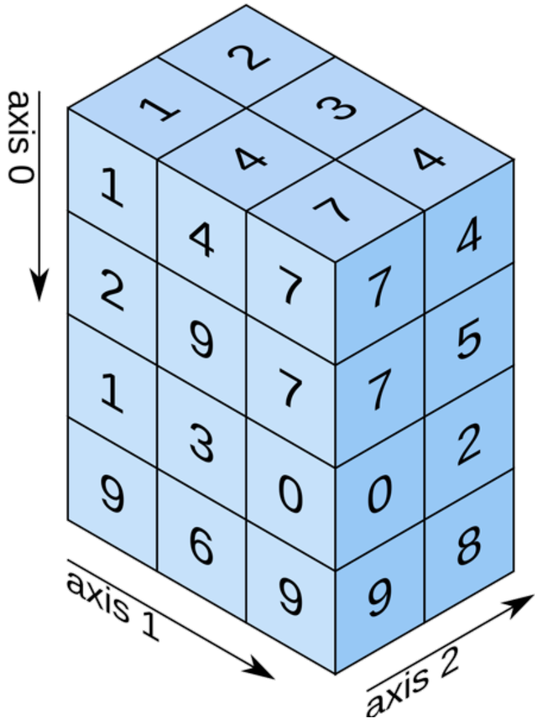
## MAESTRO file

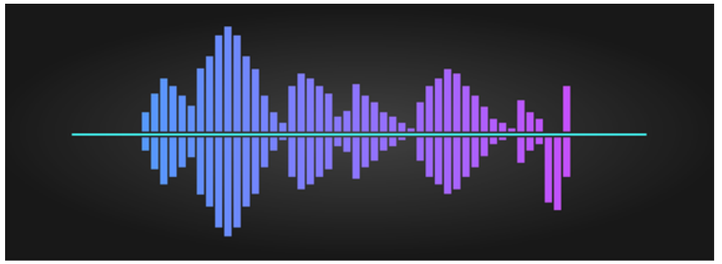
MAESTRO (MIDI and Audio Edited for Synchronous TRacks and Organization) is a dataset composed of about 200 hours of virtuosic piano performances captured with fine alignment (~3 ms) between note labels and audio waveforms.



# 3D array





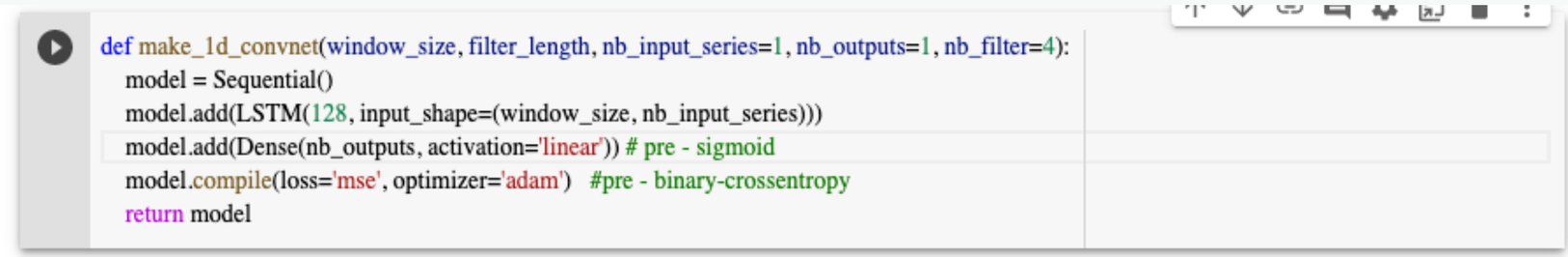



# Training methods

1D CNN <- not really working!!

LSTM

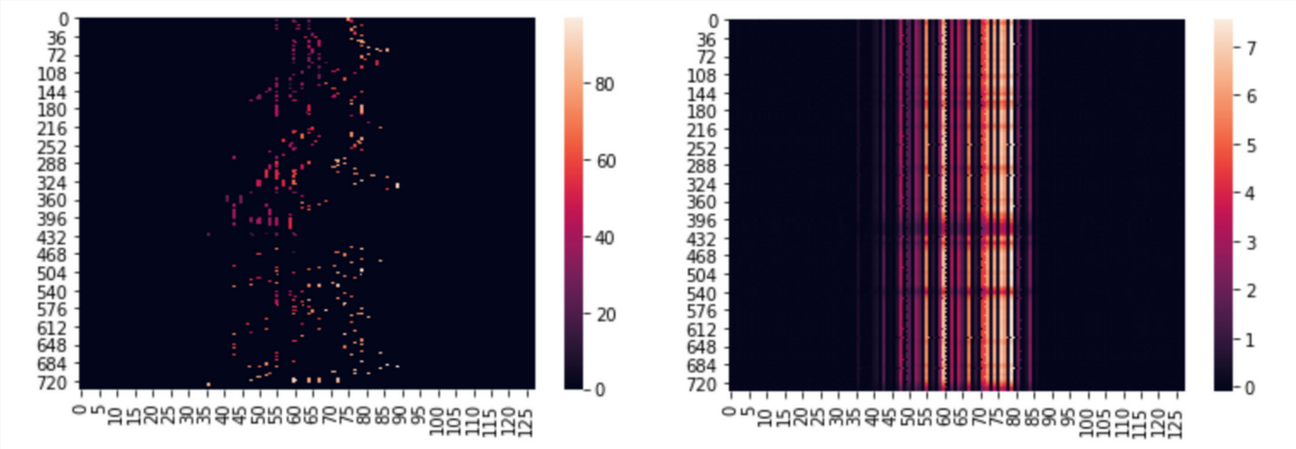
A type of recurrent neural network capable of learning order dependence in sequence prediction problems



```
def make_1d_convnet(window_size, filter_length, nb_input_series=1, nb_outputs=1, nb_filter=4):
    model = Sequential()
    model.add(LSTM(128, input_shape=(window_size, nb_input_series)))
    model.add(Dense(nb_outputs, activation='linear')) # pre - sigmoid
    model.compile(loss='mse', optimizer='adam')   #pre - binary-crossentropy
    return model
```

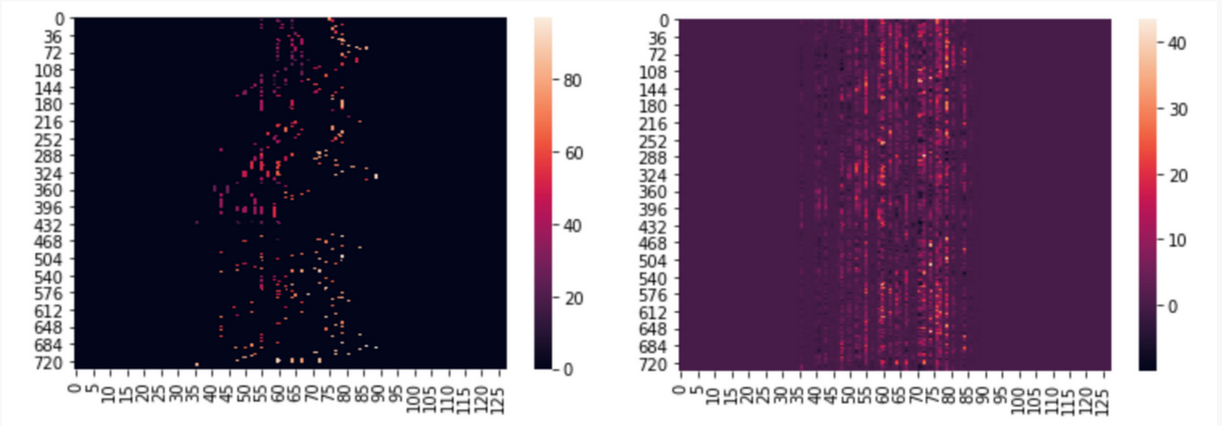
# Results / Evaluation

## 1D CNN



PITCH * TIME (* AMPLITUDE)

## LSTM



# Conclusion / Further discussion


・LSTM is quite valid for generating music with multiple pitches
・Need more LSTM layers and apply Dropout to prevent over-fitting and give more improvements
・Can try fine-tune a pre-trained model to build a robust system, as the size of the training dataset is small
・Use WaveNet for the further training


THANK YOU FOR LISTENING!