

# EDM Melody Generator

Initiate

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2022-10-13

## Project Description and Approach

Nowadays, with the increasing availability of powerful computers on the private market and with the diffusion of Digital Audio Workstations (DAWs), it has become incredibly easy to produce a song from the comfort of our beds and more and more people are trying their luck by producing and releasing songs, dreaming of becoming famous music producers. However, making a song is a really complex process and it is extremely difficult to produce a hit song that will "catch the ears" of millions of listeners. One of the most important elements to a memorable song, especially when it comes to Electronic Dance Music (EDM), is a catchy melody and oftentimes artists struggle with coming up with one.

The goal of this project is to create an application that facilitates the melody creation process by using deep learning methodologies to automatically generate melodies that can be used as they are or serve as a starting point to spark the imagination and creativity of artists. In particular, the type of this project is **"Bring your own data"** and the main focus will be on collecting a dataset of EDM melodies and use them to train an already existing deep learning model to generate similar melodies.

The approach that this project will use are Recurrent Neural Networks (RNN) which have proven to be really efficient in generating melodies as we can see in various publications presented at the ISMIR conference (International Society for Music Information Retrieval). Among the publications there are melody generation models like VirtuosoNet [1], StructureNet [2] and other architectures based on RNNs [5]. The reason why RNNs are suited is that they can learn the relationship each note has to the other notes being played and can use that information to generate notes based on notes that have been played previously in time. Specifically for this project, we will use the collected dataset to train MelodyRNN [3], a recurrent neural network designed by Google to generate monophonic melodies.

## Dataset

Having an great and ample dataset is of really high importance and in virtually any deep learning application the amount and quality of data can make the difference between a great and a poor result.

For genres like classical and pop music, big datasets already exist and an example could be the POP909 dataset [4], a collection of 909 pop piano performances by various professional pianists. By using this dataset it is possible to train a RNN to generate pop melodies that are to the human ear as pleasing as melodies handcrafted by professional musicians. However, when it comes to EDM, a suitable dataset hasn't yet been created.

The main focus of this project, therefore, will be on the collection of a suitable dataset to be able to train a deep learning model on EDM melody generation. The dataset will contain monophonic melodies (not more than one note played at the same time) created by EDM artists (e.g. Avicii, Kygo, ...) saved in MIDI format (.mid), which is the standard format when it comes to storing musical information on electronic devices. In particular, MIDI does not store any audio information or any information about the sound being reproduced but rather it stores the pitch, start time, stop time and other properties of each individual note being played and is used as a musical data format by many deep learning frameworks.

## Timeline

Table 1 shows the approximate expected timeline of the project stages and the expected workload in hours:

Stage	Workload
Dataset Collection	40h
Network Building	5h
Network Training	20h
Application Development	15h
Final Written Report	5h
Final Presentation	2h

Table 1: Stages

## References

- [1] Dasaem Jeong, Taegyun Kwon, Yoojin Kim, Kyogu Lee, and Juhan Nam. Virtuosonet: A hierarchical rnn-based system for modeling expressive piano performance. In *ISMIR*, 2019.
- [2] Gabriele Medea, Srikanth Cherla, Katerina Kosta, Matt McVicar, Samer Abdallah, Marco Selvi, Ed Newton-Rex, and Kevin Webster. Structurennet: Inducing structure in generated melodies. In *ISMIR*, pages 725–731, 2018.
- [3] Elliot Waite. Generating long-term structure in songs and stories. <https://magenta.tensorflow.org/2016/07/15/lookback-rnn-attention-rnn>, 2016.
- [4] Ziyu Wang, Ke Chen, Junyan Jiang, Yiyi Zhang, Maoran Xu, Shuqi Dai, Xianbin Gu, and Gus Xia. Pop909: A pop-song dataset for music arrangement generation. *arXiv preprint arXiv:2008.07142*, 2020.
- [5] Jian Wu, Changran Hu, Yulong Wang, Xiaolin Hu, and Jun Zhu. A hierarchical recurrent neural network for symbolic melody generation. *IEEE Transactions on Cybernetics*, 50(6):2749–2757, 2020.