

Music Generation with LSTM Neural Networks

Carla Barrientos, Stefano Sossi, Vincent Valenzuela, Andrea Villarroel

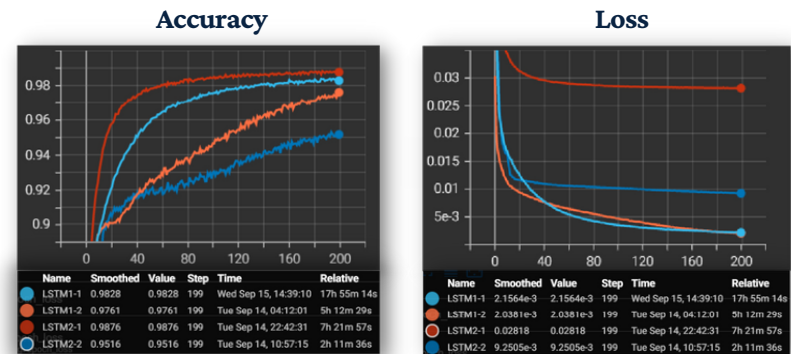
The idea

Implement an algorithm that can be used for the generation of musical pieces using Recurrent Neural Networks (RNN), more specifically Long-short term memory networks (LSTM).

With this form the model will have the ability to remember past details and structure musical notes for future projection of the learning sequence.

Results

The following figures show the resulting performance value between the two networks trained with two different data sets, from which, it can be said that the model with the highest precision and the highest error value is the network that has 3 LSTM layers that was trained with the classical piano melodies dataset.



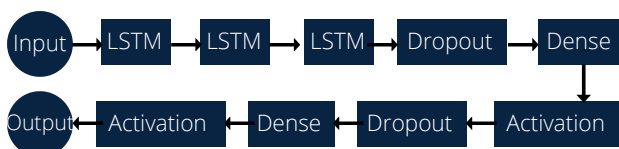
The method

Throughout the project, two model architectures were taken into account and each one was trained with two different datasets:

- The first model is a replica of what was stated in [1] with a single LSTM layer.



- The second model is an extension of model 1, the architecture was modified in order to obtain better results.



Conclusions

With the present implementation, the objective of generating music using recurring neural networks without human intervention was achieved. As could be seen in the results, both models had a similar performance, both in the accuracy and loss values. However, the second model produced more coherent pieces. There is still a long way to go in terms of generating music using Artificial Intelligence, the results obtained are not comparable with the pieces composed by people today. However, in the future it is expected to continue venturing into the area, testing with larger datasets and testing with different combinations of hyper parameters to improve performance.

References

- [1] Mangal, S., Modak, R., & Joshi, P. (2019). Lstm based music generation system. arXiv preprint arXiv:1908.01080.