LSTM Models

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| Test Number | Description | Training Dataset | Architecture | Pre-generation Inputs | Training Time | Analysis |
| 0.0 | Using the tutorial provided by TensorFlow to provide a starting point for creating my own model. | The ‘maestro-v2.0.0’ dataset from Google, containing 1282 midi files and 7.13 million notes. | 1 Input Layer, 1 LSTM Layer connected to the Input Layer, and 3 Dense Layers connected to the LSTM Layer, for Duration, Pitch and Step.  There is an initial length of each sequence to be 50 notes, over 100 epochs | Temperature: 1.0  Input Notes:  From Dataset. | 1h 9min | The model generated a relatively fast-paced melody, with some repetition in the notes providing at least some basic consistency. |
| 0.1 | Changing the temperature setting to generate a more deviated output. | As above | As in 0.0 | Temperature: 2.0  Input Notes:  From Dataset. | As in 0.0 | The change in temperature had little effect on the overall steps and duration of each note, resulting in a similar lively tempo, but the consistency of the pitch is much more varied, but lacks the consistency and progressiveness of the piece produced in Test 0.0. |
| 0.2 | Changing the input notes to a song not from the training set, instead using a jazz tune (hymmj.mid) | As above | As in 0.0 | Temperature: 1.0  Input Notes:  “hymmj.mid”  Comment:  Changed the number of notes produced to double to 120 | As in 0.0 | The change in the initial input notes slightly affected the mood of the produced tune, with added higher notes and a consistency with two main lower notes. However, the duration and step values again seem to have no real change. |
| 1.0 | Attempting to train the model using a different, larger dataset | The “ADL Piano MIDI”, consisting of 11086 piano pieces from a large range of genres | As in 0.0 running over 30 epochs | Temperature: 1.0  Input Notes:  From Dataset | 27min | The resulting output was extremely poor, with almost no variation in each note’s pitch or duration, and was only marginally better regarding the steps. The loss over time also had very little degradation, and it seems the algorithm stopped at a local rather than global minimum. |
| 1.1 | Increasing the temperature to try and get a more varied result | As in 1.0 | As in 1.0 | Temperature: 3.0  Input Notes:  From Dataset | As in 1.0 | A little more variety in the pitch but not too much, very slow tempo with a creepy sound. |
| 1.2 | Further increase of temperature | As in 1.0 | As in 1.0 | Temperature: 5.0  Input Notes: From Dataset | As in 1.0 | Again sounding slightly better, but increasing the temperature would remove some of the cohesion between notes that the model tries to achieve. A common theme seems to be the massive lack of variety in duration, with it mostly being around 1.5 seconds for each note, which in turn increases the steps and decreases the tempo |
| 1.3 | Changing the initial input to a song not from the original dataset (‘tremfals.mid’) | As in 1.0 | As in 1.0 | Temperature: 5.0  Input Notes:  ‘tremfals.mid’ | As in 1.0 | The beginning at least sounded fairly cohesive, and would probably sound ok if the majority of the durations of each note was not so high. |
| 1.4 | Reducing the sequence length to try and improve the productivity of the LSTM, and Reducing the training dataset to just one music genre in order to try and generate a more refined piece, along with more epochs | From within the same dataset from 1.0, just the Classical genre will be used, reducing the dataset to 1398 notes | As in 1.0, over 60 epochs | Temperature: 1.0  Input Notes:  ‘tremfals.mid’ | 36min | The change in the dataset to be the same genre looked like it had pretty much no effect on the performance of the model, again generating a poor music sequence |
| 1.5 | Increasing the temperature to try and get a more varied result | As in 1.4 | As in 1.4 | Temperature: 5.0  Input Notes: ‘tremfals.mid’ | As in 1.4 | Again, a slightly more varied but uninspired and with no real direction. |
| 2.0 |  |  |  |  |  |  |
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Screenshots

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| Test Number | Loss over time | Pitch, Step and Duration Distributions |
| 0 |  |  |
| 0.1 | N/A |  |
| 0.2 | N/A |  |
| 1.0 |  |  |
| 1.1 | N/A |  |
| 1.2 | N/A |  |
| 1.3 | N/A |  |
| 1.4 |  |  |
| 1.5 | N/A |  |
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