

ARTIFICIAL DIGITALITY

Kuldeep Goel

Concept:

Expressing the journey of our planet with the rise of Artificial Intelligence through a Music Album.

Form of the final product:

Concept Music Album (3 tracks).

Details:

An album consisting of three tracks; each track represents a period of time.

1st track: Describing the world before A.I.

2nd track: Describing the current world where A.I. is going hand in hand with humans.

3rd track: Describing a speculation of the future. (Singularity?)

Core:

- Instead of having a human to compose all the pieces, the intention is to use A.I. to generate music, just like the way our planet is being taken over by A.I.
- So the first track is composed by a human, the second by the A.I. and a human, and the last track solely by the A.I.
- This does not only work for the concept but also shows how A.I. can take over specific creative fields like music.

Futuristic Vision:

- Music softwares, have been providing platforms (softwares) for generating music in the digital way. But when it comes to composing, the composer still has to compose it all by him/herself.
- The A.I. technology can take a form of an add-on to the music software, that will allow the music software to learn the composer's style of music composition and will enable the software to provide help to the composer.
- So instead of having only a Record button there will be an additional Machine Learning (A.I.) button which will lead to a more personal and intelligent music creation software.

PROCESS (COMPOSITION):

Step 1:

Defining / Deciding the emotion of each composition, then selecting the scale for each emotion.

1st track: Describing the world before A.I.

Emotion: Sentimental & tragic.

Scale and BPM: NATURAL MINOR: AEOLIAN MODE: TSTTSTT : C. (90bpm).

2nd track: Describing the current world where A.I. is going hand in hand with humans.

Emotion: Intellectual & Jazzy.

Scale and BPM: ALTERED SCALE: TSTTTTS : C-sharp/D-flat melodic minor. (111 BPM).

3rd track: Describing a speculation of the future. (Singularity?)

Emotion: Mysterious & futuristic

Scale and BPM: Hungarian Gypsy Scale: TSTSTTS : G #. (128 BPM)

Step 2:

Composing the 1st Track. (Chords and Melody):

Composer: Only human.

Limitation: 2 Octaves (15 keys in total) and Chord consisting of only 3 keys.

1st track: Describing the world before A.I.

Emotion: Sentimental & tragic.

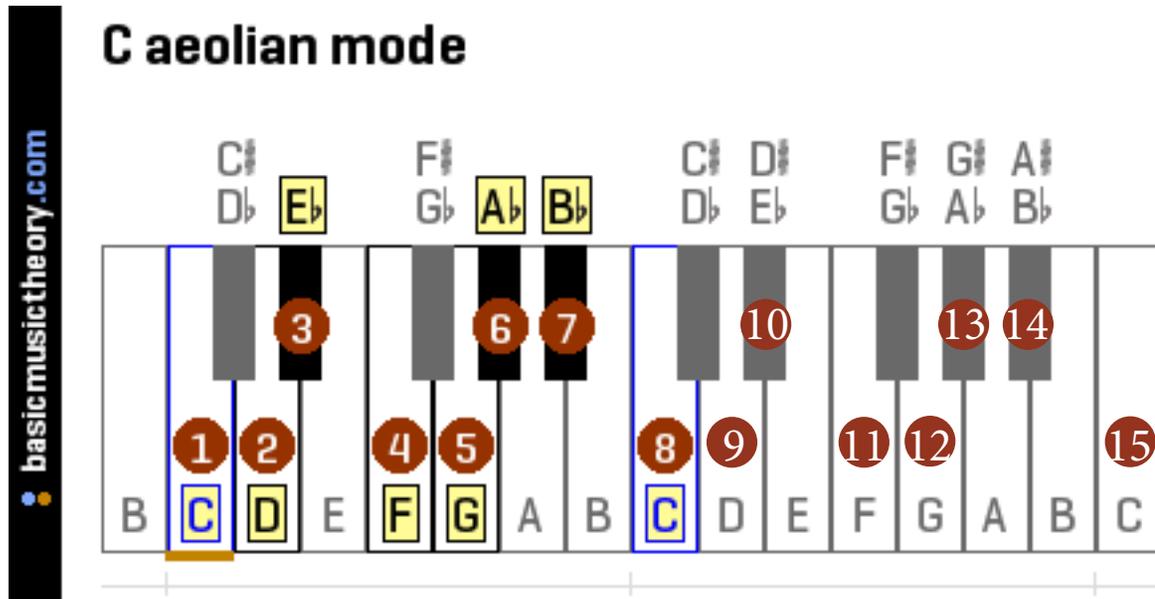
Scale and BPM: NATURAL MINOR: AEOLIAN MODE: TSTTSTT : C. (90bpm).

PROCESS (COMPOSITION):

Step 3:

Converting Data of 1st Track (Chords and Melody) in Numbers to feed it to train the neural Network.

1) Numbering the keys that are part of the Scale with two Octaves from 1...15.



Chord Data Extraction:

1/8 QUANTISATION

Chord Progression: INPUT AND OUTPUT DATA (Data Extracted from the song 1st track):

1,4,6 - 5,7,9

5,7,9 - 7,8,10

7,8,10 - 8,7,9

8,7,9 - 1,4,8

1,4,8 - 5,7,8.....

PROCESS (COMPOSITION):

Melody Data Extraction:

1) Melody Note Progressoin: INPUT AND OUTPUT DATA (Data Extracted from the song 1st track):

1,5,6 - 7,6,5

2,4,1 - 5,3,1

10,6,8 - 5,7,5

6,5,6 - 5,6,5

8,5,6 - 4,7,3

13,12,11 - 8,10,8

7,4,5 - 6,7,2

10,11,8 - 12,13,14

15,14,13 - 8,11,9

12,13,14 - 13,8,12

2) Melody: Time between two notes progression:

Value Range: 0-8 (Unit: Bars)

2,0-1,0

1,8-2,0

0,0-0,0

0,1-2,0

8,2-0,0

5,0-0,1

0,5-0,0

3,0-0,0

1,0-2,1

0,3-0,0

PROCESS (COMPOSITION):

Step 4:

Normalising all the values between 1-15, for decreasing the Error Range.

NORMALISING RANGE: 0-1 (a=0, b=1)

$a + (x-A)(b-a) / (B-A) = \text{NORMALISED VALUE}$:

x = the number (between A-B) whose normalized value is needed.

CHORD AND MELODY NOTE RANGE: (1-15) (A=1, B=15)

1 - 0 -

2 - 0.0714 - Example: $0 + (2-1)(1-0)/(15-1) = 1/14 = 0.0714$

3 - 0.1428

4 - 0.2142

5 - 0.2857

6 - 0.3571 - Example: $0 + (6-1)(1-0)/(15-1) = 5/14 = 0.3571$

7 - 0.4285

8 - 0.5

9 - 0.5714

10 - 0.6428

11 - 0.7142

12 - 0.7857

13 - 0.8571

14 - 0.9285

15 - 1

PROCESS (COMPOSITION):

MELODY TIME RANGE: (0-8) (A=0, B=8)

0 - 0 - - Example: $0 + (0-0)(1-0)/(8-0) = 0/8 = 0$

1 - 0.125 - Example: $0 + (1-0)(1-0)/(8-0) = 1/8 = 0.125$

2 - 0.25

3 - 0.375

4 - 0.5

5 - 0.625 - - Example: $0 + (5-0)(1-0)/(8-0) = 5/8 = 0.625$

6 - 0.75

7 - 0.875

8 - 1

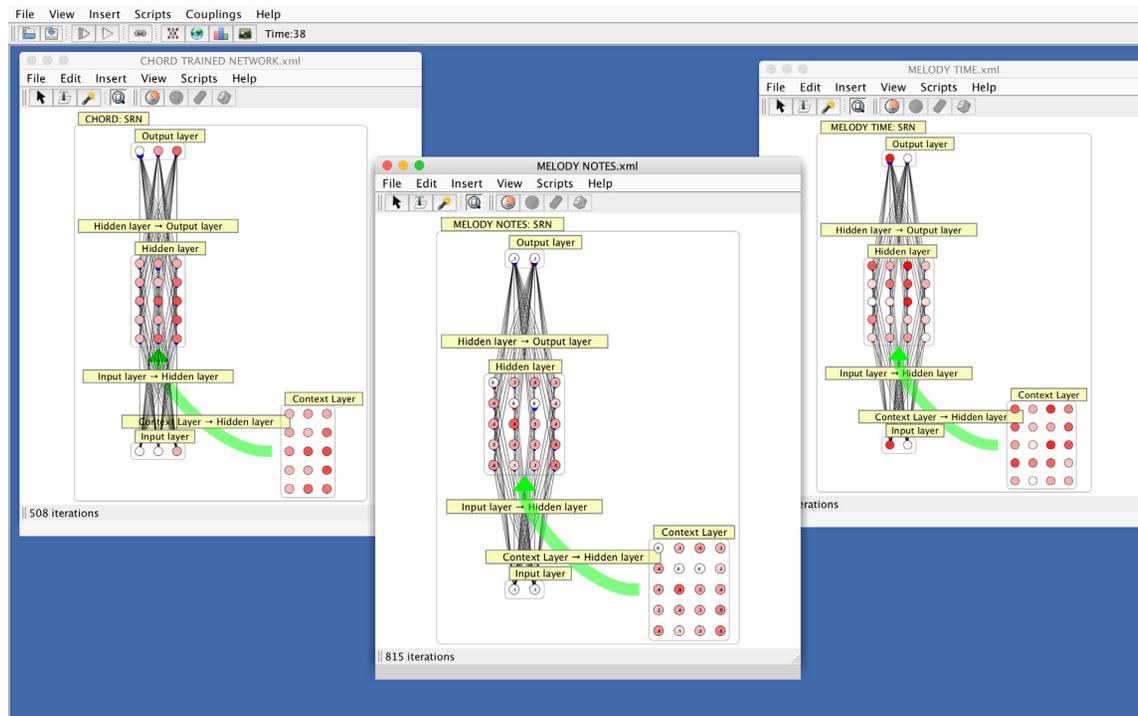
PROCESS (COMPOSITION):

Step 5:

Putting three different Data sets found in Step 3 and normalized in step 4 in **3 different neural networks to train them and make them learn the mathematics from the track 1.**

Three different SRN Network:

- 1) Chord Progression.
- 2) Melody Note Progression.
- 3) Melody Time between the notes Progression.



PROCESS (COMPOSITION):

Step 6:

Track 2: Composer: Human and A.I.

Trained neural networks are used to get the data for track 2 composition.

Changes: Scale and BPM: ALTERED SCALE: TSTTTTS : C-sharp/D-flat melodic minor. (111 BPM).

Method:

Chord:

Feeding value of first chord played by human in the neural network to suggest the next chord.

3rd chord decided by the human, 4th by the Neural Network and so on.

Melody

Note Progression: Feeding value of first and second note played by human in the neural network to suggest the third and the fourth note. Fifth and Sixth note decided by the human, Seventh and the Eight by the Neural Network and so on.

Time between the notes progression:

Simultaneously with the notes progression, the third neural network is used to get the time intervals between the notes. So the time interval between the 1-2, 2-3 note is decided by the human and fed to the neural network to get value of the time interval between 3-4, 4-5. And so on.

PROCESS (COMPOSITION):

Step 7:

Track 2: Composer: Only A.I.

Trained neural networks are used to get the data for track 3 composition.

Changes: Scale and BPM: Hungarian Gypsy Scale: TSTSTTS : G #. (128 BPM).

Method:

Chord:

Feeding value of first chord played by neural network in the neural network to suggest the next chord.

Then feeding the value of the Second Chord by the Neural Network to get the value of the third and so on. Feeding the value of Neural Network to itself to keep getting the successive data.

Melody

Note Progression: Feeding value of first two notes played by neural network in the neural network to suggest the next two notes. Then feeding the value of the 3rd and 4th by the Neural Network to get the value of the 5th and the 6th note. Feeding the value of Neural Network to itself to keep getting the successive data.

Time between the notes progression:

Simultaneously with the notes progression, the third neural network is used to get the time intervals between the notes. So the time interval between the 1-2, 2-3 note is decided by the Neural Network and fed to the neural network to get value of the time interval between 3-4, 4-5. And so on.