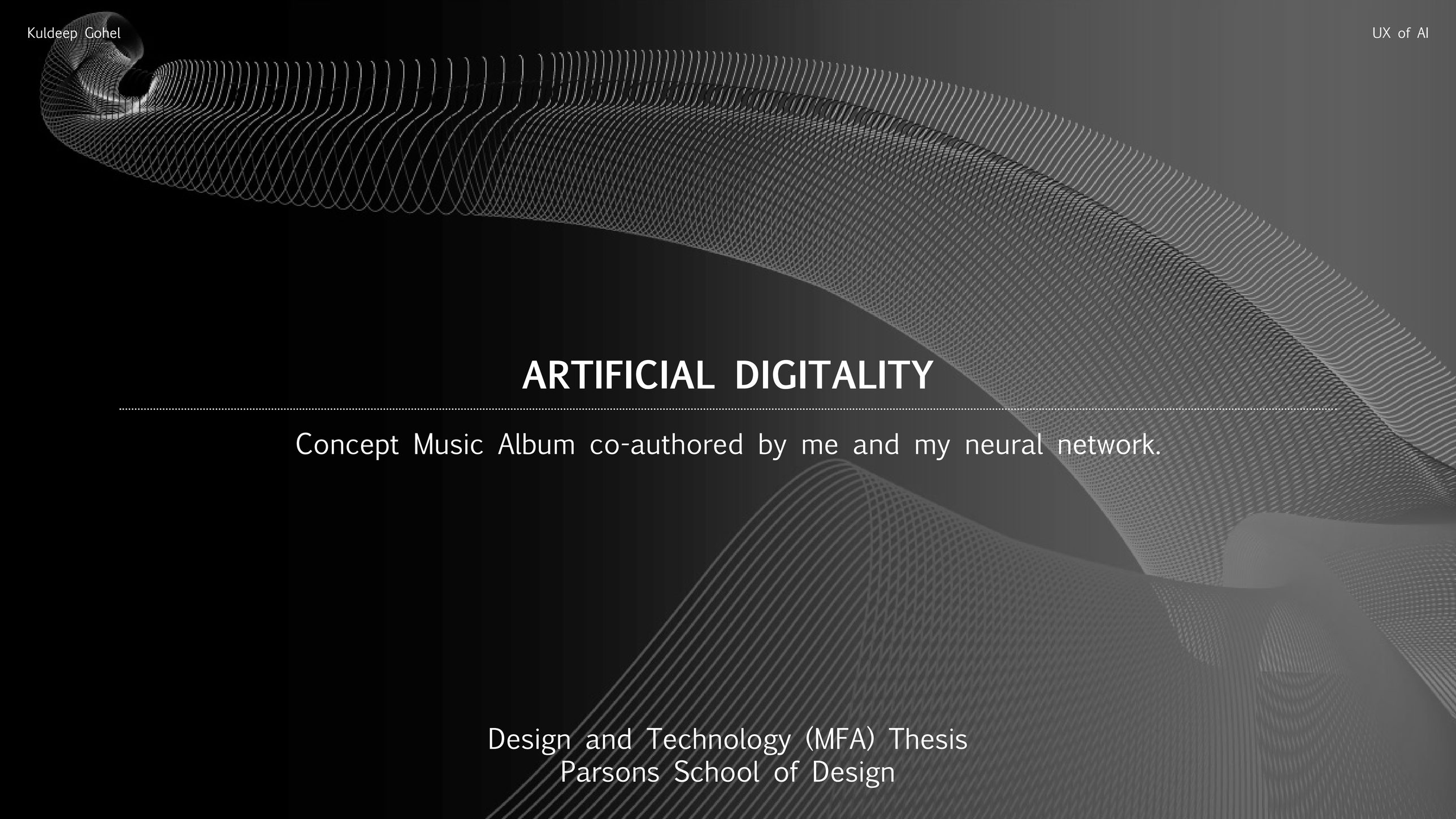


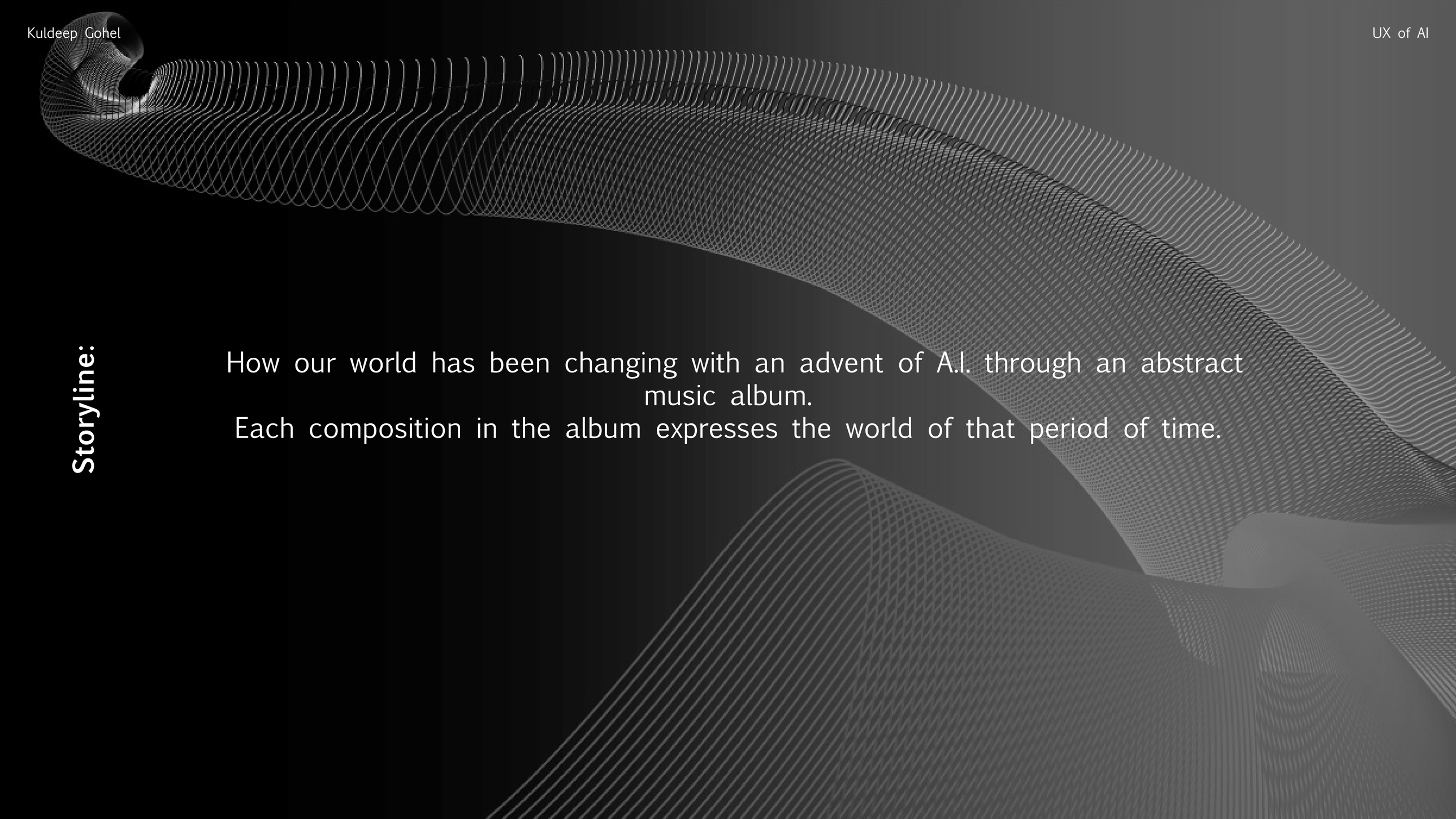
ARTIFICIAL DIGITALITY

Concept Music Album co-authored by me and my neural network.

Design and Technology (MFA) Thesis
Parsons School of Design

Initial Idea:

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



Storyline:

How our world has been changing with an advent of A.I. through an abstract music album.
Each composition in the album expresses the world of that period of time.

Details:

Artificial Digitality:	State of the world:
Composition: 1	Human
Composition: 2	Human + Artificial Intelligence
Composition: 3	Artificial Intelligence

Tinker With a **Neural Network** Right Here in Your
Don't Worry, You Can't Break It. We Promis

Epoch
000,000

Learning rate
0.03

Activation
Tanh

Regularization
None

FEATURES

Which properties do you want to feed in?

2 HIDDEN LAYERS

4 neurons

2 neurons

X_1
X_2
X_1^2
X_2^2
X_1X_2
$\sin(X_1)$

*The outputs are mixed with varying **weights**, shown by the thickness of the lines.*

*This is the output from one **neuron**. Hover to see it larger.*

ml4a guides demos classes code @

Machine Learning for Artists

ml4a.github.io is an in-development book about machine lea
(@genekogan) and Francis Tseng (@frnsys). Expected first
~~2017~~ **mid-2017**.

Why the delays? The delays in the release schedule can be a

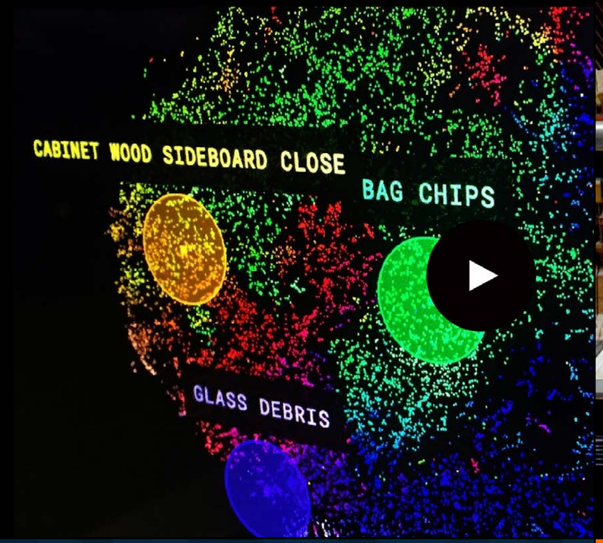
- **Changes in scope:** initially, ml4a was to be a collection of read
be more broadly useful, necessitating the development of new
Guides were elevated from supporting materials to the book in
- **The goalposts keep moving:** since the initial version of this pa
announcement of TensorFlow, deep generator nets, synthetic
~~machines~~, and many other major milestones in the field. To kee
keep up with the field.

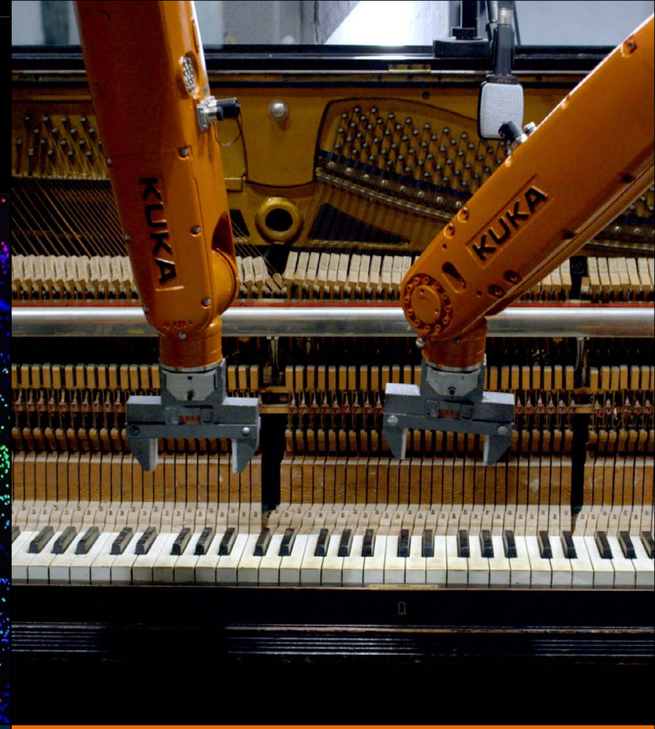
Draft chapters may be viewed here. Some are nearly comple
Guides and Demos are being released as we go.

about contribute github.com/ml4a

The Infinite Drum Machine

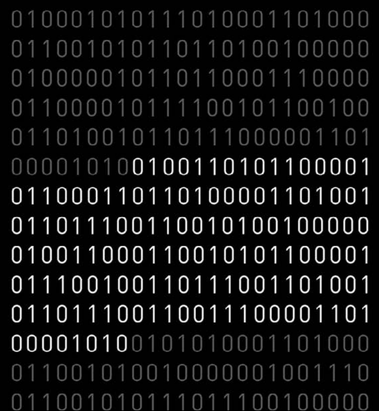
Thousands of everyday sounds, organized using machine learning.
By Manny Tan & Kyle McDonald





MACHINE LEARNING

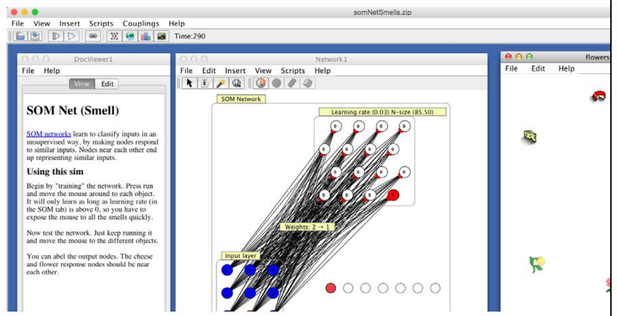
ETHEM ALPAYDIN



simbrain

DOWNLOAD YOUTUBE DOCUMENTATION SCREENSHOTS GITHUB

SIMBRAIN is a free tool for building, running, and analyzing neural-networks (computer simulations o
as visual and easy-to-use as possible. See our design goals. Unique features of Simbrain include its i
ability to represent a network's state space. Simbrain is written in Java and runs on Windows, Mac OS
how Simbrain works, see our youtube channel, check out the screenshots, or just download the softw
is open source, and constantly evolving. We'd love for you to join our team. To discuss any aspect of S



magenta Home Blog Datasets

Welcome to Magenta!

Jun 1, 2016 • Douglas Eck (douglaseck , douglas_eck)

We're happy to announce Magenta, a project from the Google Brain team th
learning to create compelling art and music? If so, how? If not, why not? We
release our models and tools in open source on our GitHub. We'll also post
and technical papers. Soon we'll begin accepting code contributions from t
you'd like to keep up on Magenta as it grows, you can follow us on our GitH
group.

What is Magenta?

Magenta has two goals. First, it's a research project to advance the state of
intelligence for music and art generation. Machine learning has already bee
understand content, as in speech recognition or translation. With Magenta,
side—developing algorithms that can learn how to generate art and music,
compelling and artistic content on their own.

Second, Magenta is an attempt to build a community of artists, coders and
researchers. The core Magenta team will build open-source infrastructure a

TensorFlow ™ Install Develop API r1.3 Deploy

An open-source software library for Machine Intelligence

GET STARTED

TensorFlow 1.3 has arrived!

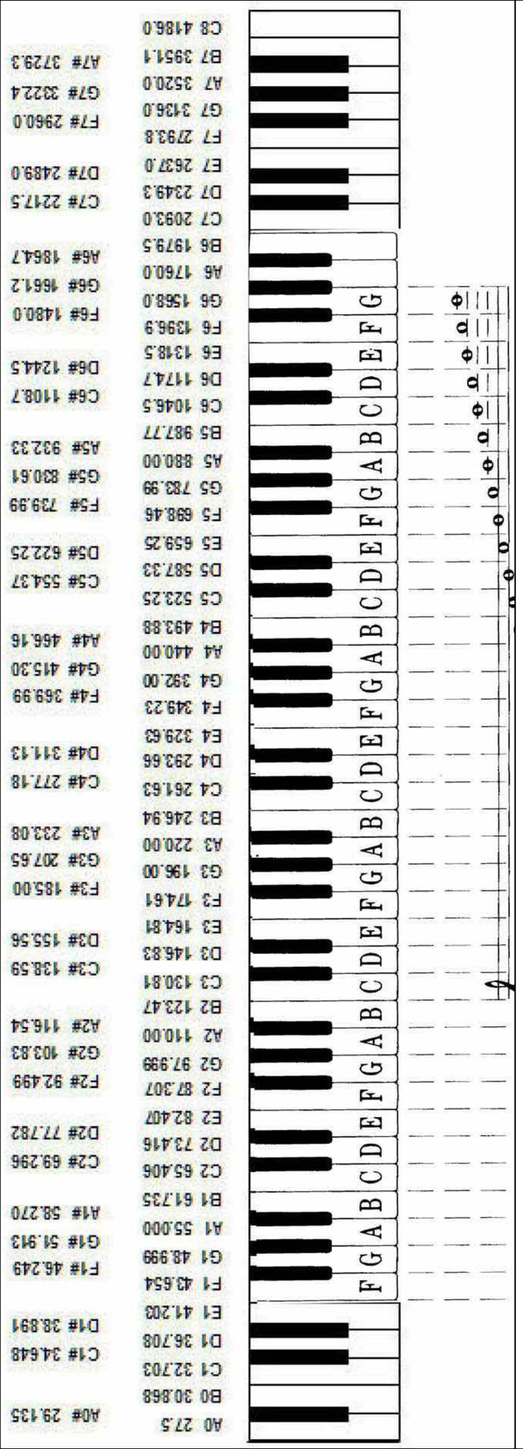
We're excited to announce the release of TensorFlow 1.3! Check out the release notes for all the latest.

Introducin
Research

We're making
accelerate ope

Album Content Detailing:

Artificial Digitality:	Composer:	State of the world:	Time:	Key:
1	Human	Human	..1950	Cm Natural
2	Human + Neural Network	Human + Artificial Intelligence	1950...2045	C#m (Melodic)
3	Neural Network	Artificial Intelligence	2045...	G# H. Gypsy



3 DIFFERENT SCALES FOR 3 DIFFERENT SONGS:

1ST SONG – NATURAL MINOR: AEOLIAN MODE
(90bpm)

2NS SONG – ALTERED SCALE: **TSTTTTS : C–sh**
Jazzy. (111 BPM)

3RD SONG – Hungarian Gypsy Scale: **TSTSTTS**

(SCALE FORMULA GIVEN: http://www.bandn
(EMOTION AND SCALE: http://www.ethanhe

CHORDS:
1/8 QUANTISATION
TIME CONSTANT
3 NOTES PER CHORD
2 OCTAVES (C2–C4): 15 NOTES IN TOTAL:

INPUT AND OUTPUT DATA (Data Extracted fror

1,4,6–**5,7,9** -- 0, 0.2142, 0.3571 – **0.285**
5,7,9–**7,8,10**
7,8,10–**8,7,9**
8,7,9–**1,4,8**
1,4,8–**5,7,8**
5,7,8–**7,8,10**
7,8,10–**5,7,9**

MELODY (NOTES):
1/8 QUANTISATION
2 OCTAVES (C3–C5): 15 NOTES IN TOTAL:

INPUT AND OUTPUT DATA (Data Extracted fror

1,5,6–7,6,5 -- 0, 0.2857,0.3571 – **0.4285, 0.**
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

NORMALISING RANGE: 0–1 (a=0, b=1)

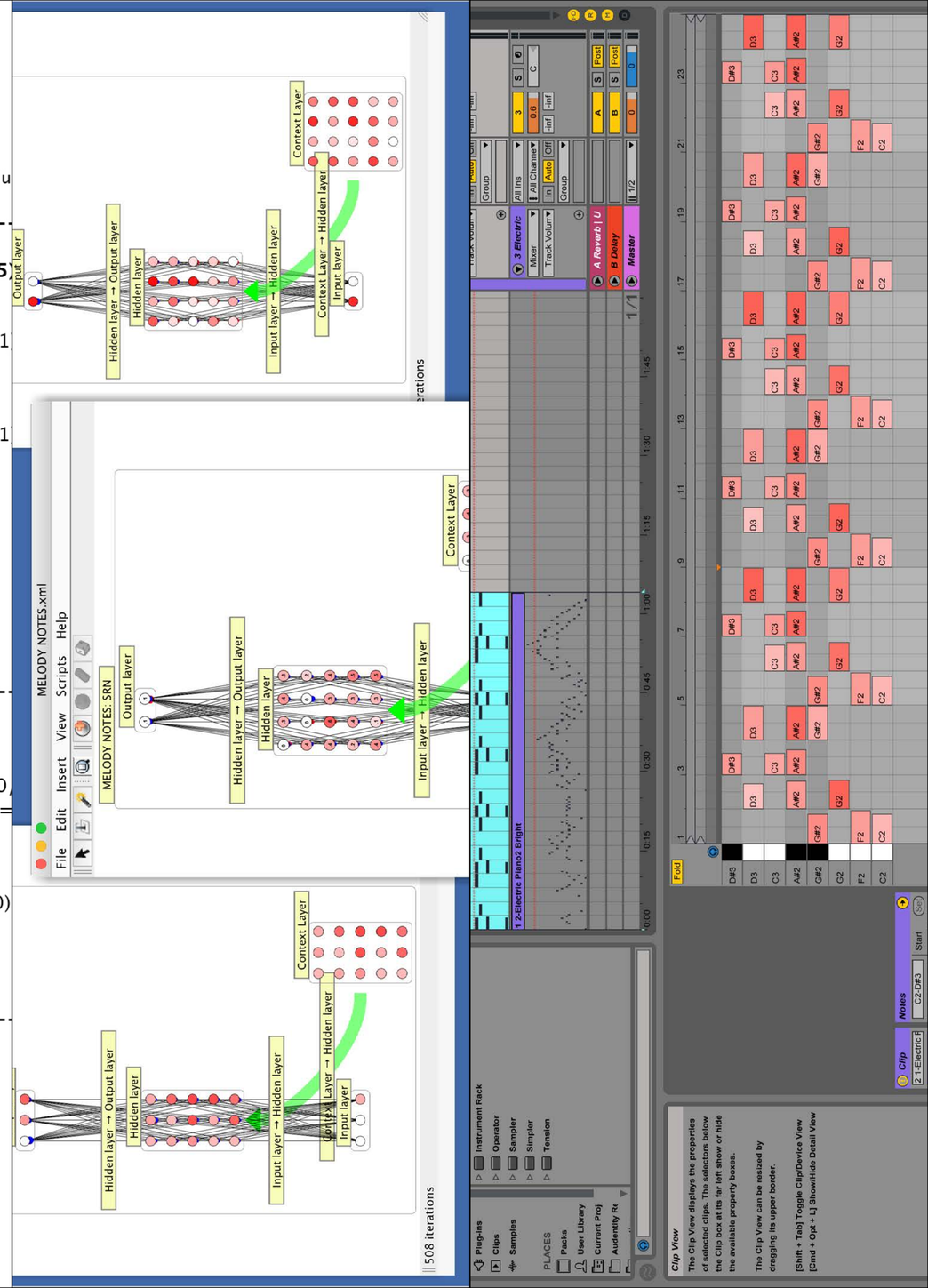
a+ (x–A)(b–a) / (B–A) = NORMALISED VALUE:
x = the number (between A–B) whoes normalized valu

CHORD AND MELODY NOTE RANGE: (1–15

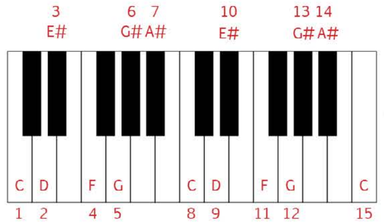
1 – **0** –
2 – **0.0714** – Example: 0 + (2–1)(1–0)/(15–1
3 – **0.1428**
4 – **0.2142**
5 – **0.2857**
6 – **0.3571** – Example: 0 + (6–1)(1–0)/(15–1
7 – **0.4285**
8 – **0.5**
9 – **0.5714**
10 – **0.6428**
11 – **0.7142**
12 – **0.7857**
13 – **0.8571**
14 – **0.9285**
15 – **1**

MELODY TIME RANGE: (0–8) (A=0, B=8)

0 – 0 – – Example: 0 + (0–0)(1–0)/(8–0) = 0
1 – 0.125 – Example: 0 + (1–0)(1–0)/(8–0) =
2 – 0.25
3 – 0.375
4 – 0.5
5 – 0.625 – – Example: 0 + (5–0)(1–0)/(8–0)
6 – 0.75
7 – 0.875
8 – 1



Composition 1:
Scale: NATURAL MINOR: AEOLIAN MODE: TSTTSTT : C
BPM: 90 bpm
Mood: Sentimental & Tragic.

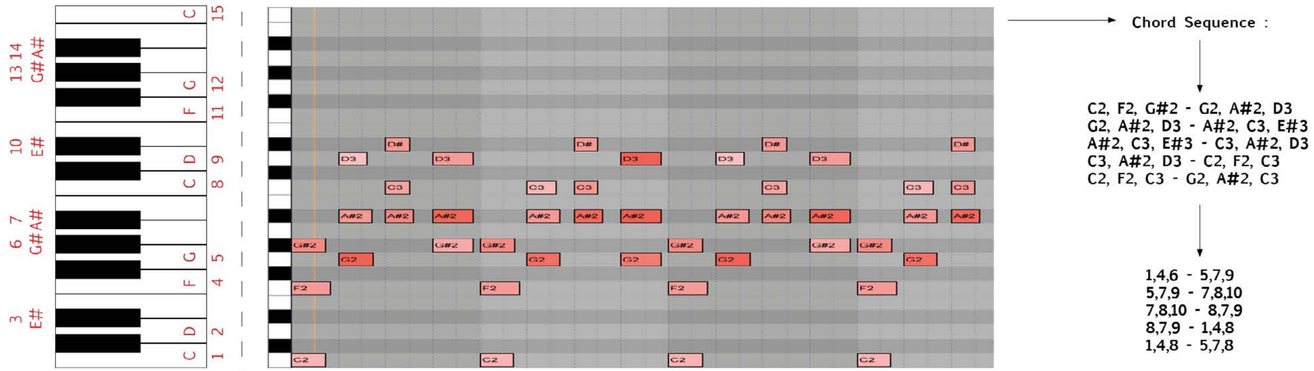


Notes used in making the first composition.
1-15

Chord Structure

Melody Structure

Note played over time

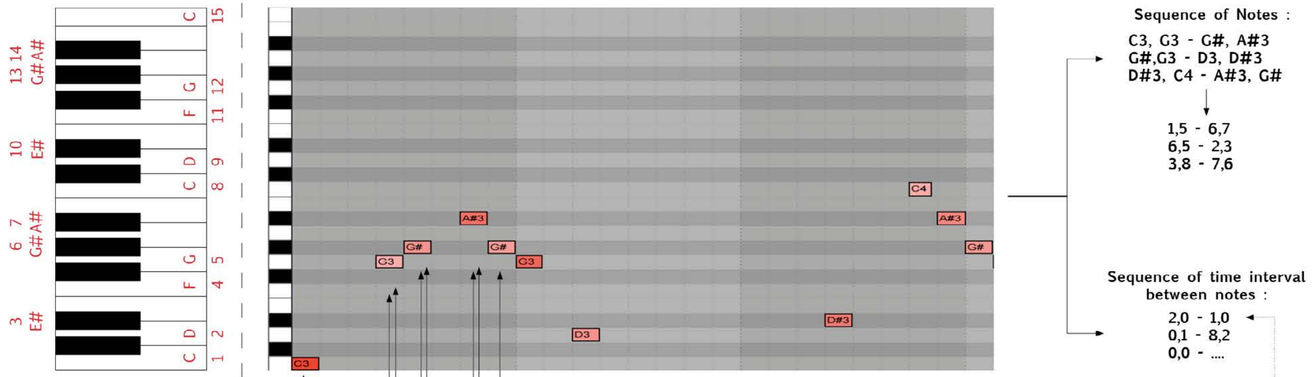


Chord Sequence :

C2, F2, G#2 - G2, A#2, D3
G2, A#2, D3 - A#2, C3, E#3
A#2, C3, E#3 - C3, A#2, D3
C3, A#2, D3 - C2, F2, C3
C2, F2, C3 - G2, A#2, C3

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

Time



Sequence of Notes :

C3, G3 - G#, A#3
G#,G3 - D3, D#3
D#3, C4 - A#3, G#

1,5 - 6,7
6,5 - 2,3
3,8 - 7,6

Sequence of time interval between notes :

2,0 - 1,0
0,1 - 8,2
0,0 - ....

Note played over time

All the three data sequences, Chord: Note Progression, Melody: Note Progression, Note time interval progression, are fed to three different SRN neural networks to train them. Based on the trained neural network, the second and the third compositions are generated.

Normalizing data:

Normalising all the values between 1-15.

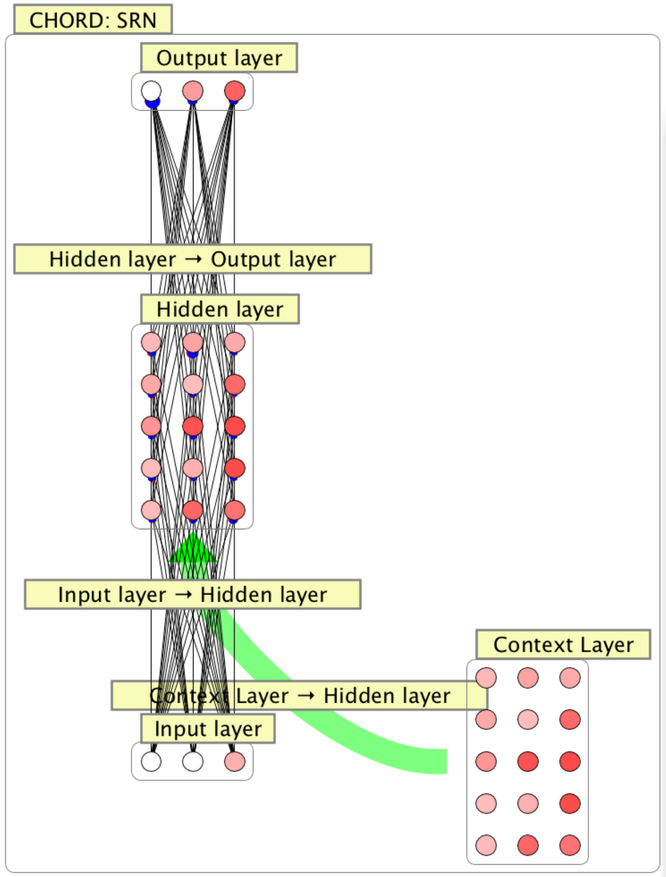
NORMALISING RANGE: 0-1 (a=0, b=1)
a+ (x-A)(b-a) / (B-A) = NORMALISED VALUE:
x = the number (between A-B) whoes normalized value is needed.
CHORD AND MELODY NOTE RANGE: (1-15) (A=1, B=15)
1 - 0 -
2 - 0.0714 - Example: 0 + (2-1)(1-0)/(15-1) = 1/14 = 0.0714
3 - 0.1428
4 - 0.2142
5 - 0.2857
6 - 0.3571 - 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

Normalizing data:

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

CHORD TRAINED NETWORK.xml

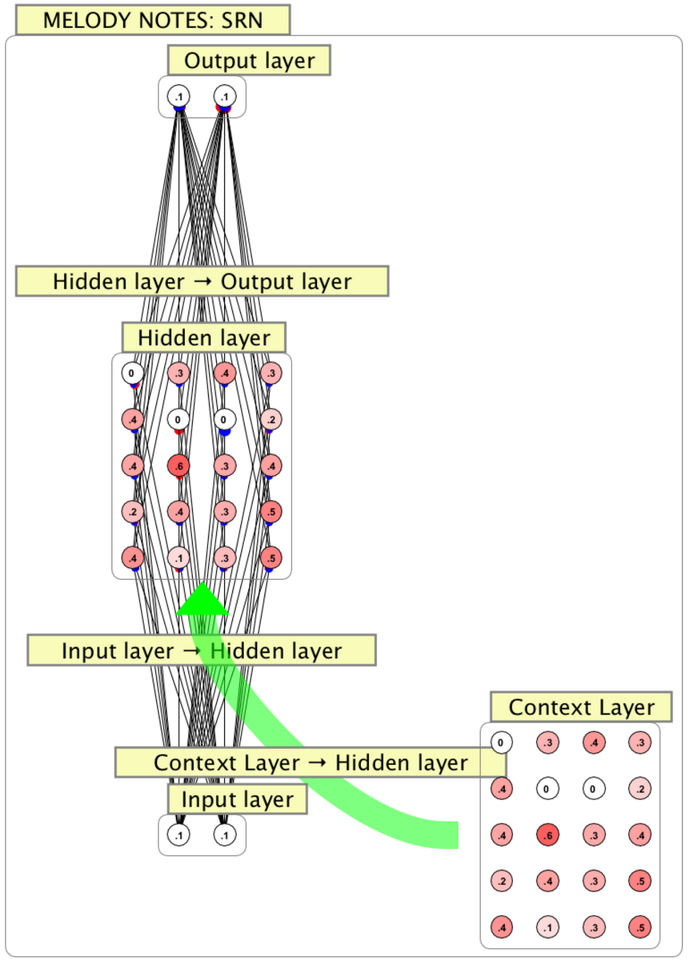
File Edit Insert View Scripts Help



508 iterations

MELODY NOTES.xml

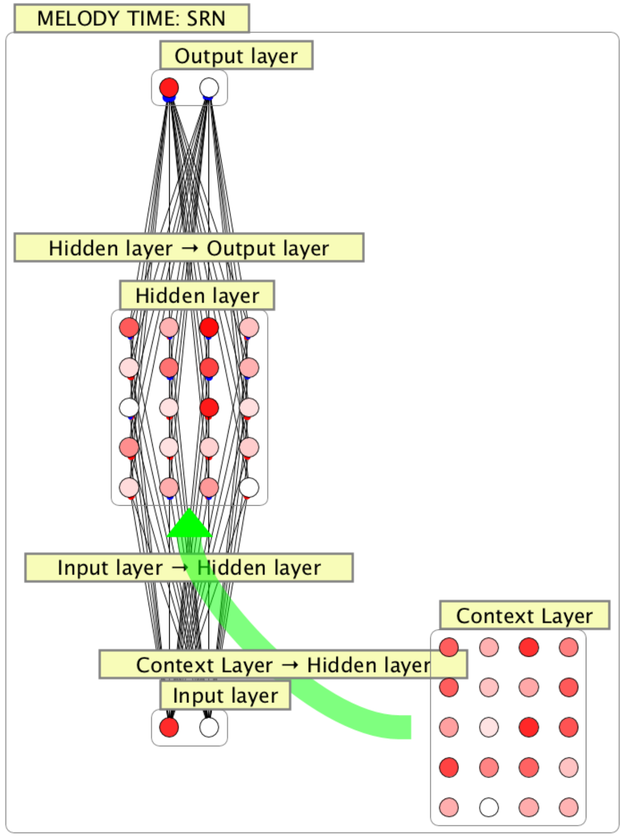
File Edit Insert View Scripts Help



815 iterations

MELODY TIME.xml

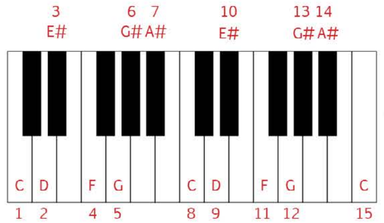
File Edit Insert View Scripts Help



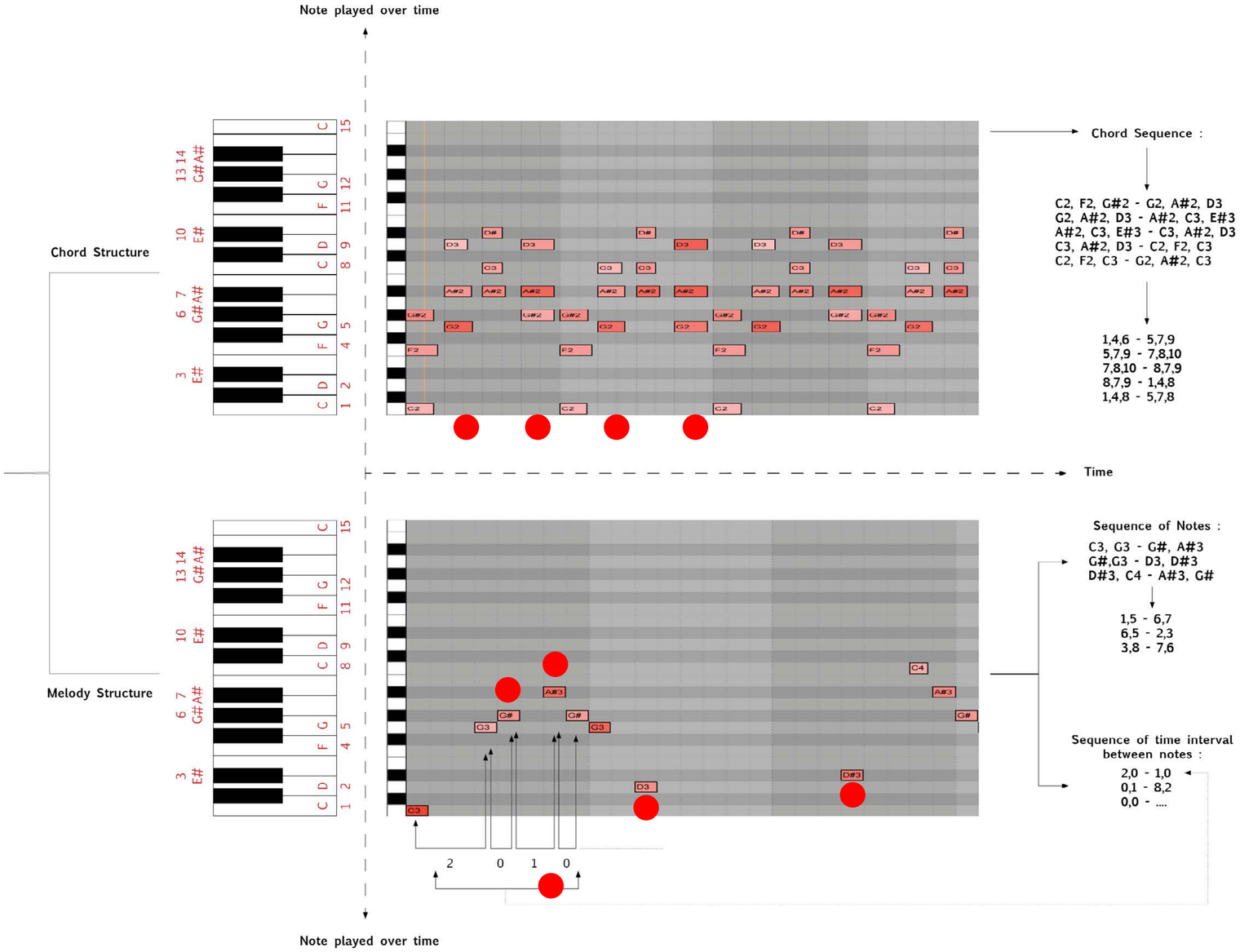
erations

Composition 1: Necessity is the mother of Invention.

- Scale: NATURAL MINOR: AEOLIAN MODE: TSTTSTT : C
- BPM: 90 bpm
- Mood: Sentimental & Tragic.



Notes used in making the first composition.
1-15



All the three data sequences, Chord: Note Progression, Melody: Note Progression, Note time interval progression, are fed to three different SRN neural networks to train them. Based on the trained neural network, the second and the third compositions are generated.

Composition 1: Necessity is the mother of Invention.

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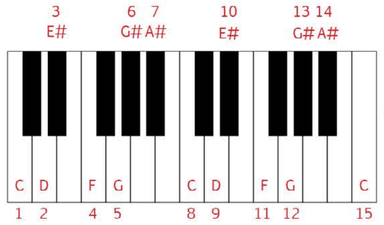
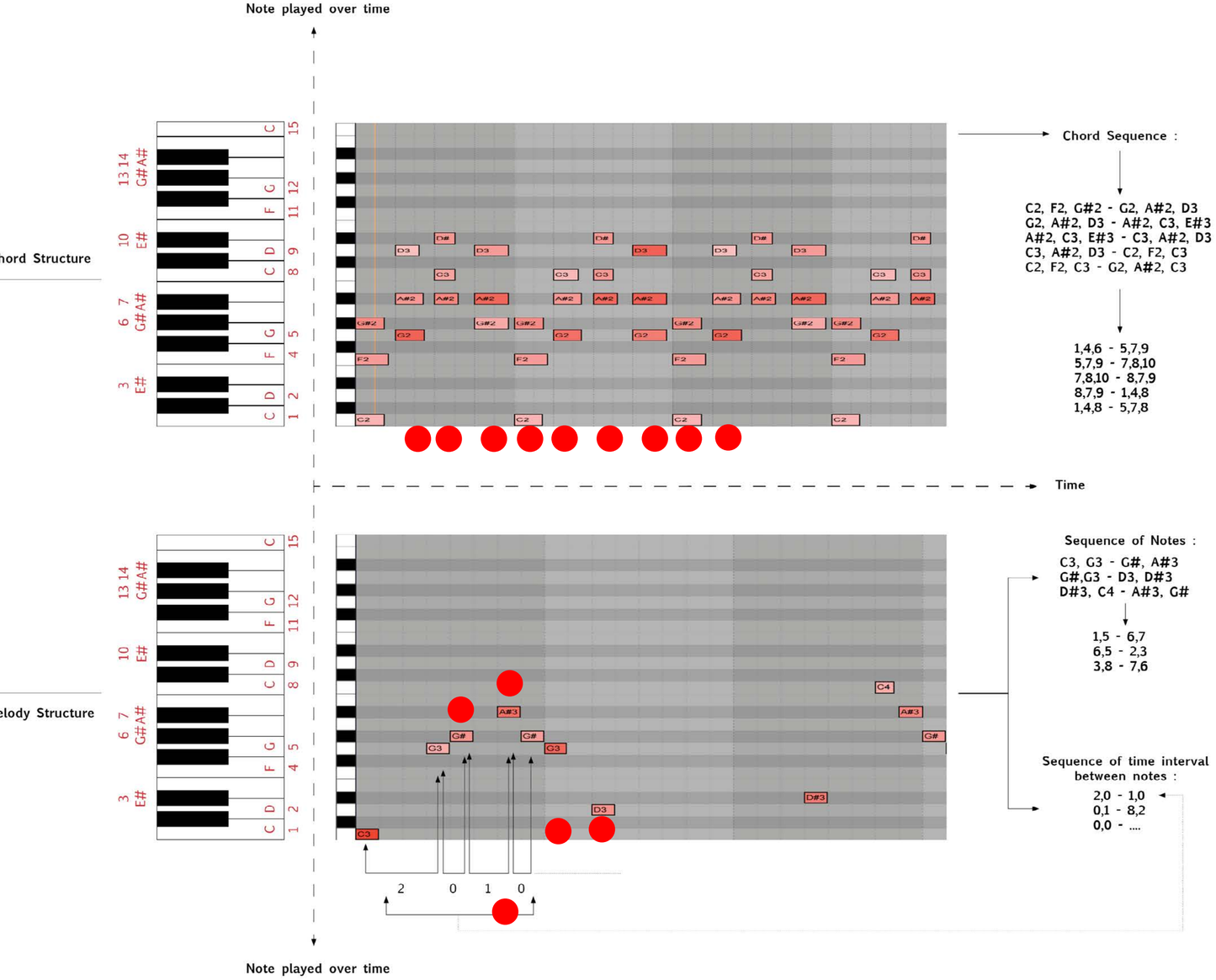


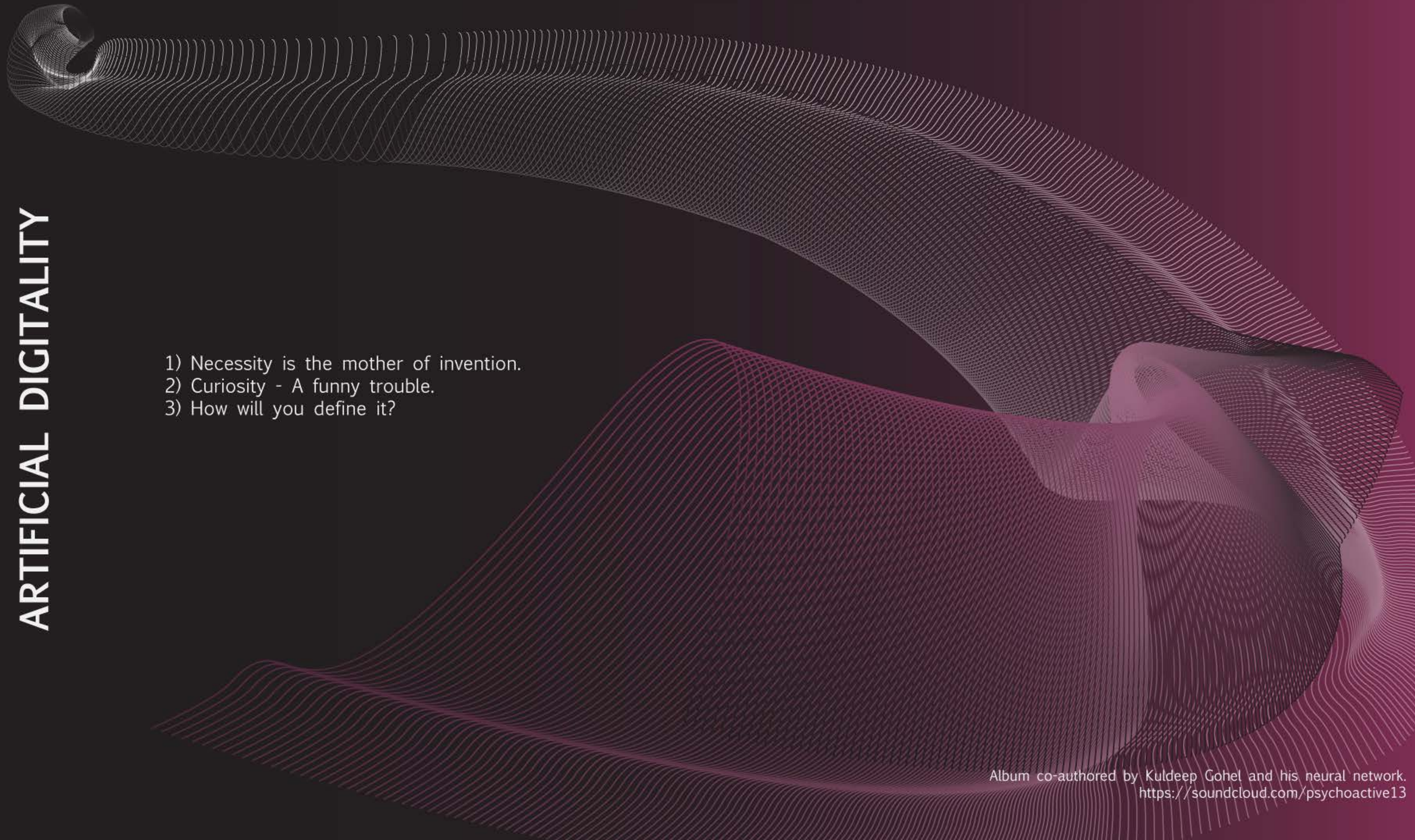
Notes used in making the first composition.
1-15



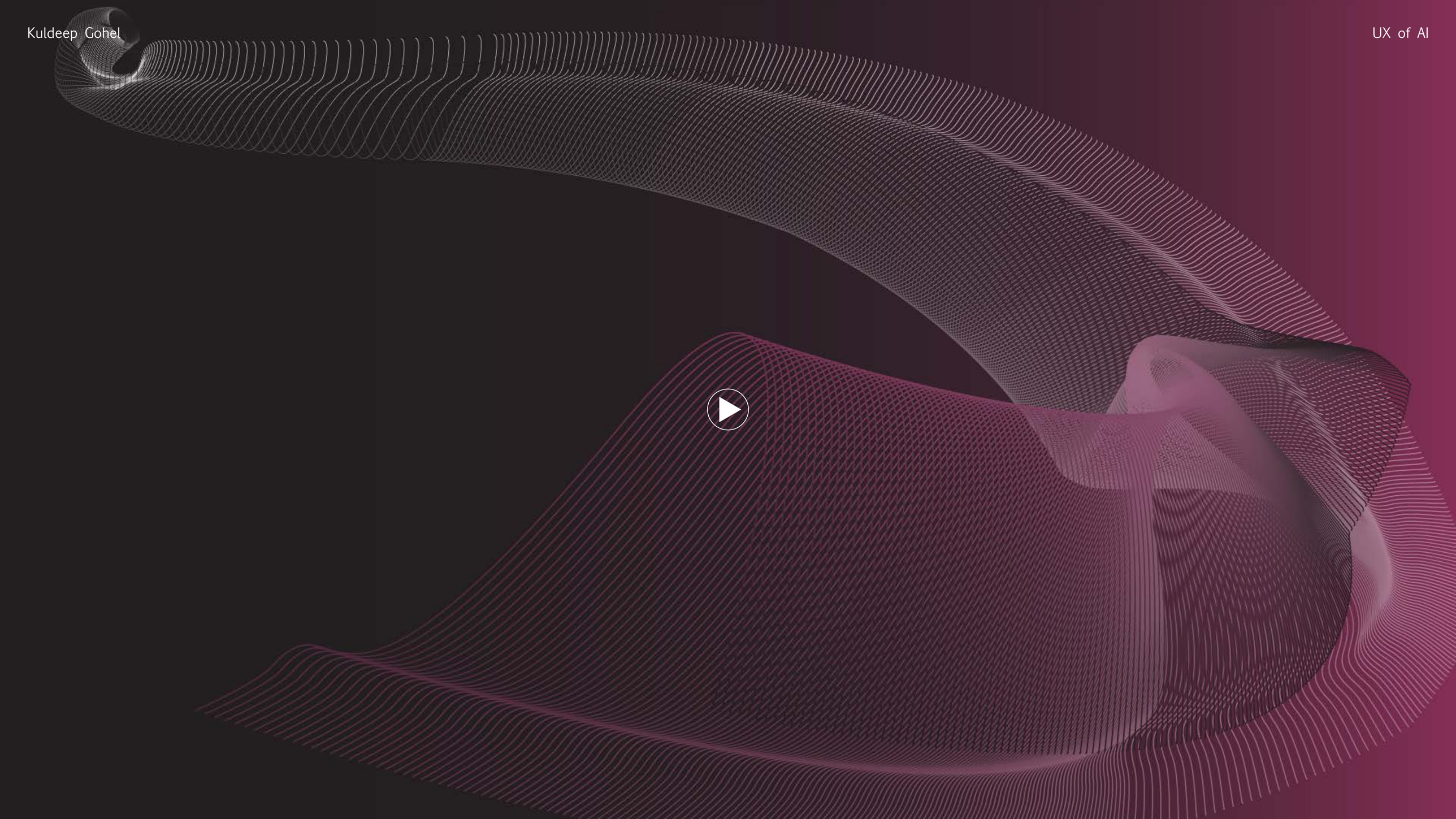
All the three data sequences, Chord: Note Progression, Melody: Note Progression, Note time interval progression, are fed to three different SRN neural networks to train them. Based on the trained neural network, the second and the third compositions are generated.

ARTIFICIAL DIGITALITY

1) Necessity is the mother of invention.
2) Curiosity - A funny trouble.
3) How will you define it?



Album co-authored by Kuldeep Gohel and his neural network.
https://soundcloud.com/psychoactive13

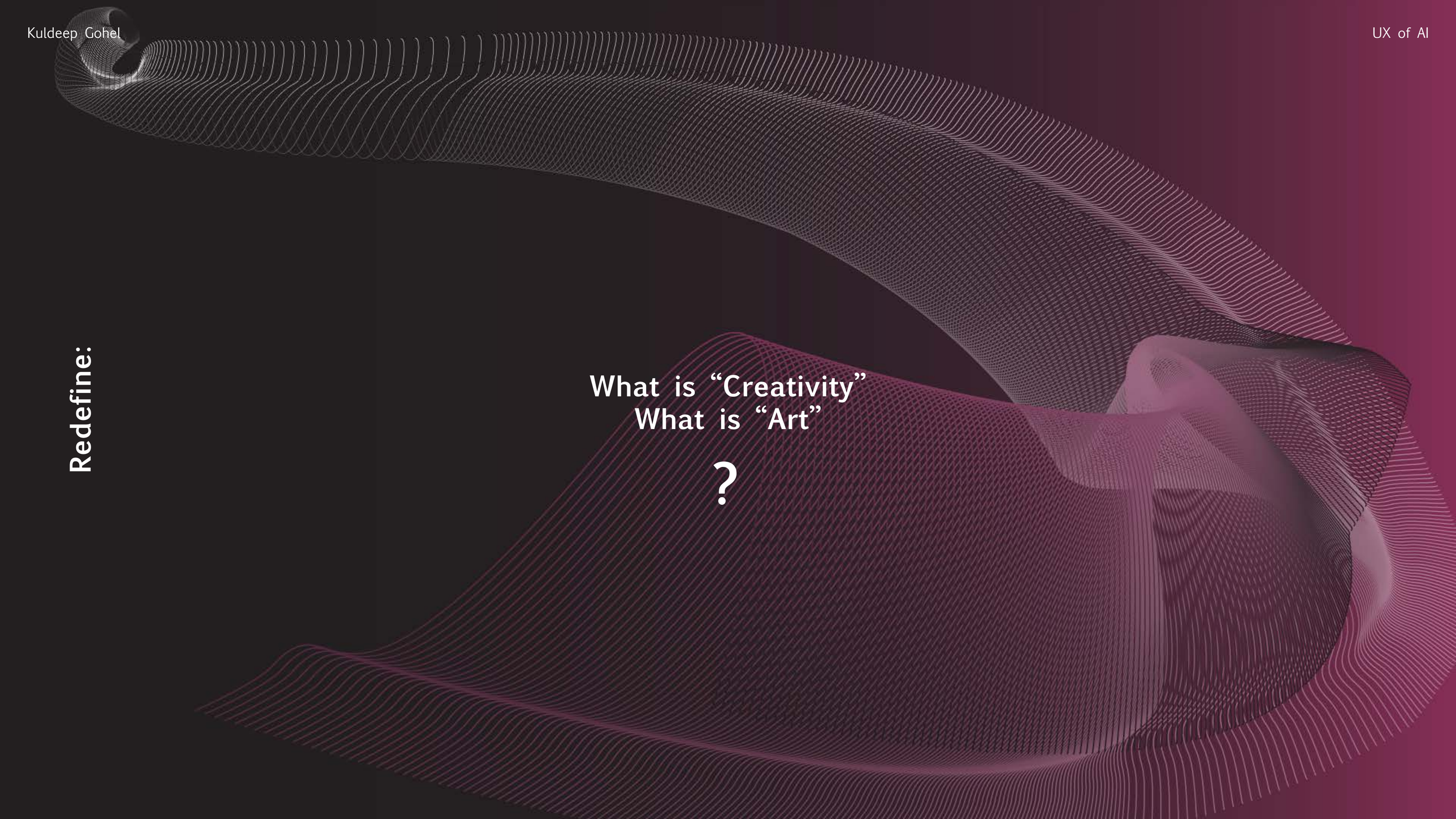


Kuling Test

Redefine:

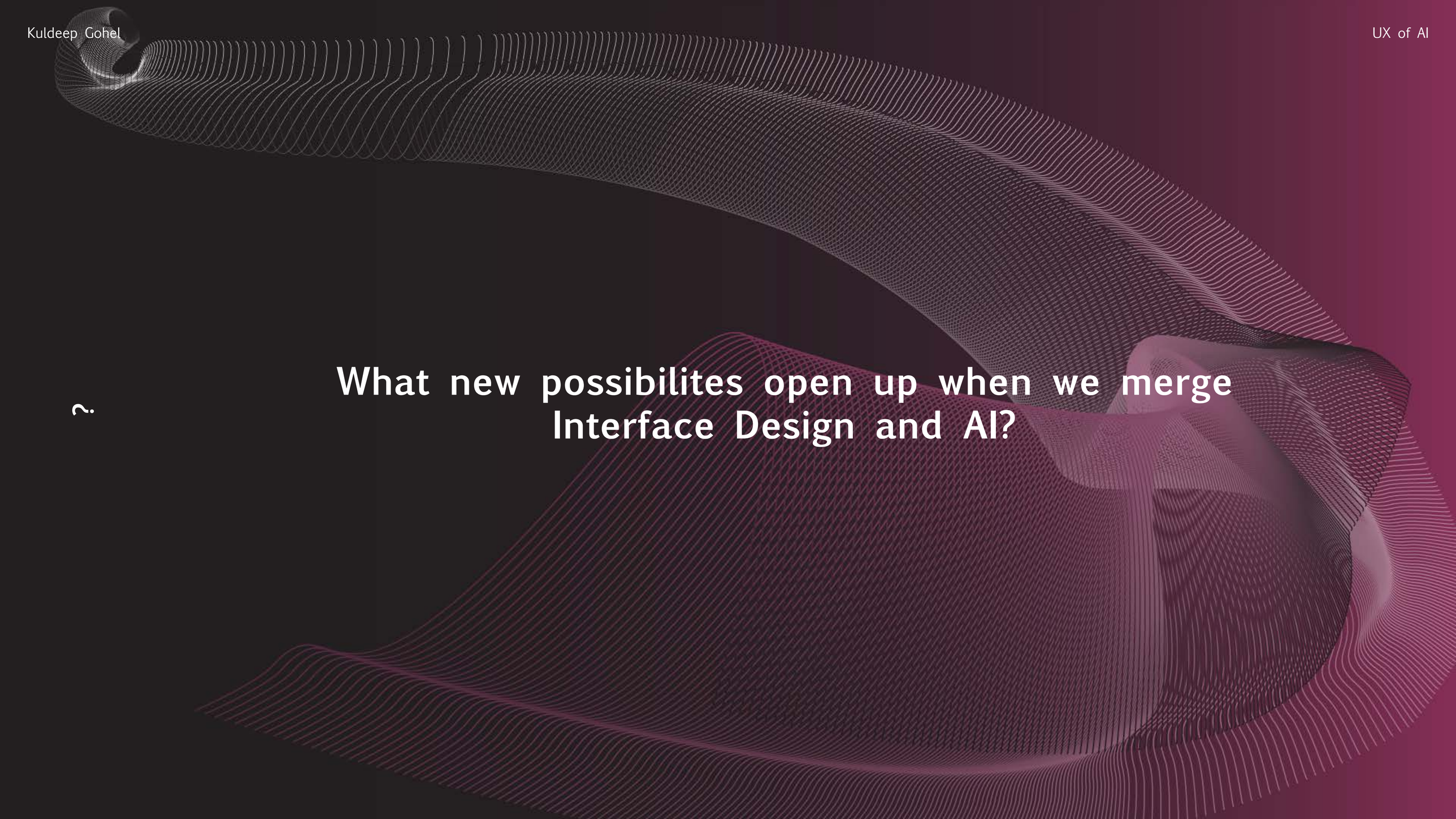
What is “Creativity”
What is “Art”

?



Interfaces:

Music - Instruments - Recording - Interfaces - Intelligent Interfaces.



2.

What new possibilites open up when we merge Interface Design and AI?

Thank you.

kuldeepgohel.com
gohek510@newschool.edu