



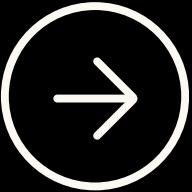
POLITECNICO
MILANO 1863

DJ ART DESIGNER

Present Djavan BORIUS
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PROJECT DESCRIPTION



The Concept:

- Mix Between NID and Generative Art
- Automatic visuals generator

The Purpose:

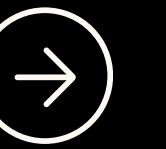
- Enhancement of the DJ performance
- To give the audience a visual feedback associated to music involving them more
- To create interaction between crowd and performance

The User Experience:

- Easy to use
- Use of OSC apps
- All modules are coded in Processing except for fractal module that is coded with TouchDesigner

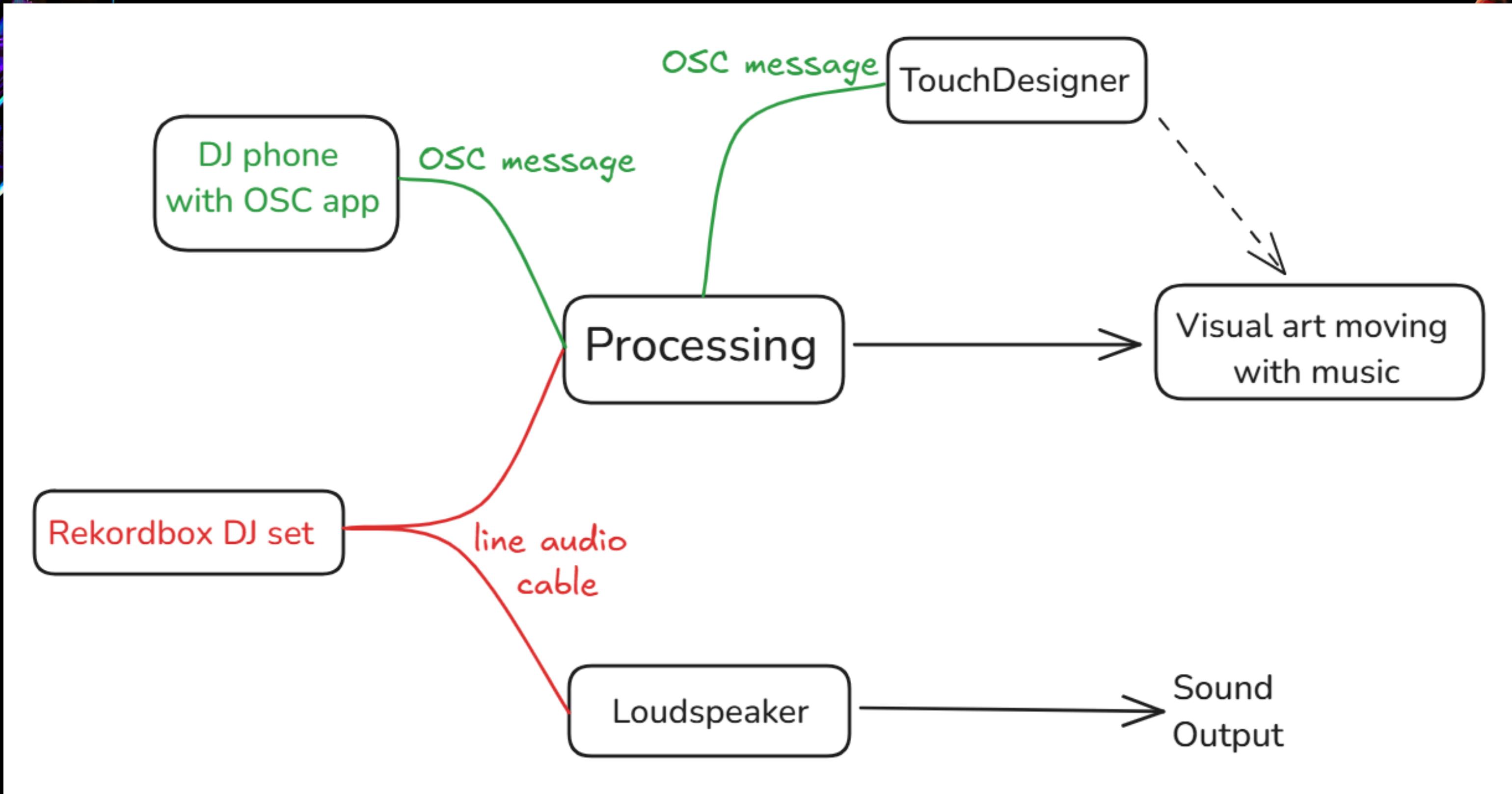


TECHNICAL SOLUTIONS

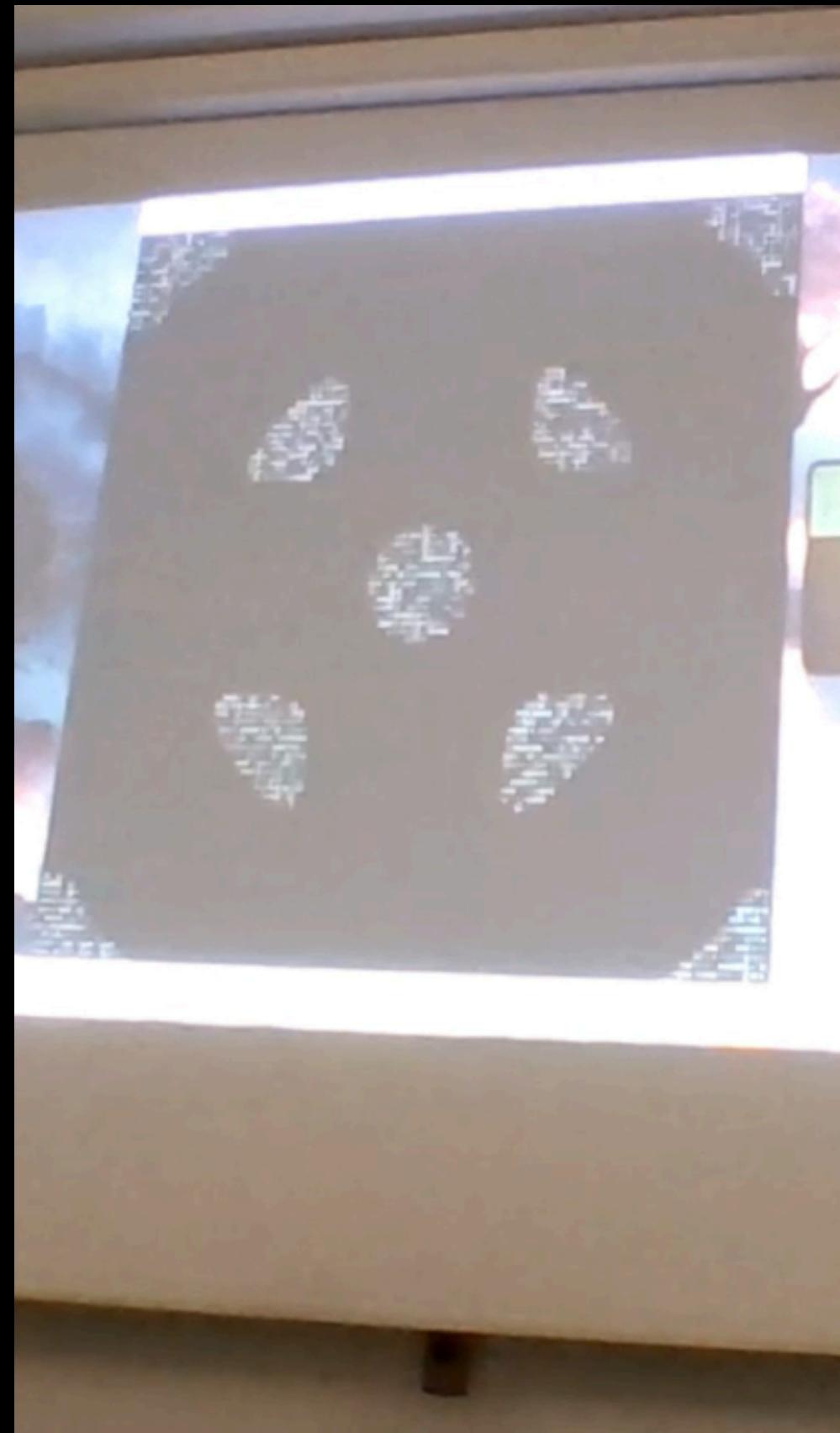
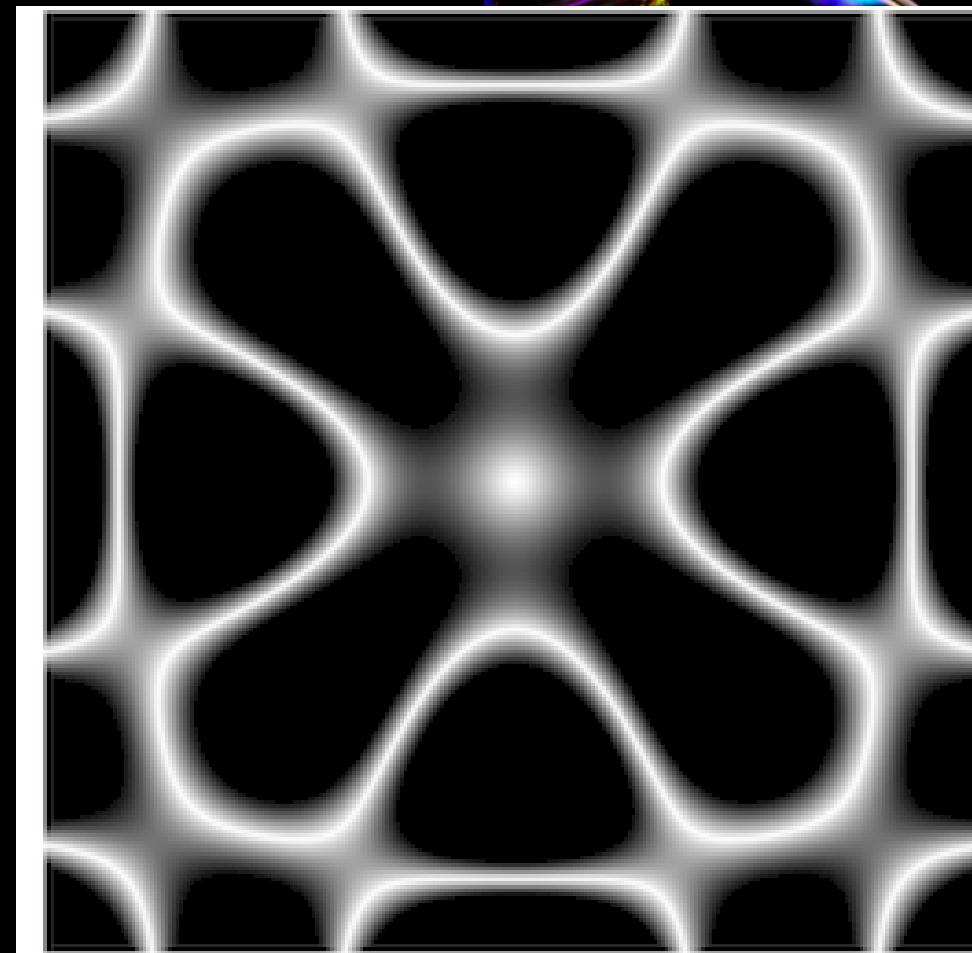


Reactive Agent (Reflex agent)

- Environment : OSC message and sound coming from rekordbox is fully observable
- Real time agent => choose between performance and computational time
- Sensors :
 - Virtual line audio cable not optimal because of the richness of the data collected
 - Interaction with crowd modeled with phones and sensor2OSC
- Many Softwares to model the interactions (Processing, Rekordbox, TouchDesigner, OSC controller...)



MODULE 1 : CHLADNI PATTERNS



Idea : Table of grains positioned on a grid discretized as 100x100

Calculate the mode according the following formula

$$\mathbf{S}(x, y) = \sum_{i=1}^n g_i(x, y)$$

$$g_i(x, y) = \sin \left(\frac{2\pi}{60} \cdot F \cdot \left(T - \frac{1}{V} \cdot \sqrt{(x - x_i)^2 + (y - y_i)^2} \right) \right)$$

FEATURES FRAME TO FRAME

This function extracts low level features of the music played by the DJ in real time.

These features are used as parameters to modify visuals.



Energy

$$E_k = \sum_{k=0}^{K-1} |X(k)|^2$$



Entropy

$$S_{en} = -\frac{\sum_{k=0}^{K-1} |X(k)| \cdot \log(|X(k)|)}{\log K}$$



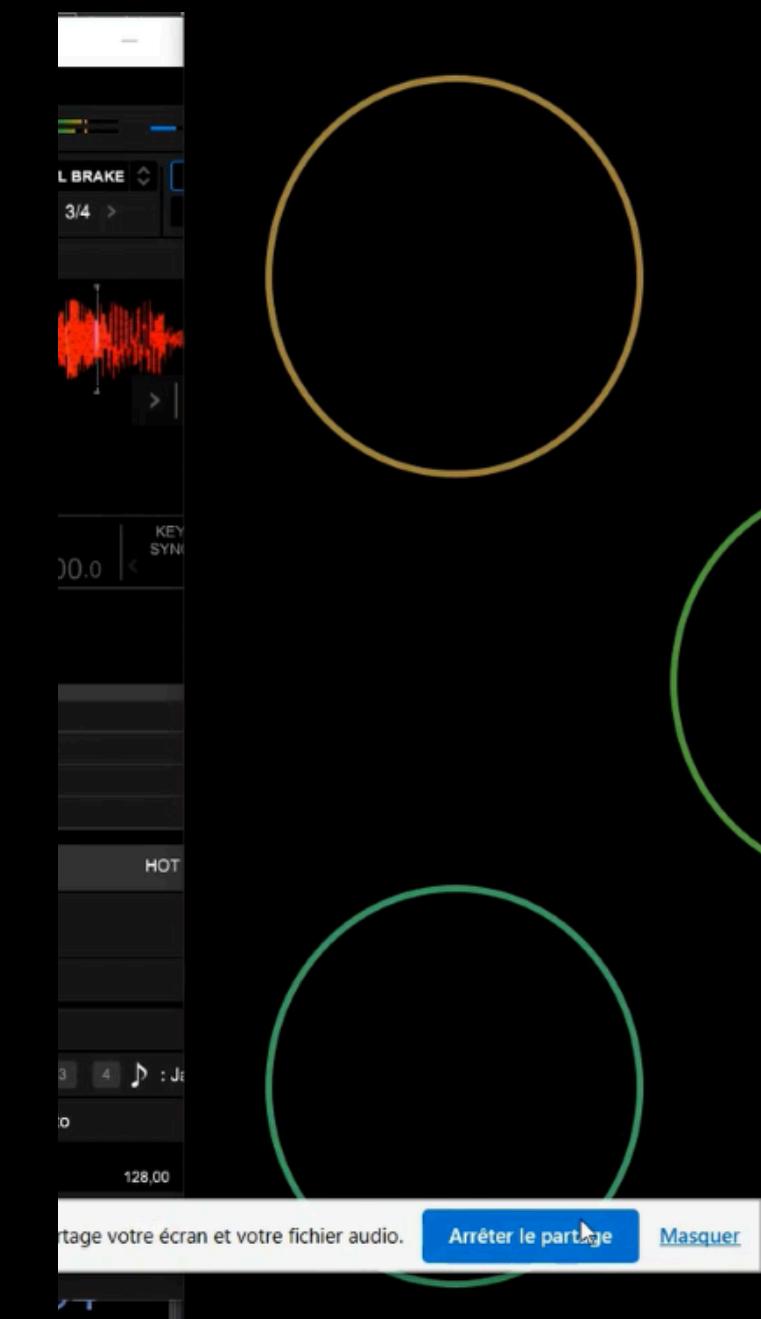
Drop (energy focused on the low frequencies k')

$$D_k = \sum_{k=0}^{K'} |X(k)|^2$$

MODULE 2 : CIRCLE DANCING

This module displays circles that reacts according to the features of the music played:

- Energy: controls the color and the thickness of circles;
- Entropy: controls the width and the height of circles;
- Drop: once passed a setted threshold 5 circles are showed instead of 1 allowing to feel more intensively the energy of drops made by DJ



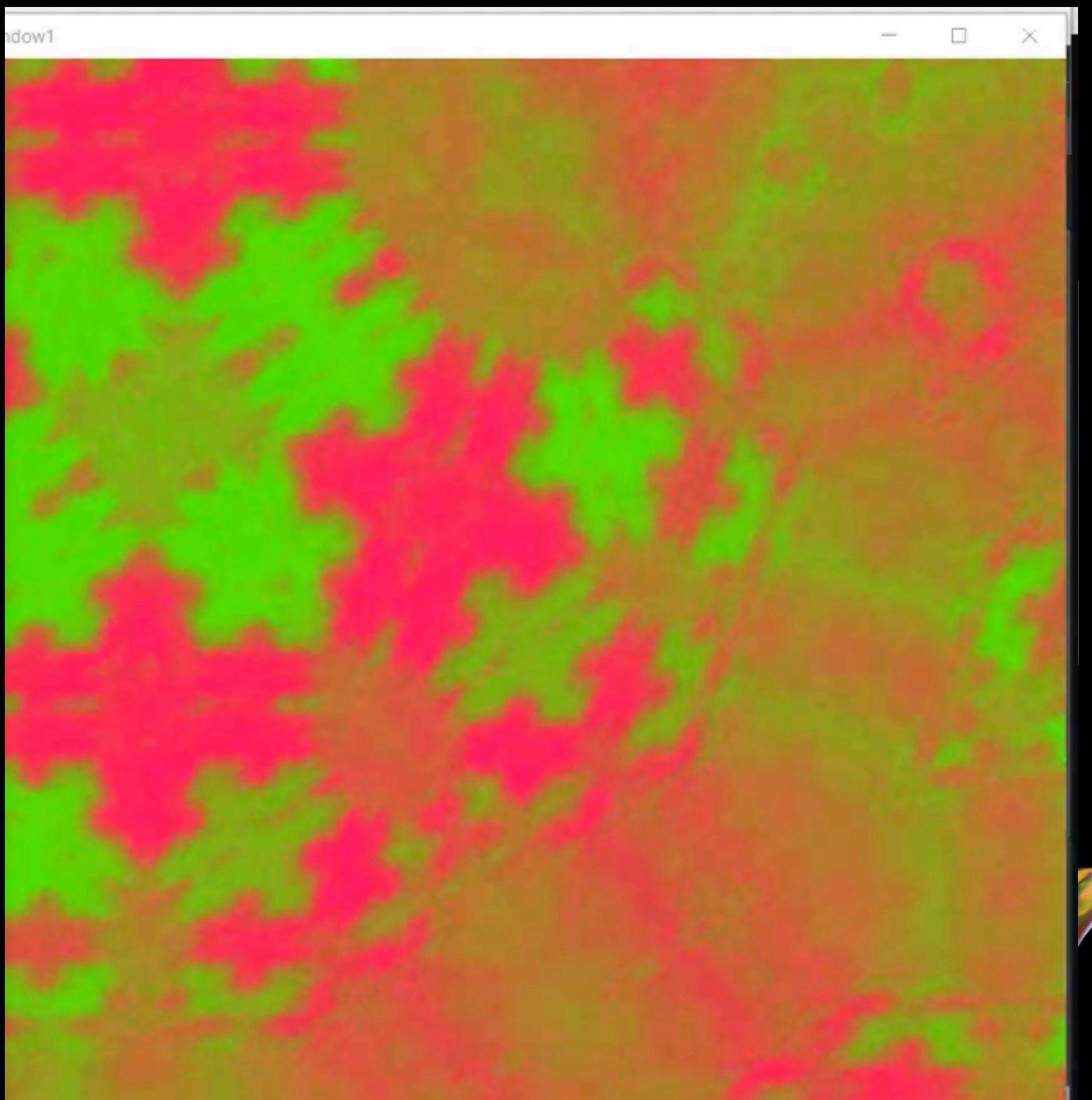
MODULE 3 : FRACTAL ART

Using Features values we calculated :

- Energy
- Drop
- Entropy

Send with OSC message to TouchDesigner

Using different modules in TouchDesigner (CHOPs, TOPs, COMP etc) we can succeed and arrive to a virtual art reacting to the music played



TOUCHDESIGNER

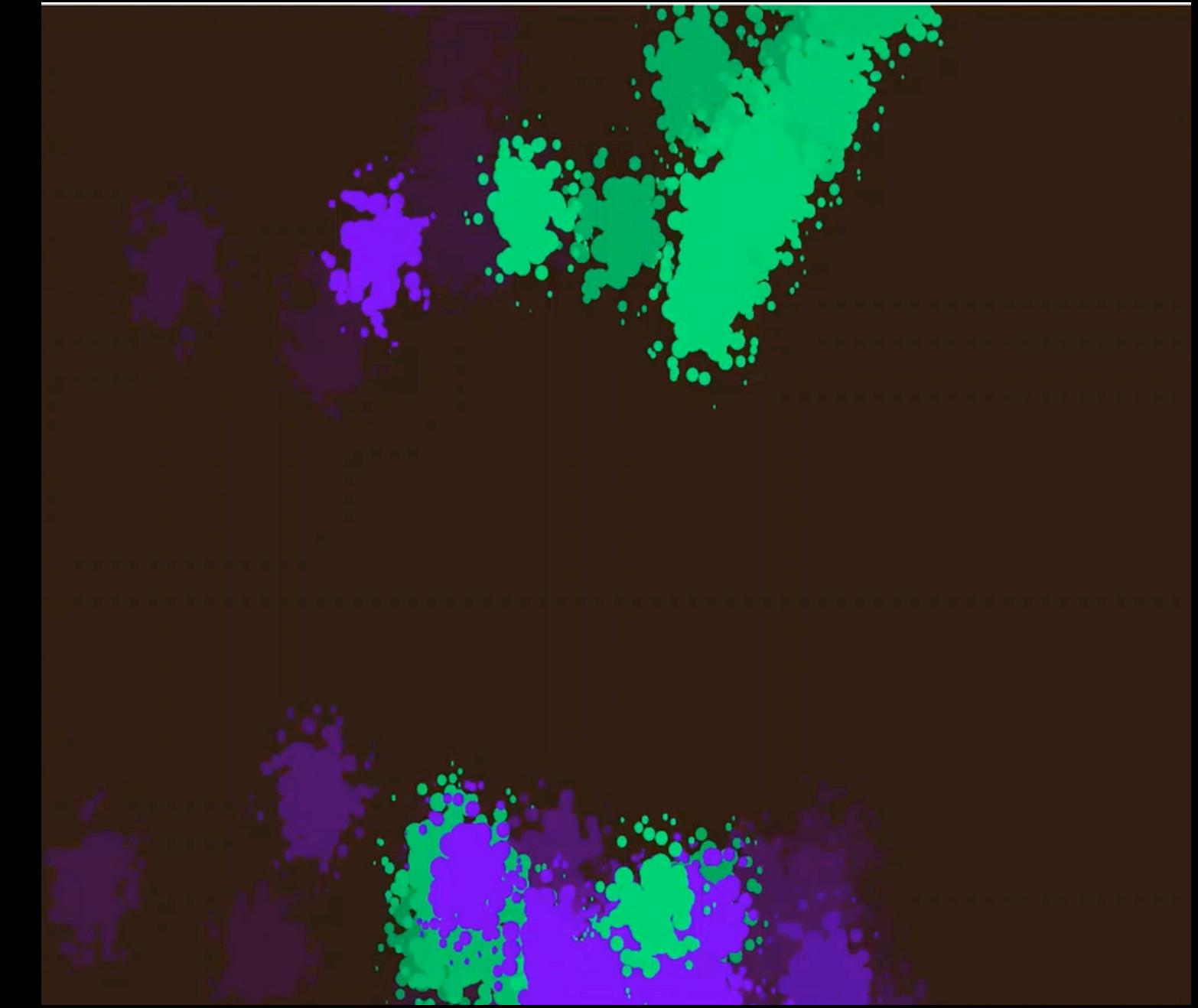


MODULE 4 : INTERACTIVE PAINTING

1ST : CONNECT DEVICE SENDING
GYROSCOPE VALUES TO
COMPUTER

2ND : INTERPRET THE MESSAGES
AND ASSOCIATE COLOR TO
DIFFERENT IP ADDRESS

3RD : DANCE AS MUCH AS YOU
CAN !



Sensor used during demo : sensor2OSC on android
with 2 phones

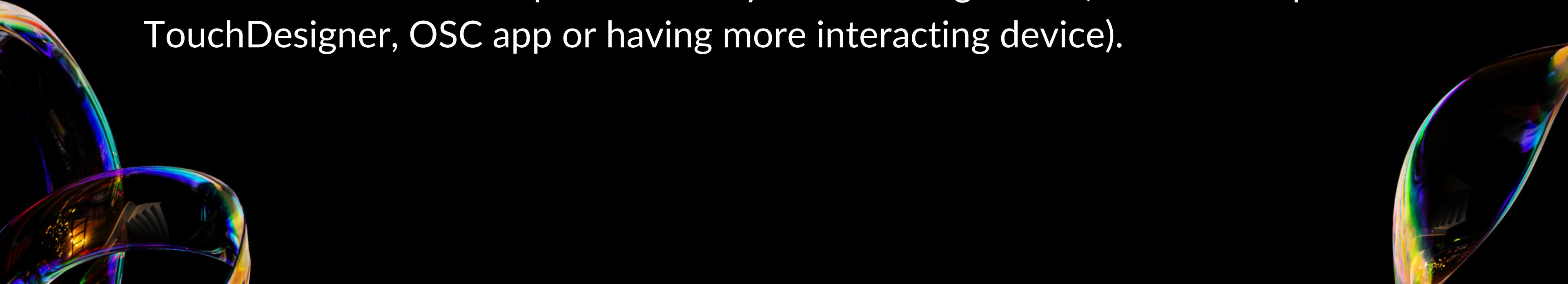
Advised sensors : connected bracelets with gyroscope
and connected with ARTNet or OSC messages

MOTIVATIONS & CONCLUSION

As we are both musicians we experienced playing in front of a crowd and what it makes unique is the interaction with people .

So we thought of a way to increase the involvement and to give them a visuals associated with music and to make them collaborate in creating visuals is the best solution for us, since we think people are more involved if they have a visual feedback.

We think that with the different modules of the ART DJ Designer we accomplish this purpose. Furthermore we let space for more modules to be created and we can improve or vary the existing ones (with subscription to TouchDesigner, OSC app or having more interacting device).





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THANK YOU

Be ready for the demo !

