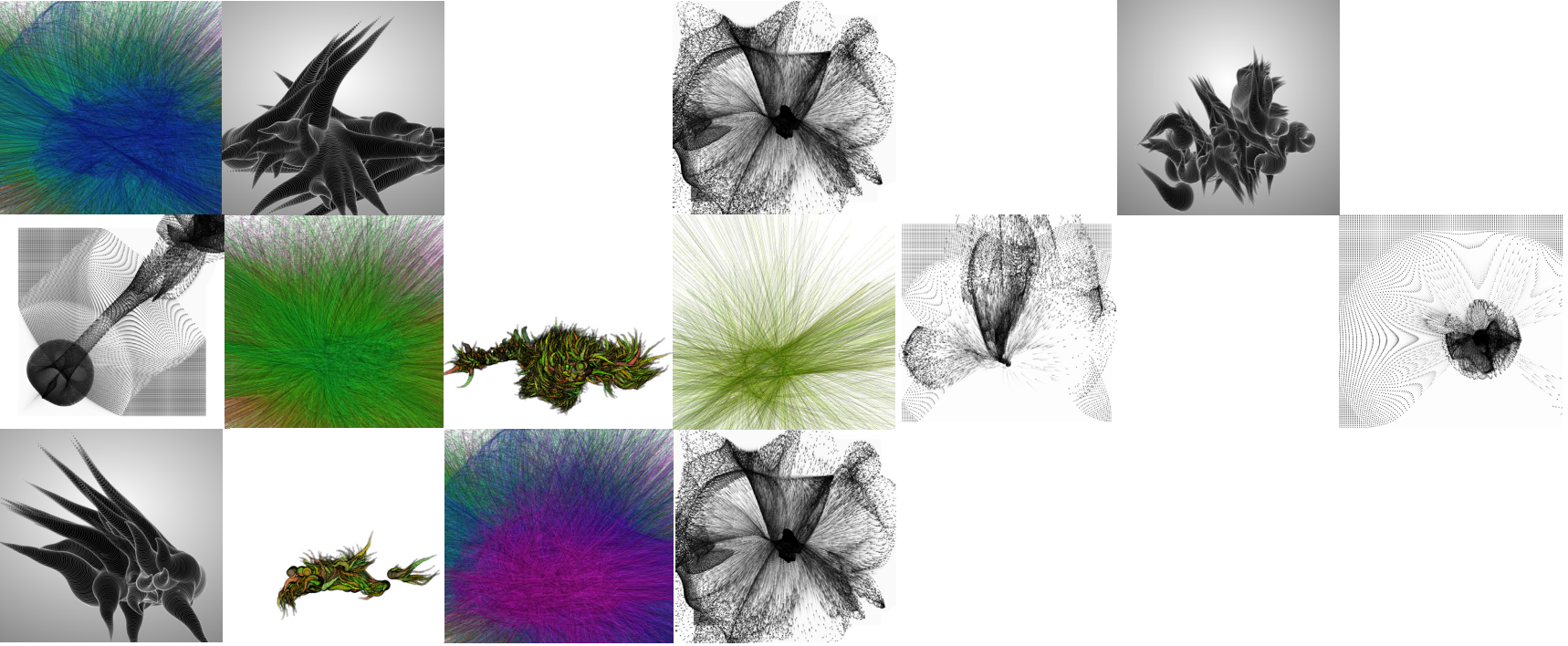
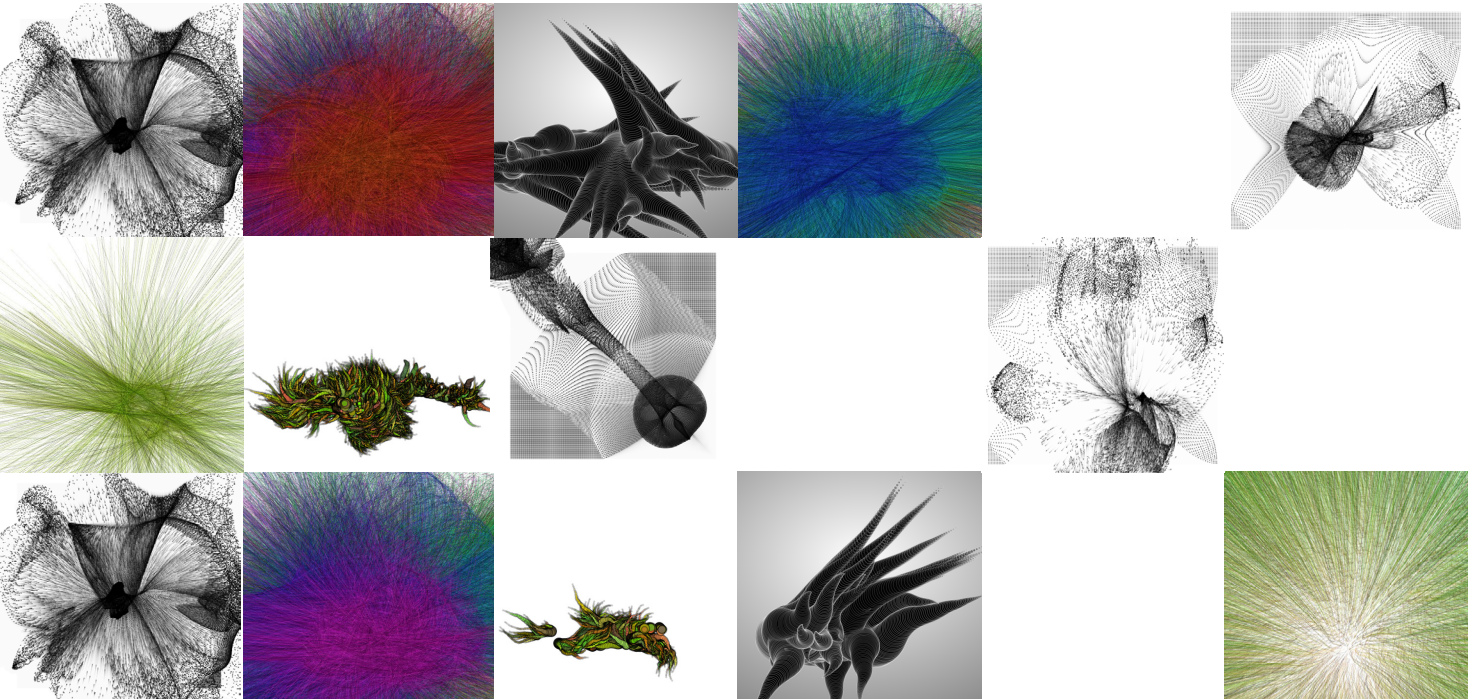


Data Generative Art Installation



Design Research Seminar

Under the Guidance of:
Prof. Venkatesh Rajamanickam

Debasish Biswas
136330010

Declaration

The research work embodied in the written submission titled “Data Generative Art Installation” has been carried out as Design Research Seminar (DRS) by the undersigned as part of the post graduate program in the Industrial Design Centre, IIT Bombay, India under the supervision of Prof. Venkatesh Rajamanickam.

The undersigned hereby declares that this is an original work and has not been plagiarized in part or full from any source. Appropriate reference information or links have been provided wherever due. Furthermore, this work has not been submitted for any degree in this or any other university.

I understand that any violation of the above will be cause for disciplinary action by the institute and can also evoke penal action if need arises.

Debasish Biswas
136330010
Industrial Design Centre,
Indian Institute of Technology

Approval Sheet

This Interaction Design project entitled “Data Generative Art Installation” by Debasish Biswas, 136330010, is approves in partial fulfillment of the requirement for Master of Design Degree in Interaction Design.

Project Guide

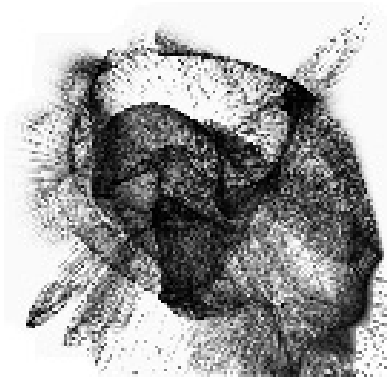
Date: 16/02/2015

Acknowledgment

I would like to express my sincere gratitude to Professor Venkatesh Rajamanickam for his support and guidance.

Furthermore, I would like to thank Rasagy Sharma for his valuable ideas and insights during the various stages of the project. The project wouldn't have been the same without my friends who supported me, at various stages during the project. Thank you Riken for the frequent help and motivation.

I would also like to thank Industrial Design Centre, IIT Bombay for providing me with all the facilities and necessary materials and an environment that encourage me to work on this project.



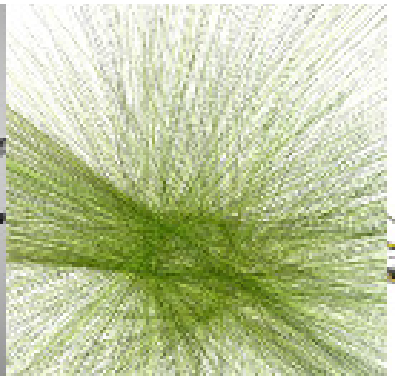



Table of Content

//Introduction

> Can a computer create art? Can a machine embrace the creative process?

Abstract

Can a computer create art? Can a machine embrace the creative process. These were the questions I wanted to find answers to with this Design Research Seminar. The intention was to research on relevant literature and implement some of the learnings.

The research aims at implementing a data generative art installation. An exhibition of artwork that generates art as viewer interacts with it. The movement and presence of the viewer is used as data. Different algorithm give different character to similar input data. These generated images then creates another collage which keeps one changing as newer images are generated by viewers.

This final collage is the culmination of experiences of all the viewers of this installation. This installation will itself create data and use it make generative art.

Scope

I was interested in artists who have worked on generative art. I studied related works to develop an understanding of Generative Art and its progression through time.

The aim is to make generative Art using data. This data can be complex or simple, dynamic or static. Can a data be given a new underlying meaning by art. This project is not about data visualization but making Art.

This is further influenced by what is one's understanding of art. For this project a simple data such as viewer's face or hand movement can be used to create generative art. The finalised idea will be implemented in a public show so that it can be evaluated.

Generative Art Systems

Audio	"Microsonic Landscapes" by Realitat "Identity of Leeds College of Music" by Precedent
Image and Depth scans	"Stardust" by Sergio Albiac "Collagene" by Do The Mutation
Text	"Synesketch" by Uroš Krčadinac "Visual Poetry" by Esono
Social Media	"We Feel Fine" by Jonathan Harris "4010 Facebook Tree" by Onformative
Data from human activities/technologies	"We are the City" by giCentre "Art is Motion" by Sergio Albiac lexus car
Data from our natural environment	"Drawing Water" by David Wicks "Nordkyn Identity"
Touch-based Interactivity	"Pigmentol Identity" by Feld "Silk" by Yuri Vishnevsky
Principles and algorithms in Sciences	"Meta-matics" by Jean Tinguely
Natural algorithms	"Signals" by Casey Raes "Cloud Forest" by Holger Lippmann

These are systems that generally allow a particular aspect of the final form or aesthetic to be decided randomly, based on attributes not under the control of anyone.

I refereed to the colloquium paper by Rasagy Sharma titled- "Creative Code: Exploring Generative Systems to create art". It helped me in understanding what Generative Art systems are and their brief history and examples. Generative art refers to art that allows an autonomous system to be part of the process of creating it, where the autonomous system could be a computer algorithm, any of the natural sciences, or just chance and randomness. [1]

Case study - We are the city

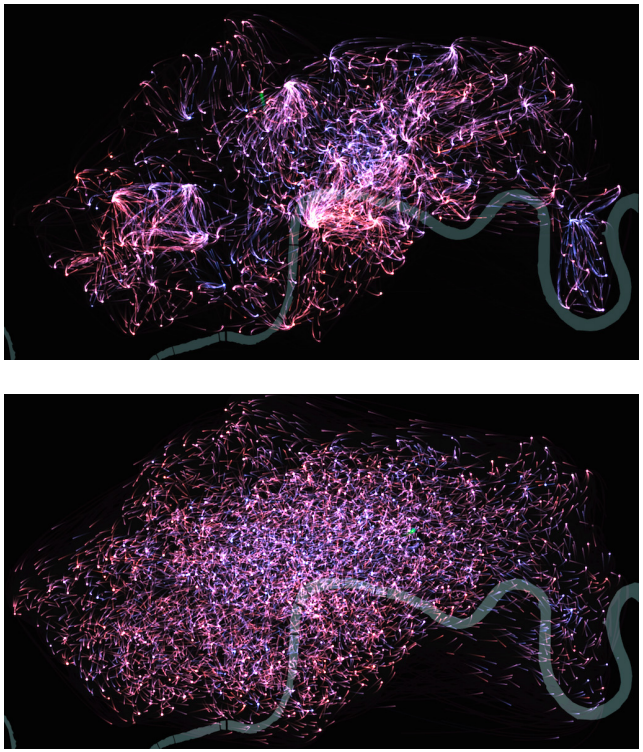


Fig 1. Cycle Journeys in morning and peak hours

This project is done by Jo Wood. Data from over 20 million journeys made with the London Cycle Hire Scheme are used to feed an animation of this bicycle movements across London. The journeys are captured and rendered as smoothly flowing curves through the capital. The apparent chaos of so many journeys gradually clears as patterns emerge that reflect our reasons to travel. Leisure cyclists exercise their way around the royal parks; commuters hurry to and from railway stations; weekenders embark on cultural excursions of museums and galleries. [2]

- Actual cycle path is simplified into curves
- Data is recorded over a period of time
- Used data set is huge
- It tends to be more focused on data visualization than generative art
- Viewers can not directly interact with it.

Case study - Art in Motion

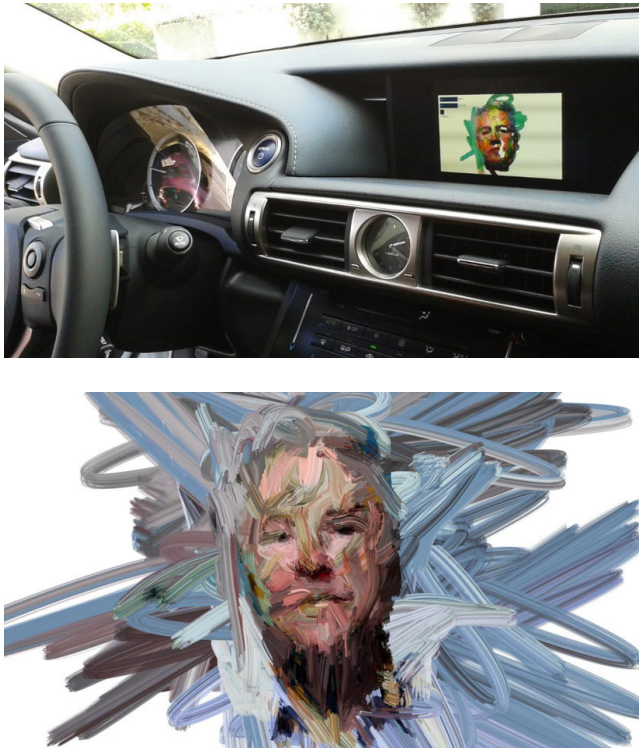


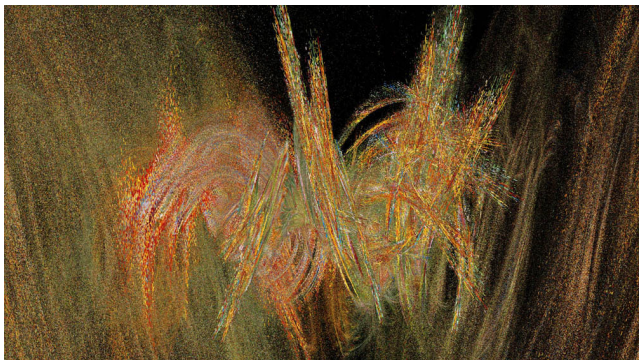
Fig 2. LEXUS dashboard and the generated Portrait

Sergio albiac made this installation inside of a LEXUS car that generates a real time portrait of the driver based on data collected over the course of the trip. For Each journey, data such as driving style, duration of travel, decision making, and traffic events etc, is collected from sensors within the vehicle. Based on this information, the aesthetic of the final portrait changes in real time. Each resulting appearance is a hybrid of a person and technology, originally derived from genetics, but physically shaped by choice and chance.

If the drive is mild, at low speed, and with lot of electronics being used, then the "brush strokes" are precise and the colours toward the violet end of the spectrum. If the drive is aggressive with lots of swift acceleration, then the strokes are broad and the colours go for the reds. [3]

- The base image for portrait is fixed.
- Data is recorded over a shorter period of time.
- Used data set is moderately large.
- It is more focused on generative art than data visualization
- Users can directly interact with it.
- Users get real time response for his driving actions

Case study - Generative Art Mining



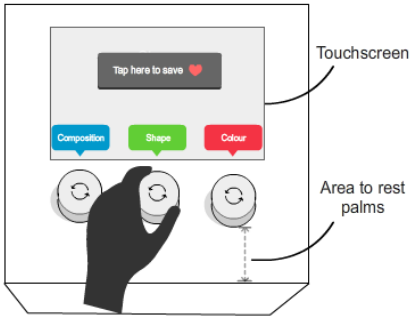


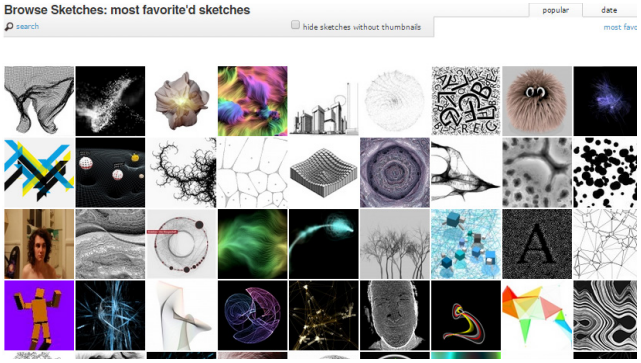
Fig 3. The mined art and the physical control panel

This is a Google devart project by David Hoe. Its an interactive tool to explore generative abstract art. It gives user a way to manipulate something that's traditionally only allowed to be viewed. They can explore the variations around that piece in real-time, or simply start in a new mining location and generate something new.

The user interface is simple enough to be used by all age groups. It uses a row of 3 physical knobs, each one corresponding to movements along one of the 3 axes. Someone could just walk up to the installation and start using it without knowing what to do. Since the knobs are tactile unlike touch-screens it allows them to interact without having to look at the controls and instead concentrate on the screen in front of the them. [4]

- It uses real time data
- Used data set is small
- It is completely focused on generative art and aesthetically pleasing pieces.
- Viewers directly interact with it using physical controls.

//Research/Studied Resources

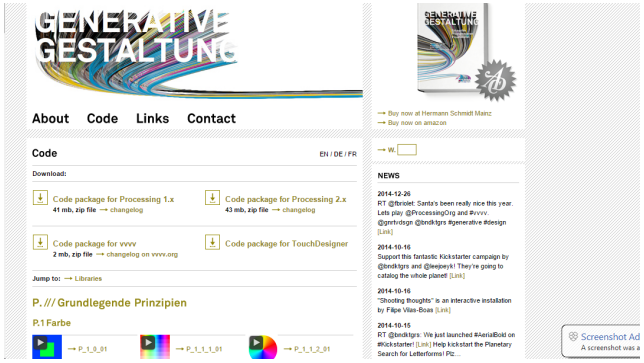


http://www.openprocessing.org/

Open Processing

Open Processing is an online community platform devoted to sharing and discussing Processing sketches in a collaborative, open-source environment.

I wanted to use processing in this project. As it was easier to learn and code for making generative art. Open processing provides an open-source platform to learn processing and I learned by tweaking different example codes.



http://www.generative-gestaltung.de/

Generative Gestaltung

This site supplements the book "Generative Design" (published by Verlag Hermann Schmidt Mainz, 2009) and has direct access to all the processing source code of the programs described in the book.

These examples gave a step by step explanation of different fundamentals and techniques used in processing.

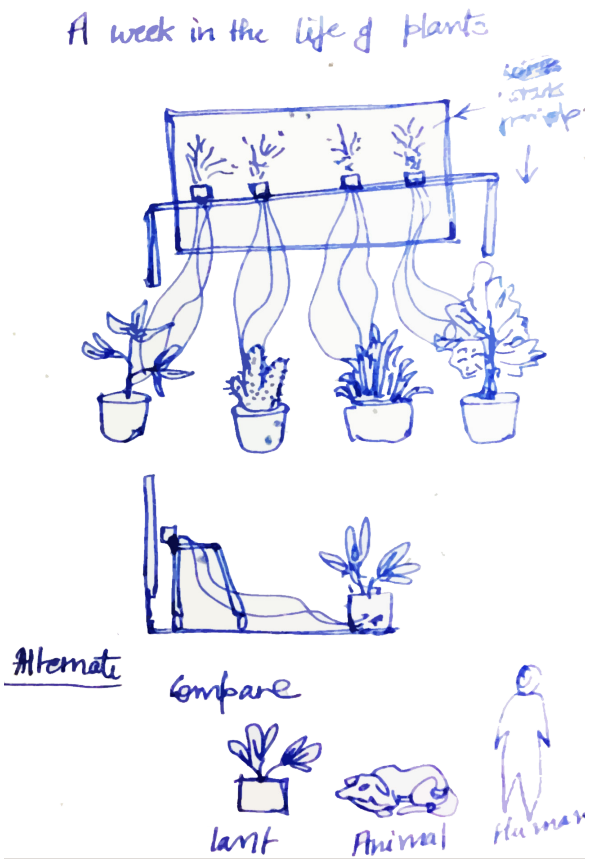
http://d3js.org/

D3.js

D3.js is a JavaScript library for manipulating documents based on data. D3 helps in bringing data to life using HTML, SVG, and CSS. D3 allows you to bind arbitrary data to a Document Object Model (DOM), and then apply data-driven transformations to the document.

I explored around with D3 but it has higher learning curve. I decided to continue with processing as tool for this project as my data was simple.

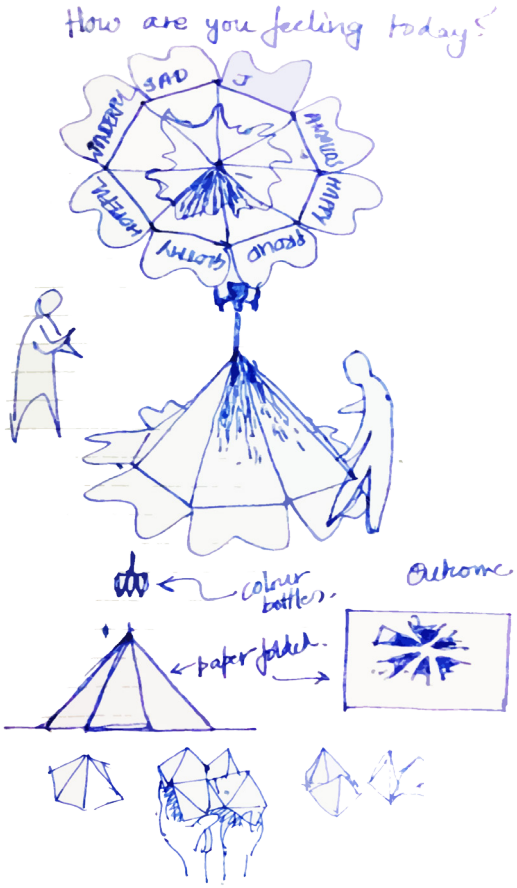
//Outcome /Initial Ideas



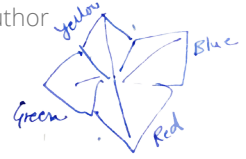
Source- Author

Idea 1

The idea was to record the activities from various plants or collect existing data on it. Then use similar data from animals and humans and make a comparative generative art for all three. This was not taken forward because such data set will be static and the final output will not be an interactive installation.



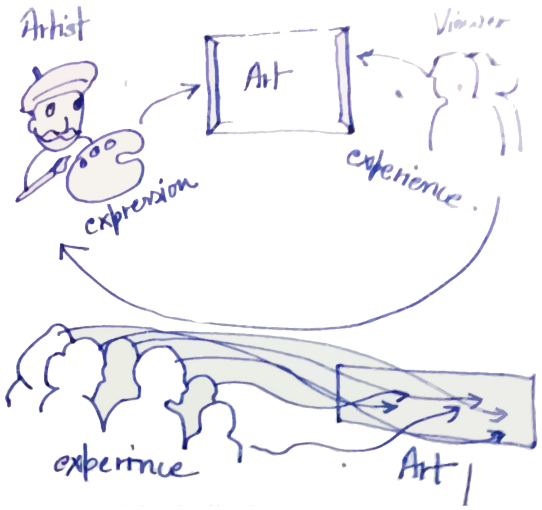
Source- Author



Idea 2

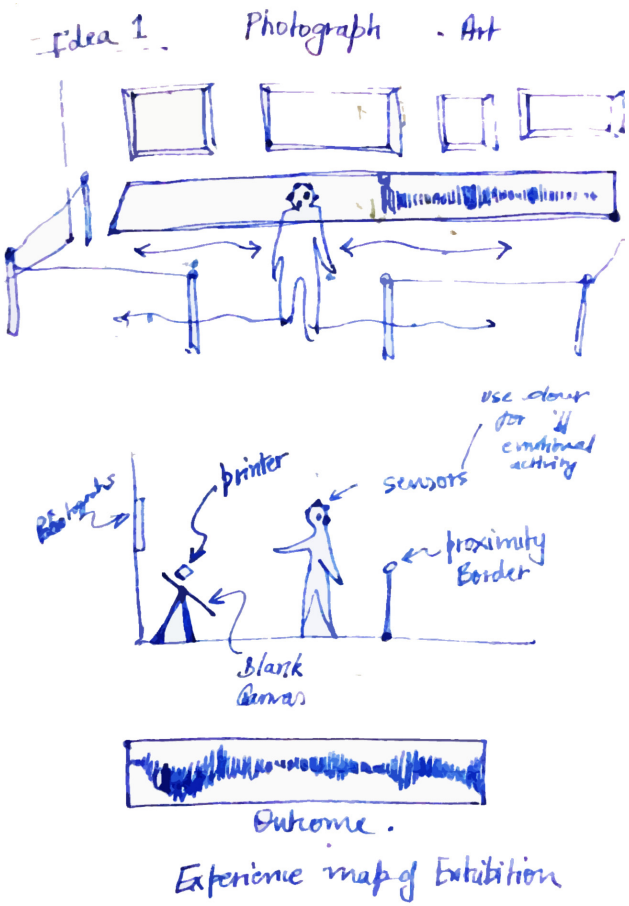
The idea was to record the emotional state of the viewers to make a dynamic generative art. We can make a folded paper mountain with touch sensor pads at the bottom. Viewer can press on the pad corresponding to his/her feeling. These inputs will control the flow of colour bottles kept at the tip of the paper mountain. This idea was not taken forward as there was no real data involved.

//Outcome /Finalized Idea



Intent

Art is mostly the self expression of an artist, which is open to be experienced by the viewers. Can we reverse this process? Can the art be created from what viewers have experienced during an exhibition. This is the intent for the installation.



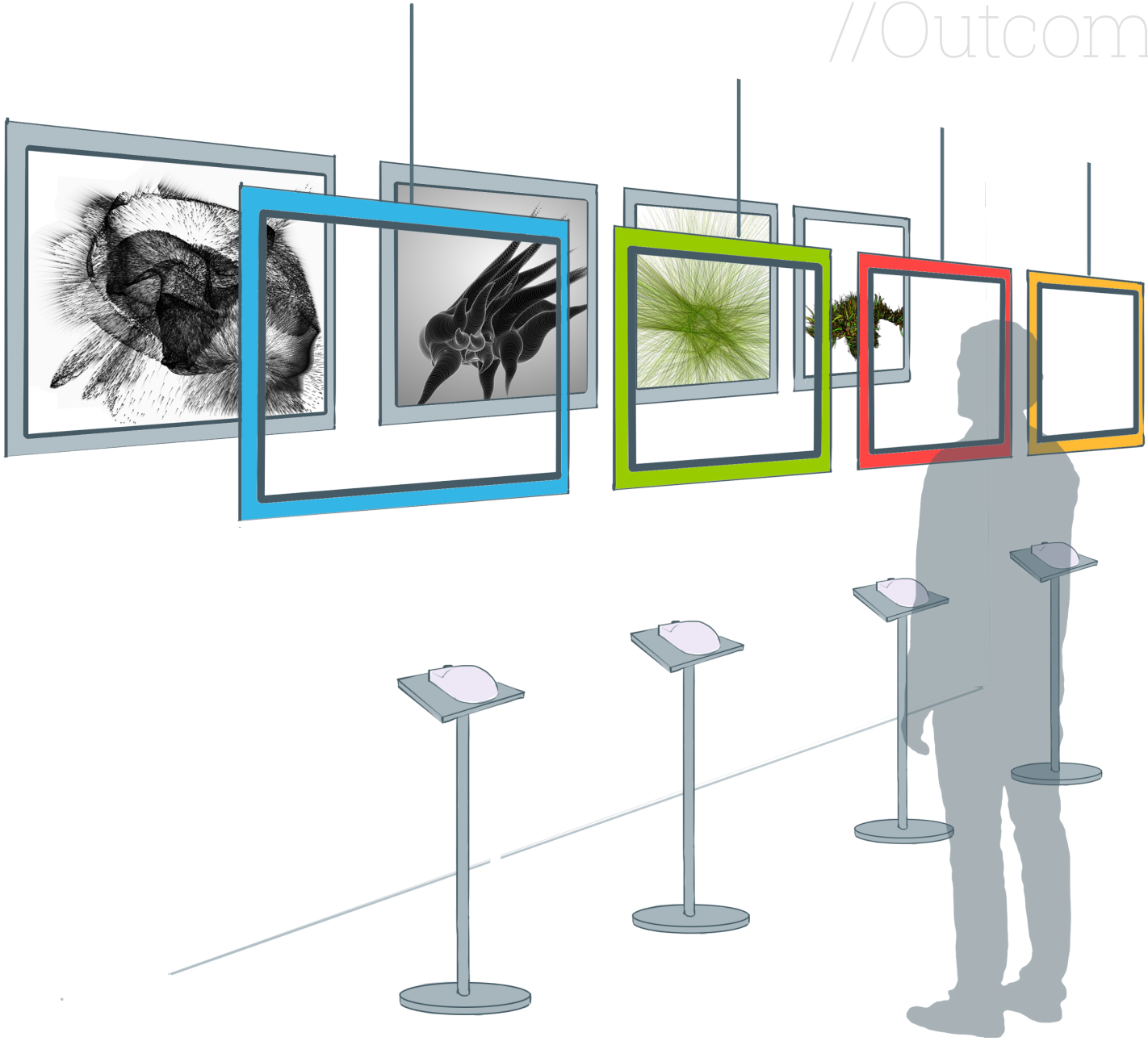
Source- Author

Idea 3

The viewer will interact with the exhibition of blank screens. These screens will record data such as for how long the user has been standing there. It can detect his face and hand movements. Using this data another computer can create a generative art. This final piece will summarize the experience of the viewer.

- It uses real time data
- Used data set is small
- It is completely focused on generative art that summarizes the experience of the viewer.
- Viewers directly interact with it using gesture based controls.

//Outcome /Installation



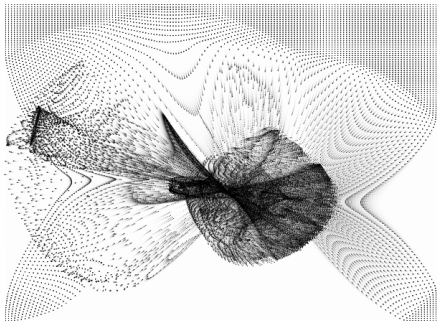
Source- Author

The aim was to give viewers a way to create something that's traditionally only allowed to be viewed. They can explore each screen output in real-time and generate something new each time.

This installation will require four display monitors stuck to the wall and four mice kept on stand. There will be coloured frames in front of each display monitor.

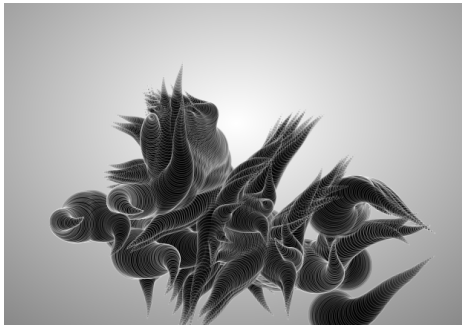
Viewer can interact with each panel by moving his head/hand within the coloured frame. They can use the mouse to reset the canvas or save something they like. In this way each viewer may or may not create a number of different images. All these images will then be used to make a dynamically changing collage. As new images get added to the dropbox folder the collage updates itself.

//Outcome / Visuals Source Codes



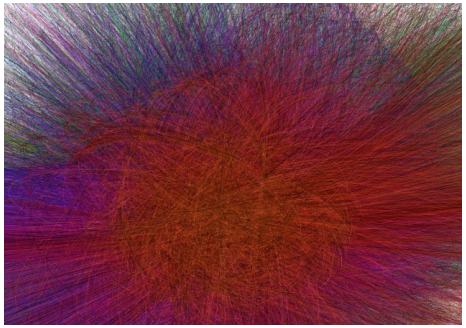
The grid attractor
http://www.openprocessing.org/sketch/185824

The visual starts with 22500 dots arranged in a 600 by 440 grid. The grid begins to collapse as the dots start getting attracted to the face location of the viewer. The dots attract on detecting face and repel in its absence.



The depth metal
http://www.openprocessing.org/sketch/185825

This visual has a gradient background to to add to the feeling of depth. The metal roots begins to grow out of the position of the face. Unfinished roots continue to grow even in the absence of the face position.



The color burst
http://www.openprocessing.org/sketch/185828

Built upon the grid attractor code. The dots are not in a grid. But, randomly coloured lines burst out of the position of the face. The lines leaves there imprints over the previous screen. The dots revolve around the position of the face. And the dots repel in the absence of data.

The wild grass
http://www.openprocessing.org/sketch/185823

This is a tweaked version of the code depth metal. The strokes are shorter and more random. They develop into grass vines tracking the face position.

/Implementation //Outcome

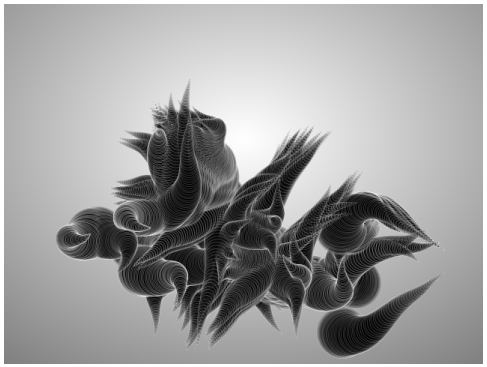
The installation consists of four computer screens which have inbuilt web cam connected to them. Processing is used for face detection and graphics generation. The face input activates once the viewer comes in proximity of the frame in front of the screen.

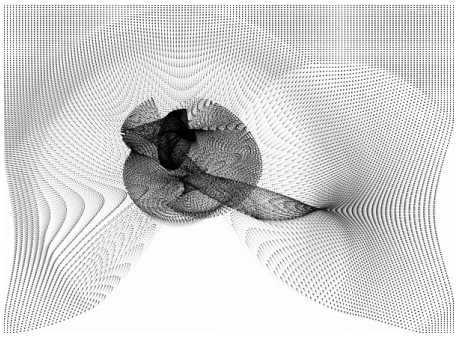
Processing records the x,y values of viewer's face position. The position of the face in the frame creates the graphics on the screen in real-time. The user can save and reset the screen using the mouse. The visualization are variations of two codes.

The created pictures are then used to generate a dynamic collage. This is a self sufficient installation, where it creates data and uses it to create sum-thing.

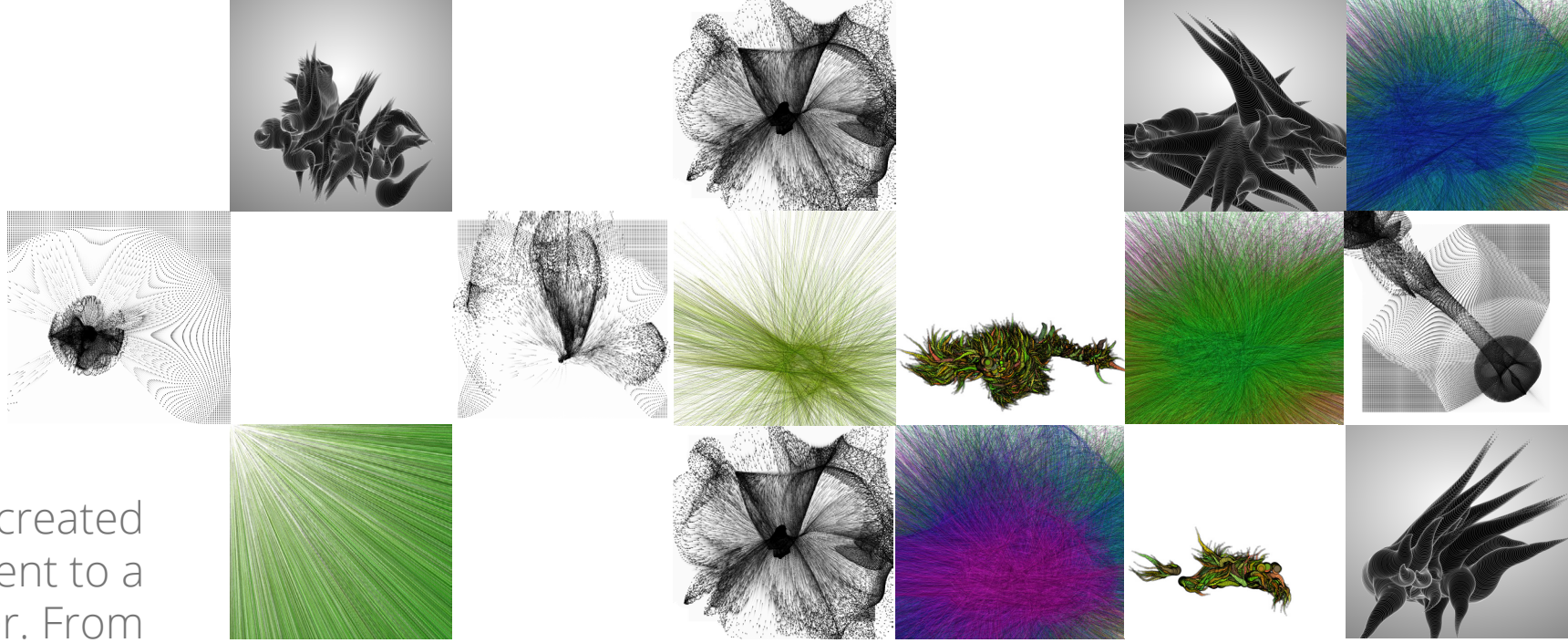
Source- Author

- The depth metal
- The wild grass
- The grid attractor
- The color burst

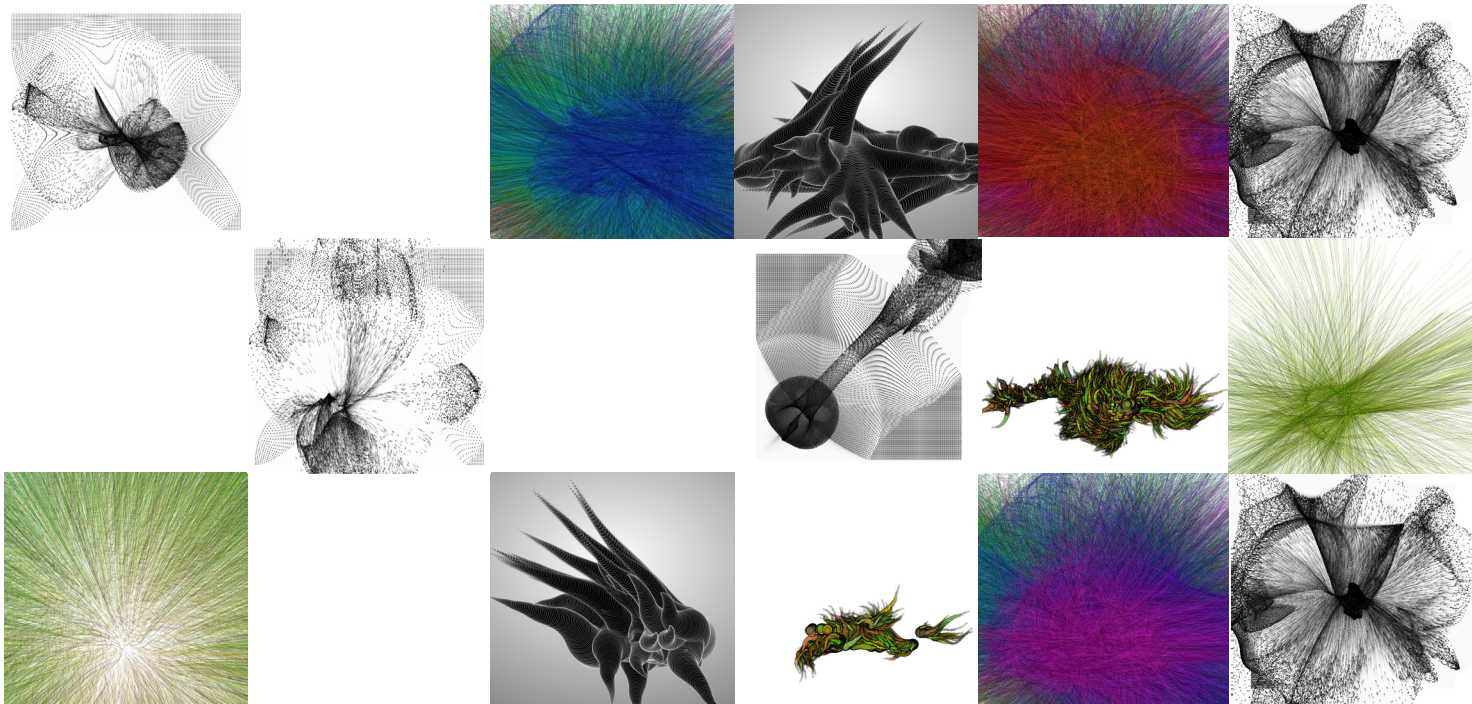




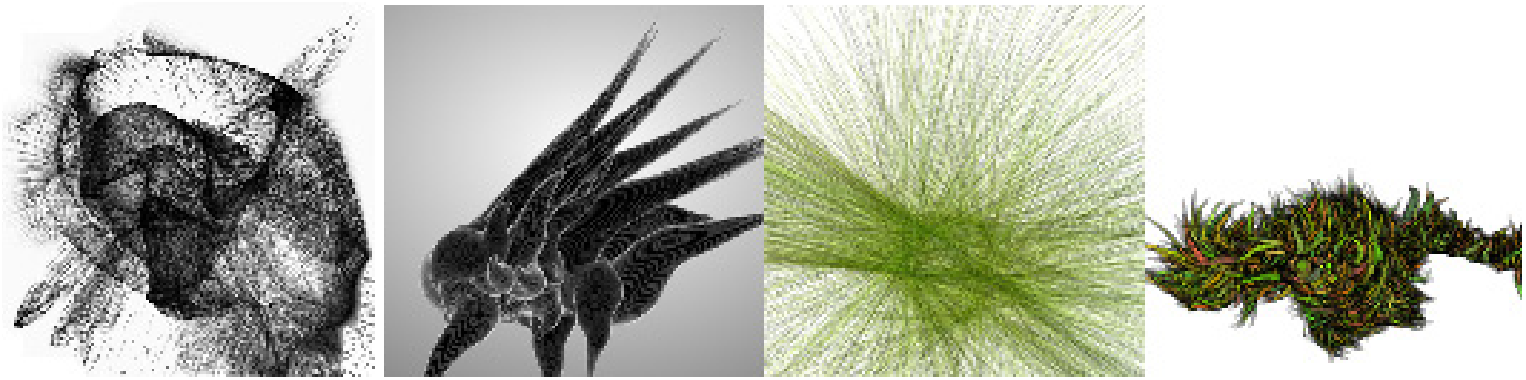
The viewer's created pictures are sent to a dropbox folder. From here the pictures are used to generate a dynamically changing collage.



Dynamic Collage



//Outcome /Conclusions



- The project helped in developing an understanding about Generative art and progression of data driven generative art by other people.
- I got to learn about image processing and using processing to generate graphics.
- The project will be implemented in upcoming typoday 2015 and further observations will be updated.
- I conclude that computers can generate art. I am not sure if they can follow a creative process. But, events such as acquisition of 14 video games by MoMA suggest we must expand the definition of art.

//Outcome /Table of figures

//Outcome /References

[1] Rasagy Sharma. Colloquium Paper, Creative Code: Exploring Generative Systems to create art, PGDPD, Information & Interface Design NID R&D Campus.

[2]giCentre. “We are the City” (2015) <http://gicentre.org/watc/index.html>

[3] Sergio albiac. “Art is Motion” (2015) <http://www.artismotion.com/>

[4] David Hoe. “Generative Art Mining” (2015) <https://devart.withgoogle.com/#/project/17109841>