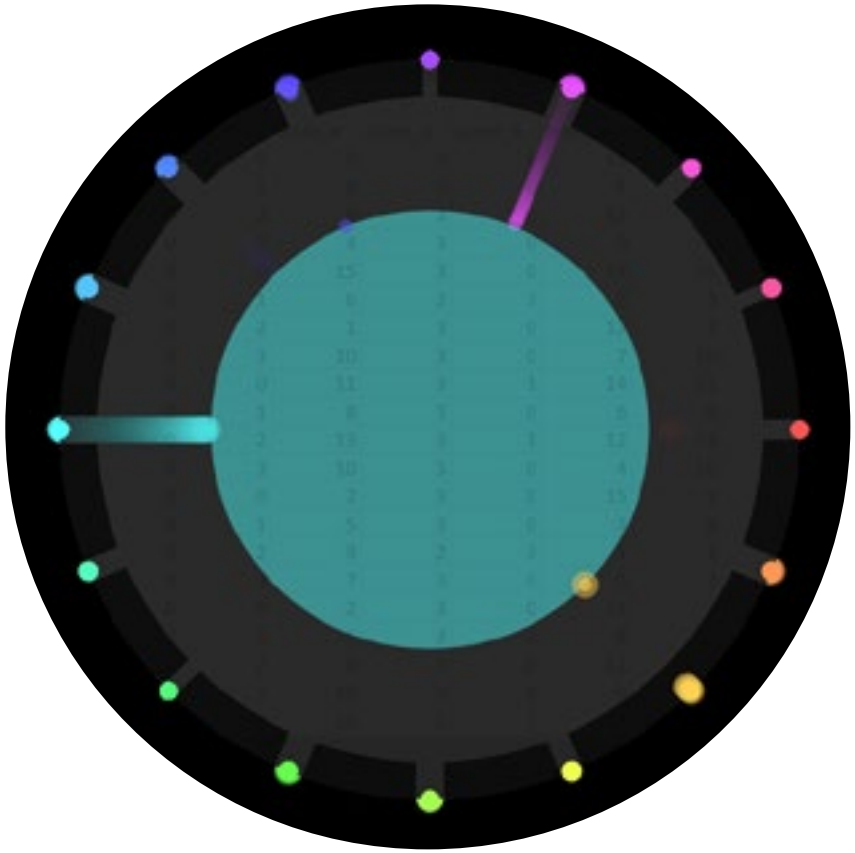

DATA ART

```
while (input==data)
{
  map(data, dull, boring, humanized, vivid, attractive);
  return (art);
}
```


Riken Patel (136330002)

Guide: Prof. Venkatesh Rajamanickam

Project Report (Draft 1)
Design Research Seminar
IDC 2015

Declaration

The research work embodied in the written submission titled “DATA ART” has been carried out by the undersigned as part of the post graduate program in the Industrial Design Center, IIT Bombay, India under the supervision of Prof. Venkatesh Rajamanickam.

The undersigned hereby declares this is his original work and has not plagiarized in part or full from any source. 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 provoke penal action if need arises.

_____
Riken Patel
(136330002)

Approval Sheet

This interaction design project entitled “DATA ART” by Riken Patel, 136330002, is approved in partial fulfillment of the requirements for Master of Design Degree in Interaction Design.

Project Guide:

Chair Person:

Internal Examiner:

External Examiner:

Date:
Place:

Acknowledgement

I am sincerely grateful to my guide, Prof. Venkatesh Rajamanickam for his constant support and utmost guidance throughout the project.

I would like to thank Debasish Bishwas for his motivation and support. I would like to thank Rasagy Sharma for his timely help and valuable feedback. I would like to thank Vaibhav Bhalekar and entire team of Inter IIT sports meet for sharing data with me.

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1. Abstract

Aim of the project is to use the data to generate art. It is an attempt to create aesthetically beautiful art pieces using real world data. A try humanizing the data that people can appreciate which otherwise remains dull and boring. The motive is to communicate data to larger audience and engaging them. Data-art is different from visualization as the primary intent of the representing data is not to convey specific communication message but to create curiosity in viewers to explore more.

At the start of the project I explored few popular existing projects and influencing personalities in domain of data-art, data-visualization or generative art.

As a next step, I have used data from 50th inter IIT sports meet to express how I interpreted it as a battle for ultimate victory. The final outcome is an interactive abstract visualization which discloses match between each IIT one by one, sports by sports and at the end of each cycle, it allows user to interact with it.

Scope of the Project

The aim of the project was to experience the process of the creating art based on the data. A limited research on the existing data-art has been carried out in order to realize where the project lies. The target audience of the final outcome is people associated with IITs, but others can also enjoy it.

2.Introduction

Art, Design, Technology & now DATA

Being a design student, I have been wondering how technology and art can guide the design. Digital technology as we know is inhuman and instruction driven and. On the other hand there is art which is abstract and humanized. The primary intension of the art is to evoke emotional response towards something by creation. While that of technology is to solving problems and elevate the mankind by discoveries.

According to me, the portion of design is somewhere intersects both art & technology as it has to do both enhance the experience and solve the problem at hand. From earlier time, artist have used technology to create art. From cave painting to computer generated art, all were created by artists using some or the other tools. Today we are highly influenced by the data, in all forms.

Design plays an important role in providing the context of the data. Hence, the target is to create an elegant piece driven by data which eventually guide in building better design by suggesting what to do (or not to do!)

Inter IIT Sports Meet is the annual sports tournament of the Indian Institutes of Technology, and is the biggest inter-collegiate tournament in the country in terms of scale. 50th Inter IIT sports meet was held at IIT Bombay during 12-19 December, 2015. The Main Meet encompasses tournaments in 11(12) sports, namely Athletics (Aquatics), Badminton, Basketball, Cricket, Football, Hockey, Lawn Tennis, Squash, Table Tennis, Volleyball and Weightlifting. A total of 16 IITs competed for the Champion's title, and to receive the coveted General Championship trophy.

"Amidst all the attention given to the science as to how they can lead to the cure of all disease and daily problems of mankind, I believe that the biggest breakthrough will be the realization that the arts, which are conventionally considered to be "useless", will be recognized as the whole reason why we ever try to live longer or love more prosperously. The arts are the science of enjoying life."
– Muriel Cooper (Director, MIT Press)

3. Research

I started looking at generative art, computer art and other influencing artist and/or designer in the domain of data driven art.

Creative Code: Exploring Generative Systems to create art

- A colloquium paper by Rasagy Sharma (Sharma n.d.)

This colloquium paper highlights some of the unique art pieces in which where the end result is not decided by artist but the code created by artist. This project were broadly classified based on ordered and disordered systems. It further divides the project based on medium of input and output of creative process i.e. audio, images& depth scan, text, social media, data from human activities/technology, data from natural environment, touch-based interactivity, principles and algorithm in science, natural algorithms.

3.1 People

Jean Tinguely :: Mechanics of Chance

(scha 2012)(Lucas 2008)

Jean was a Swiss painter and sculptor. He is well known for "Meta-mechanics" – sculptural machines as kinetic art Tinguely's art satirized the mindless overproduction of material goods in advanced industrial society.

Figure 1. Meta-machanics by Jean Tinguely

His earlier art-works were machine which produced 'kinetic paintings' – random brush stroke on paper. Later he shifted to 'moving sculptures' – movement of machine itself as outcome.

His idea was to use imperfection of the machine. This imperfection were anti-mechanical and not organic. Parts of his sculptors like motors, wheels, belts, crank-shafts were intentionally constructed so that they are imperfect

and creates infinite variation for each iteration, making it impossible to repeat the same outcome. Phenomenon like jerking, jamming, jittering epicycles of periodic rotations and translations were used to create art-piece.

His aim was to build a machine whose goal was not perfection but anti-perfection. A way to protest against highly mechanical, predictable movements.

Giorgia Lupi :: Inspiration for Visualization

She is information designer and data visualizer. She is a famous for her works in accurate printing especially for famous writer's sleep habits, life of painter and Nobel no-degrees. She uses small multiples to generate final visualization. Various parameters are associated with data

Inspiration & exploration: According to her, the process of coming up with the final solution from the data itself is non-linear. Rather she explores form and then fitting data to that form. She looks in different domains for her inspiration like abstract art, geometry, architecture, astronomy etc.

She considers drawing to be important tool for the exploration process. Reproducing reality by drawing helps to introduce level of abstraction and helps into translating things in something else. Retrieved from talk at Eyeo festival (Lupi 2014)

Visualization should not be dumbed down just to make it simple. Rather one should respect their audience by making it intellectually compelling and at the same time providing emotional value to the visualization. There should be multiple level of information so that audience can enjoy it as per their interest. One can just have overview while others can explore as much details as they want from same outcome.

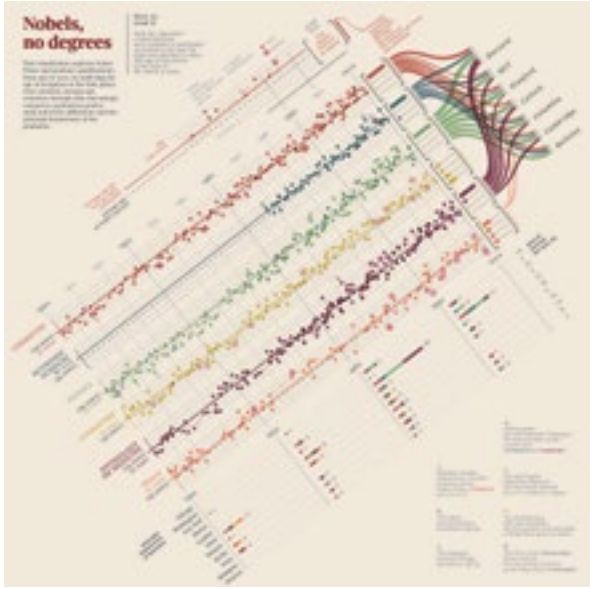

Figure 2. Nobels, no degree, a visualization of Nobel price winners from 1901 to 2012, their educational qualification and their age. It also provides how to read this visualization with example

Jer Thorp & Humanizing Data

He has background in genetics and his work has influence of science at multiple levels. He stretches the potential of infographics. He likes to make big-data more human.

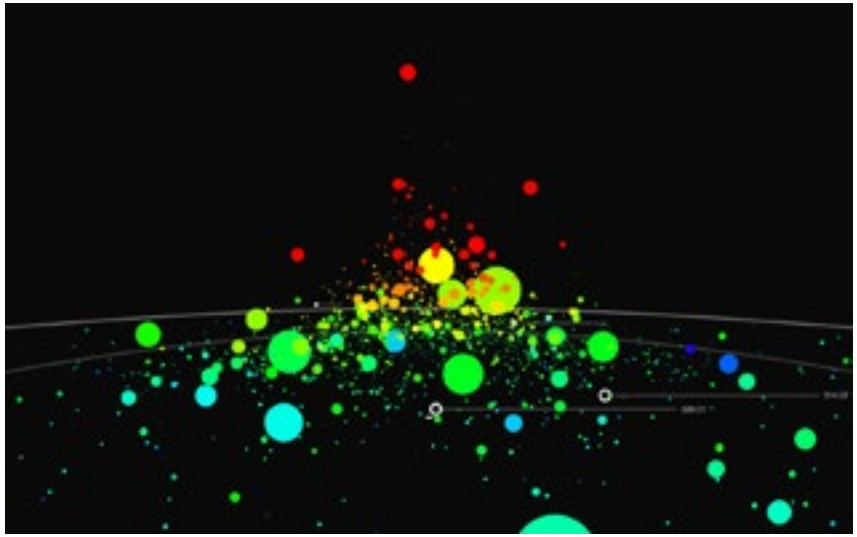

Figure 3. Visualization from Kepler project, an interactive screen based art-piece which uses data of 1236 exoplanets identified NASA's Kepler mission. (Thorp n.d.)

3.2 Projects

A Conversation between Trees:

What Data Feels Like In the Forest (Rachel Jacobs 2013)

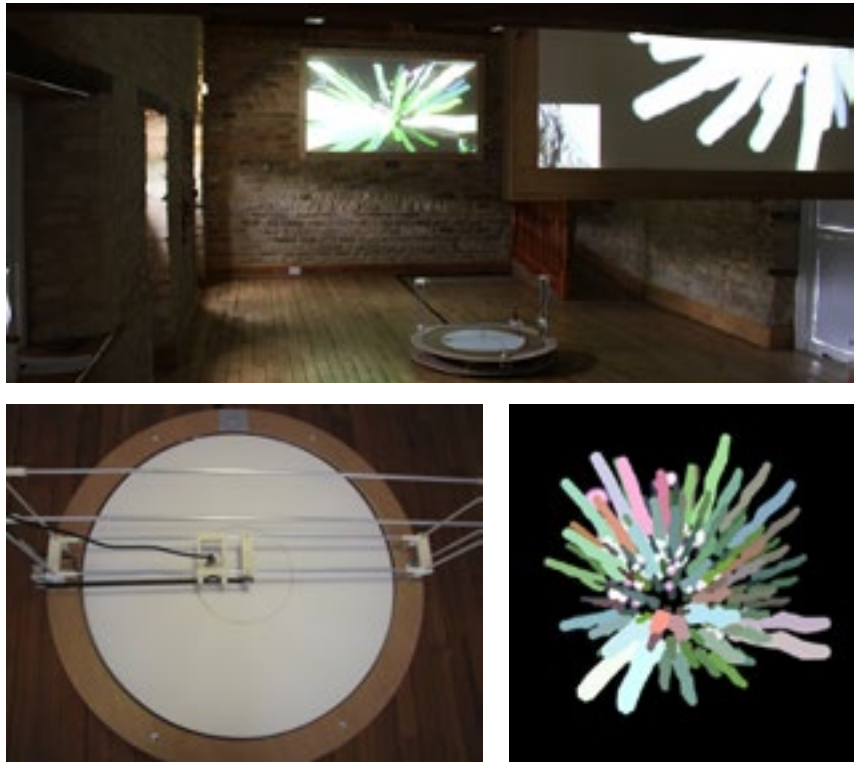

Figure 4. Gallery setup for "A Conversation between Trees"

This project is study of artist engaging the audience with scientific climate data i.e. Co2 level in forest measured by (camera-sensors on) trees. A climate machine records the

data and draws interesting visual patterns on circular paper. Simultaneously live feed from the forest is also shown in abstracted form.

Meta-phone

(Vygandas Šimbelis 2014)

The Metaphone is an interactive art piece that transforms biosensor data extracted from participants into colorful, evocative perceivable visual patterns on a big canvas

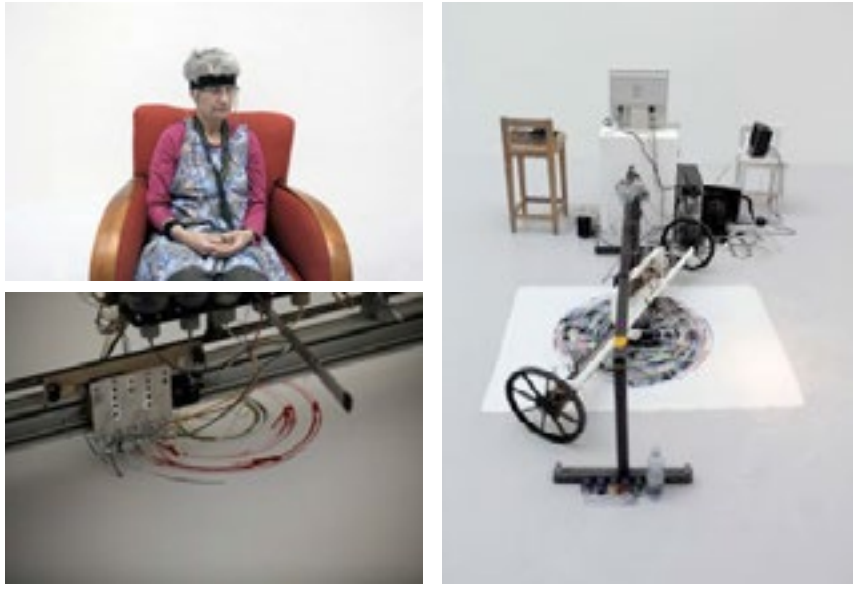

Figure 5. An artistic exploration of biofeedback and machine aesthetics

Microsonic Landscapes

(REALITÄT n.d.)

Figure 6. 3-D printed micro-sculpture representing recorded sound

It is physical manifestation in form of 3D printed micro-sculptors. The hills and valleys of the sculptors are based on actual recorded sounds. Different soundtracks have different intangible personality which are highlighted in tangible form.

Leeds College of Music

Brand Identity (Nurse n.d.)

Precedent developed a generative identity to showcase the diversity of talent within the college and reflect each student's personal work. A piece of bespoke software allows the college and its students to render a reactive visualization of a piece of student music within a set of parameters based upon the core visual mark. Our work touches the intersections between code, music, sound art, bio art, illustration and design

Figure 7. Different generative identity and sample visiting card

We are the city

(Wood 2013)

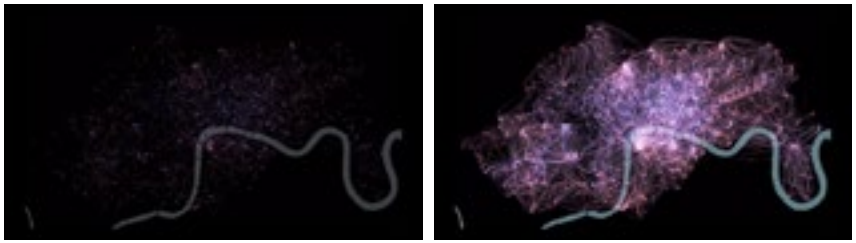

Figure 8. Screenshots from video generated from project "We are the city"

During this 9 month period over 7 million journeys were made using London's public cycle hire scheme. These journeys are shown in 25 min video using red, purple and blue lines colored according to the number of bikes available at the journey's origin and destination. Structure is revealed in the chaos of millions of bicycle journeys by carefully watching the video.

Physical Visualization

Physical visualization (Dragicevic 2012) is a chronological list of physical visualizations and related artifacts. Currently it has 188 entries. 1947 – Dorothy Hodgkin's Electron Density Contours

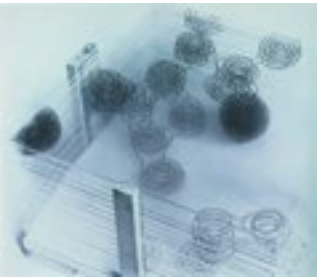

Figure 9. Dorothy Hodgkin's Electron Density Contours

‘Art is motion’

A project investigating human identities through technology integrated artwork (Art is motion n.d.)

Artist sergio albiac has conceived an interactive art installation inside of a car that generates a real time portrait of the driver based on data collected over the course of the trip.

Figure 10. Set-up and potraits for different type of driving habbits

3.3 My Understanding

Many of the projects are based on random event be it digital noise or mechanical imperfection. Artist decides what will happen in occurrence of the noise.

It is not possible for artist to completely disappear from producing the art. The work of art can be generated without artist’s presence but not without the ideas. Two different extremes can be thought as one where artist creates art by reflecting by himself and one where he has no control over final outcome.

The process of creating the visualization is not linear. One has to go back and forth or completely out of the way to represent data.

The intension of data visualization is purely to communicate the details while data-art is representation of the data by primary intention of aesthetics. There can be multiple levels at which these both can intersect. Using data which can be dull and difficult to understand by human, we can convert it to make it interesting while keeping the context unclear to audience at first. Gradually we can reveal the details describing the context and make it more interpretable.

4.
50th Inter IIT Sports Data

Data comprised of total of 11 sports event participated by 16 IITs for both Men and Women category.

In Men category, 11 sports event and in Women category 6 sports event took place. Among these sport athletics event comprised of several individual events such as 100m, 200m, 400m race, long jump etc. In men's athletics 18 while in women's athletics 10 events took place.

Figure 11. Inter IIT sports meet

4.1 Nature of the data

The data recorded by the authorities was in chronological order. Scores of all the matches were recorded in table in PDF.

Most of the sports event (except athletics & weight-lifting) were played in rounds. Initial rounds were heat round were teams were divided in pools based on number of IITs competing for that particular sport. These round matches were followed by quarter final, semifinal, match for third place and finals.

The data was then cleaned and parsed. I converted the data in sports wise matches which were easy to process and will make more sense. It would also make it easy to implement making the data granular.

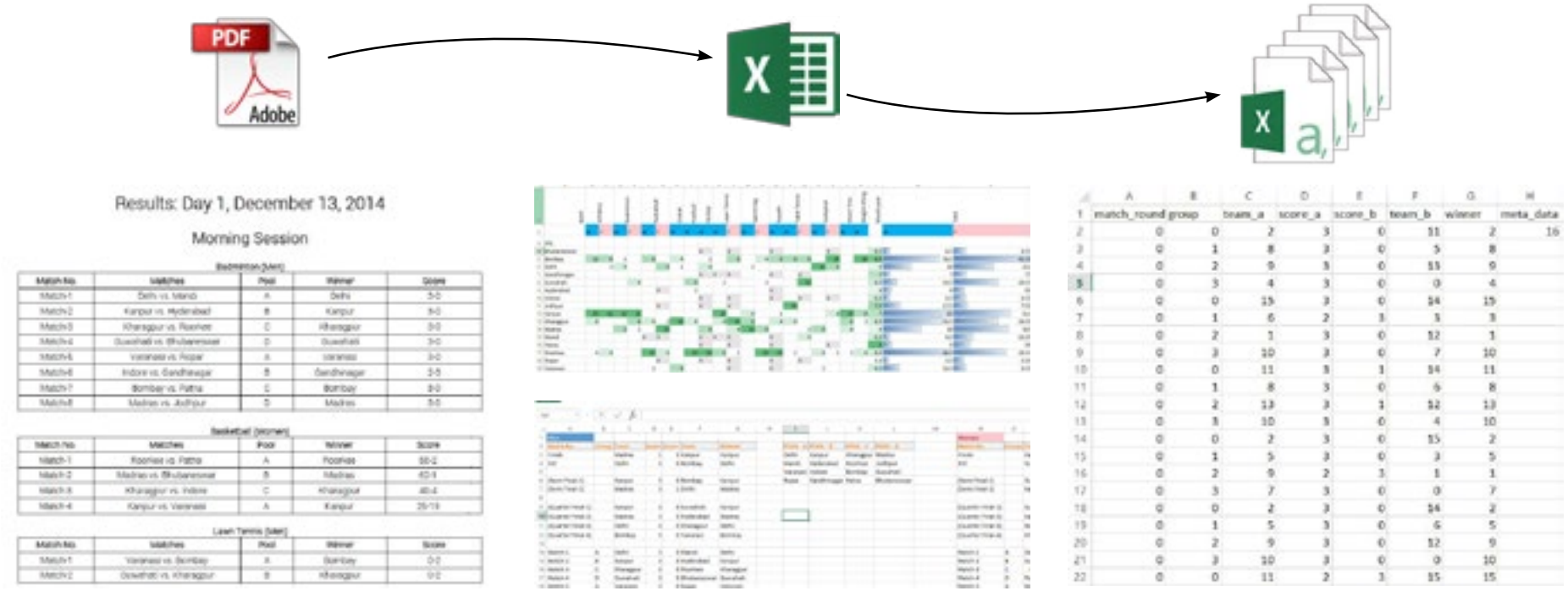

Figure 12. Data handling & flow

5. Exploration

From Initial Ideas to final Outcome

5.1 Initial Ideas

I started creating ideas, initial ideas were influenced by past and contemporary famous art pieces & geometry. In process I also tried to look at mathematical graphs i.e. dendrogram.

I tried to draw inspirations from surroundings, mood-boards having abstract art, geometry, generative art etc.

Initial ideas were more suited for data visualization, while others didn't capturing the essence of rich data. Set of ideas were just extension of the earlier famous visualizations or art-pieces. Set idea was driven by the desire of making it tangible.

One of the personal goal was to expose the final outcome to huge number audience which seemed possible using web or printed form. I chose former one and I focused on screen based static/interactive outcome.

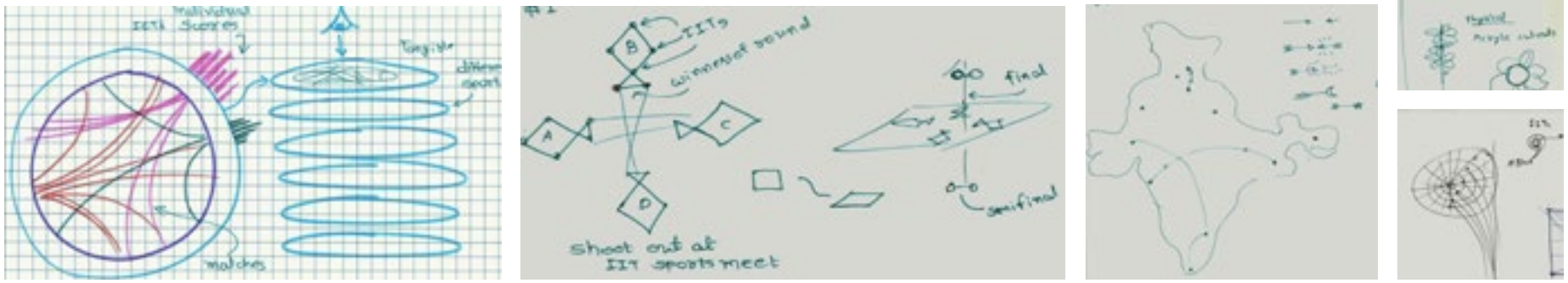

Figure 13. Different alternates for representing data

There is no specific reason to select one particular idea over other. The only parameter considered in selection was the ability of showing rich details in the data. If the final-outcome cannot represent data then it will be unfair to the rich data that we have.

5.2 Finalized Idea

The finalized idea mimic the race between raindrops which eventually merge into each other. Each IITs will be placed around a circular glass disk according to alphabetical order. With the progression one by one match will be displayed in form of race between those two IITs. Each IIT will have color retrieved from the color wheel based on their position on round disk. At the end of the match, both the water droplet will merge and their color will turn to winner IITs. In such a way matches for each sport will be showed one after the other.

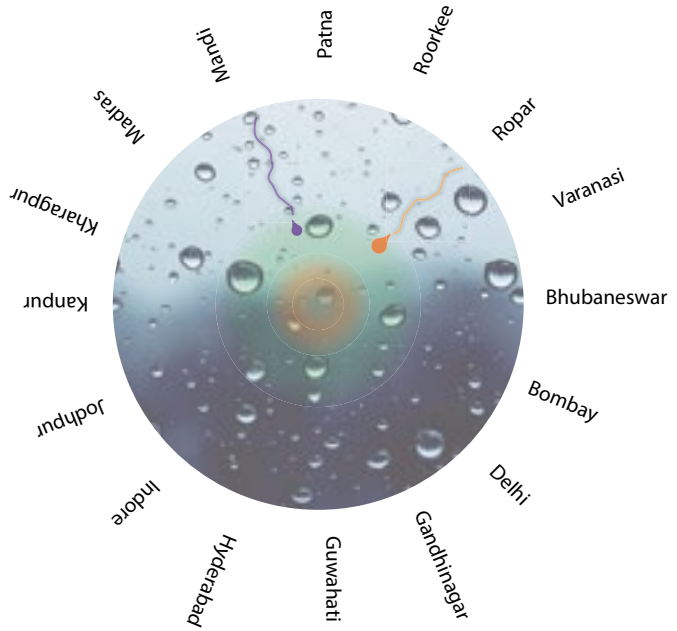

Figure 14. Concept for data-representation having realistic effects

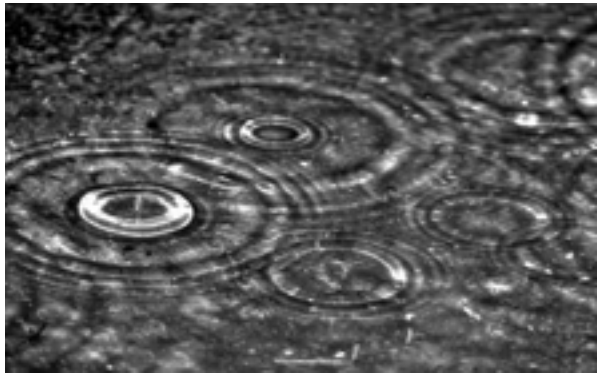

Figure 15. Moodboard during exploration

For realizing the representation, the abstracted version of the final idea was implemented. The water drops were represented by tiny circles and bold bright colors were used.

Interactivity with the user will be improved in consecutive iteration. User will be able to adjust the speed, move to desired sports, can find out further details with mouse hover and mouse click interaction.

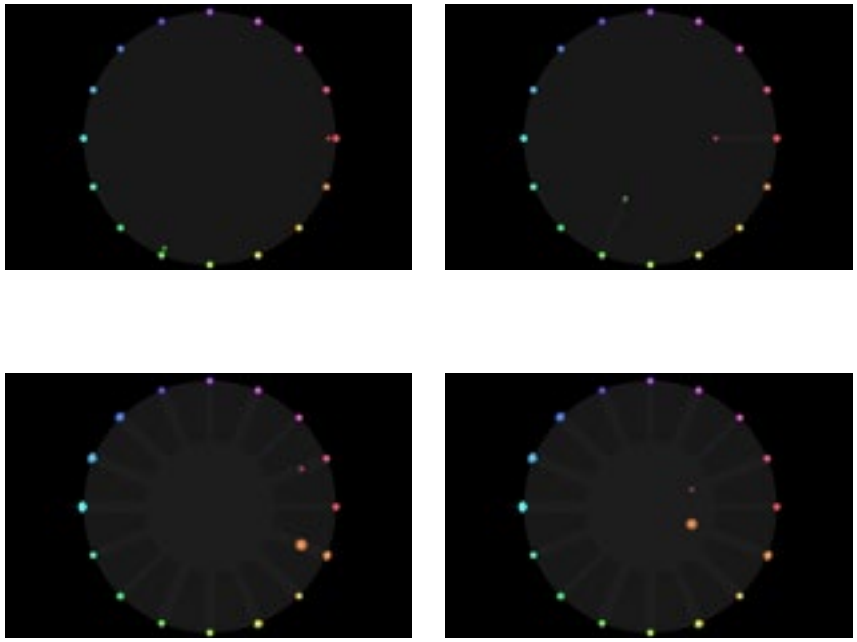

Figure 16. Screenshots of final representation

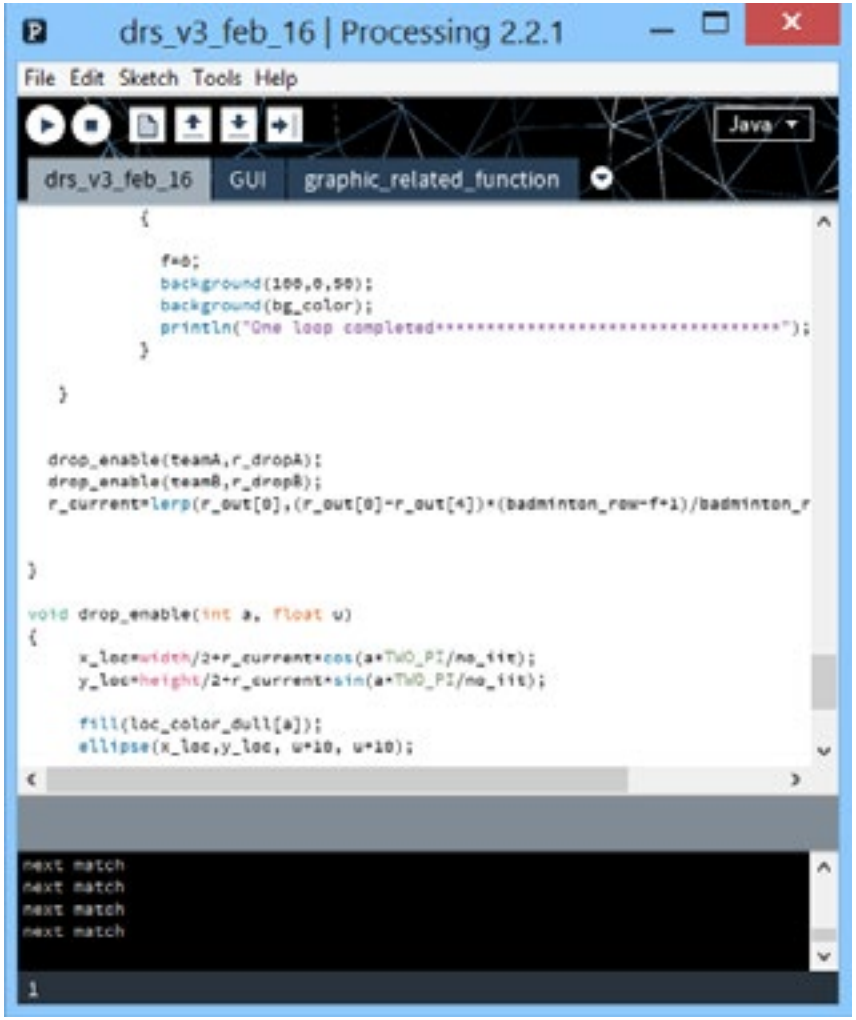

Figure 17. Processing development environment

5.3 Final Representation

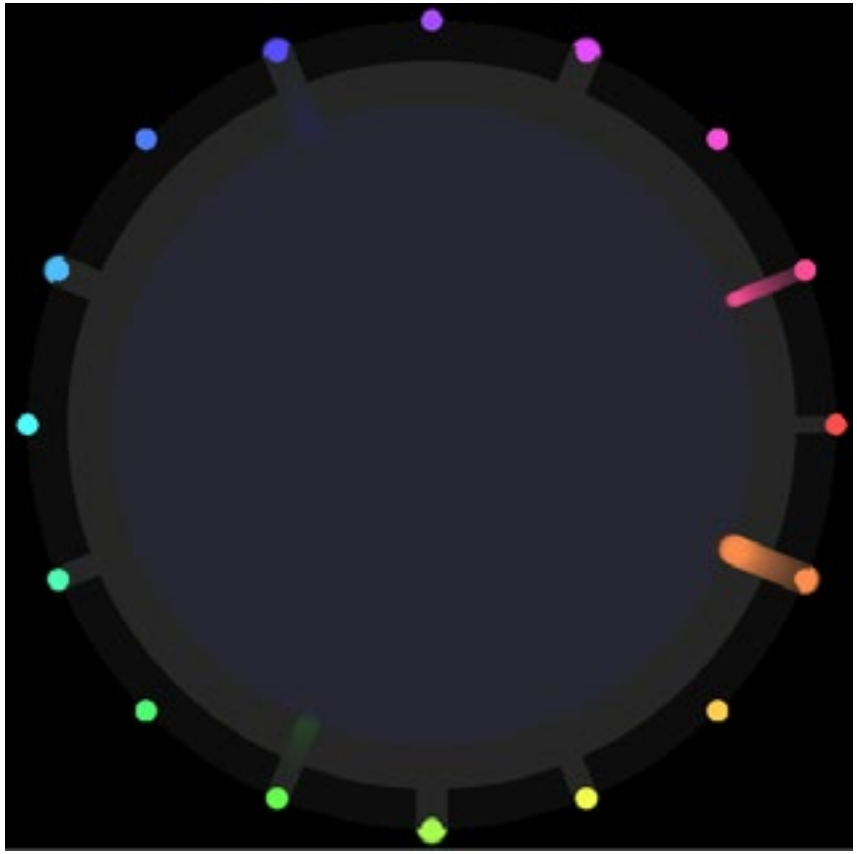

Figure 18. Final representation, Round matches

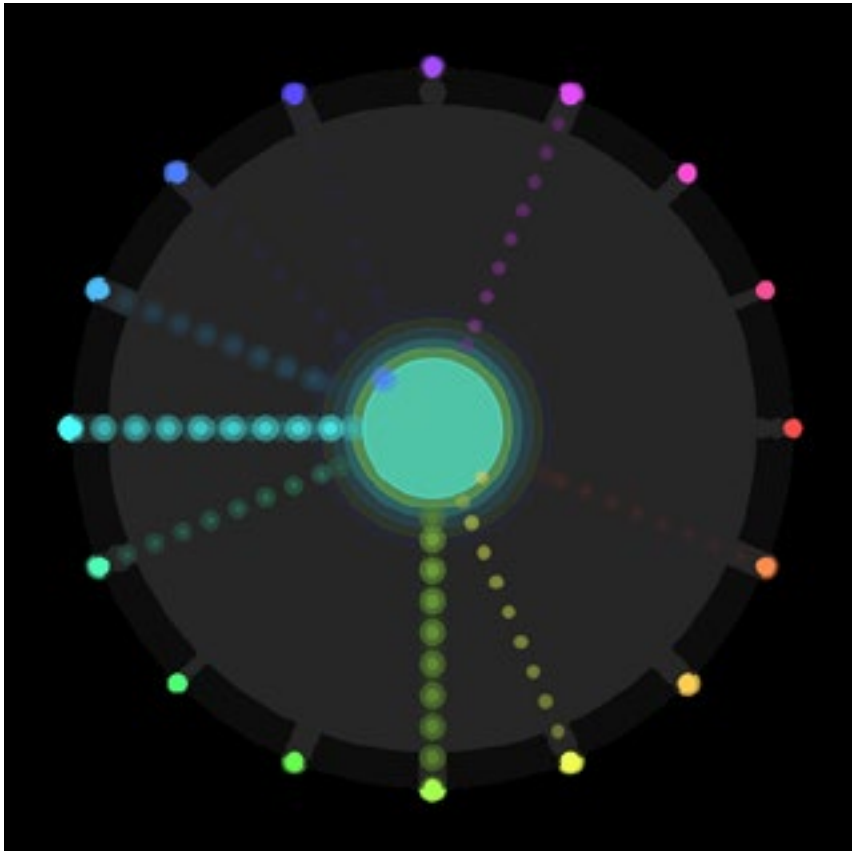

Figure 19. Final representation, semi-final match

5.4 Online data & source-code

You can find all repository here at:
https://github.com/riken312/DataArt

Download executable file at:
https://github.com/riken312/DataArt/tree/master/Executable%20files

FInd the video of the final outcome at:
https://youtu.be/N02jL5Gmuxc

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