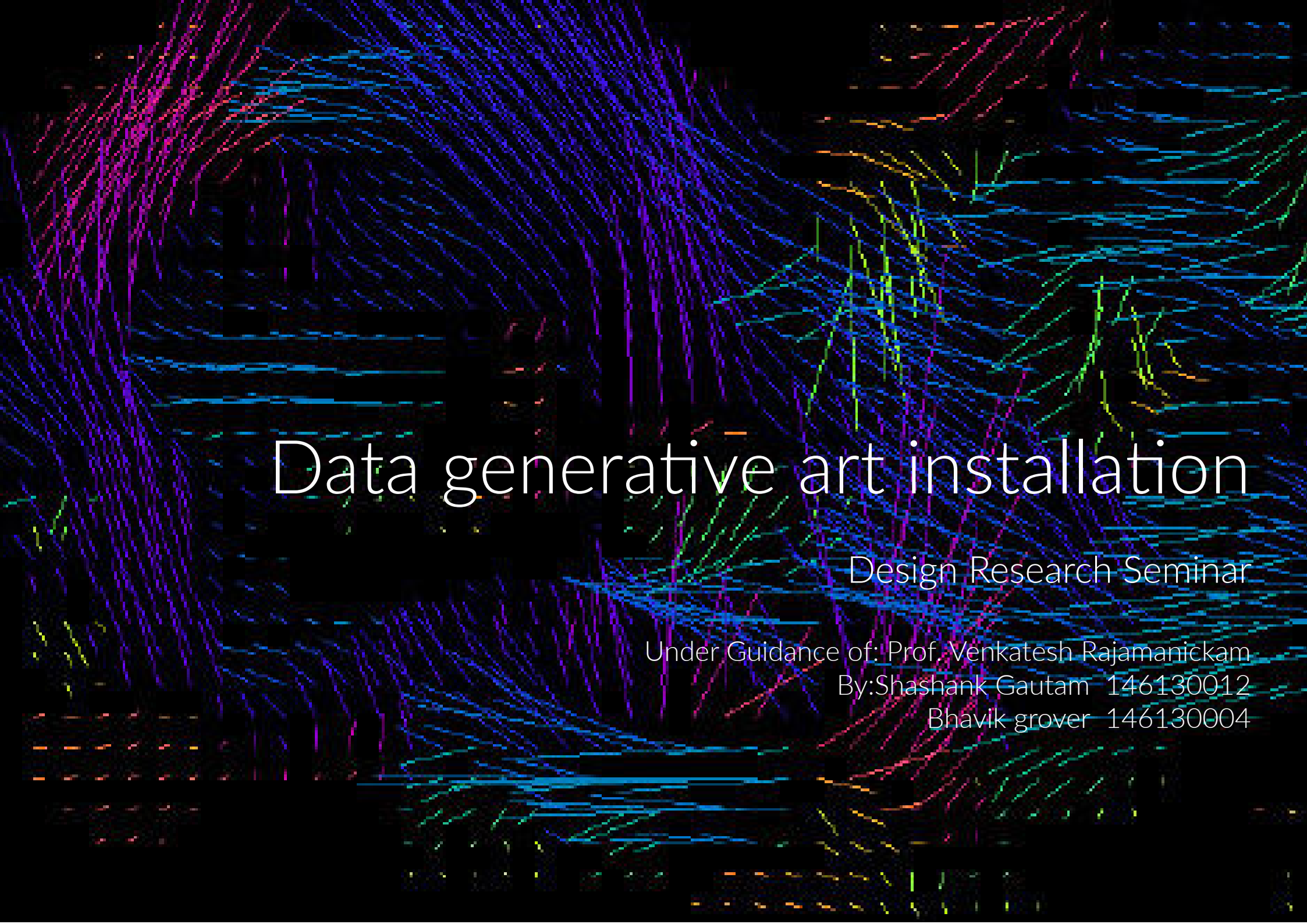




Data generative art installation

Design Research Seminar

Under Guidance of: Prof. Venkatesh Rajamanickam

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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.

We 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.

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Industrial Design Centre,
Indian Institute of Technology

Approval Sheet

This project entitled “Data Generative Art Installation” by Shashank Gautam, 146130012 and Bhavik grover, 146130004 is approved in partial fulfillment of the requirement for Master of Design Degree in Interaction Design.

Project Guide

Date

Acknowledgement

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

The project wouldn't have been the same without my friends who supported me, at various stages during the project. We would also like to thank Industrial Design Centre, IIT Bombay for providing us with all the facilities and necessary materials and an environment that encourage me to work on this project.

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“Science is what we understand well enough to explain to a computer. Art
is everything else we do”
~Donald Knuth

Abstract

How can we create a space more experiential using generative art?

The aim of the research is to implement a data generative art installation by integrating a physical space with technology where people can come and be a part of that space, the sense of inclusiveness and engagement will create an emotional experience .

We targeted to make mundane space more happening , and to reduce gap between physical world and digital world by giving an immersive experience to user.

Research Structure

DESIRABLES

Public art installation
Data generative art
Interactive
Virtual reality
Should be playful
Encouraging enough to involve
Should be physically/virtually dynamic
Magical space

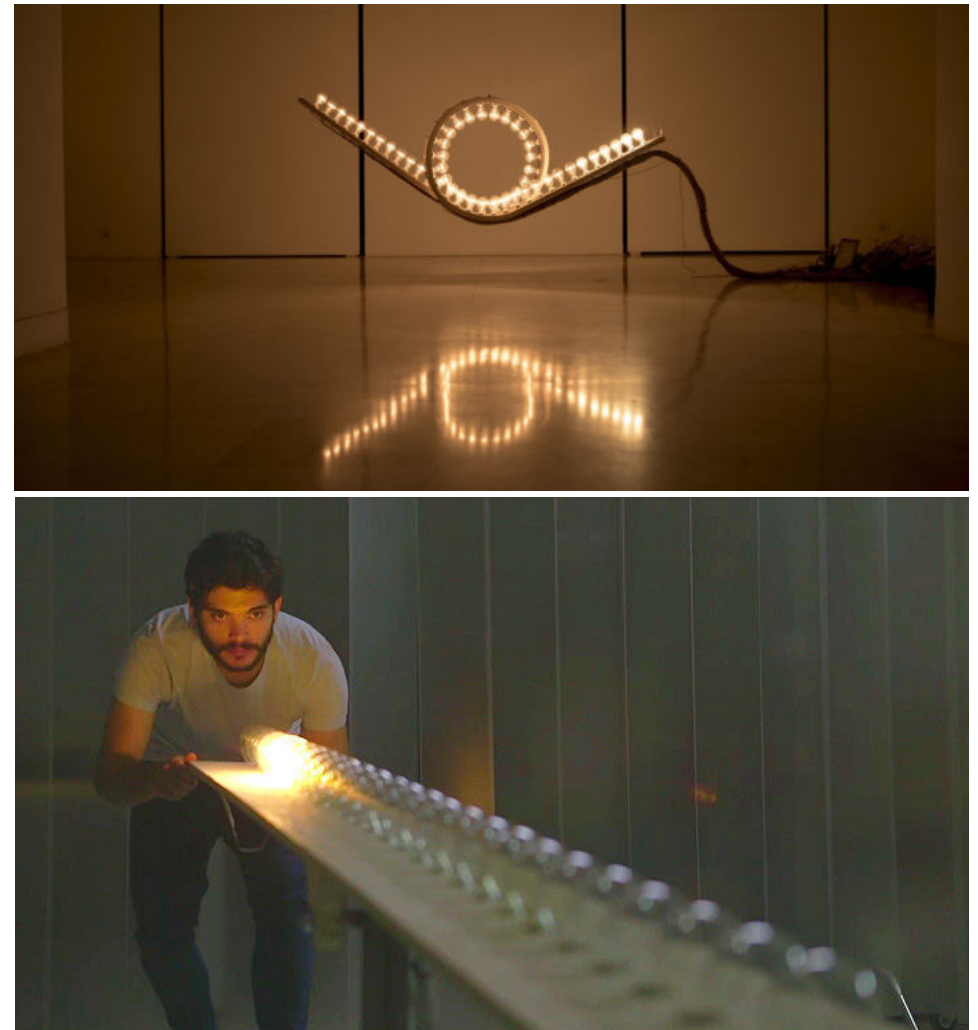
BRIEF

To create an interactive installation using data generative art which will let user interact with space around , which will lead to certain immersive experience for user.

Case Studies

LIGHT KINETIC

Light, as we usually see it, is an element that lacks mass, to treat it under the laws of gravity is somehow magical. The laws that describe the behavior of light are hardly understandable because it neither behaves as body or as a wave. As Einstein wrote concerning the wave-particle duality: “We have two contradictory pictures of reality; separately neither of them fully explains the phenomena of light, but together they do”. In this project, we have built a computer simulator that reduces this extraordinary phenomenon to the simple classical mechanical laws.



Case Studies

UNNUMBERED SPARKS

For TED's 30th anniversary, artists Janet Echelman and Aaron Koblin collaborated to create Unnumbered Sparks, a monumental interactive sculpture in the sky. Choreographed by visitors in real time through their mobile devices, at night the sculpture became a crowd-controlled visual artwork on a giant, floating canvas.

The sculpture spanned 745 feet between buildings in downtown Vancouver, Canada from March 15-22, 2014 (map). At night, it came alive with illumination. Visitors with smart phones and tablets were able to paint vibrant beams of light across the sculpture at a remarkable scale: small movements on their phones became hundred foot long trails evolving and combining with fellow participants.



Case Studies

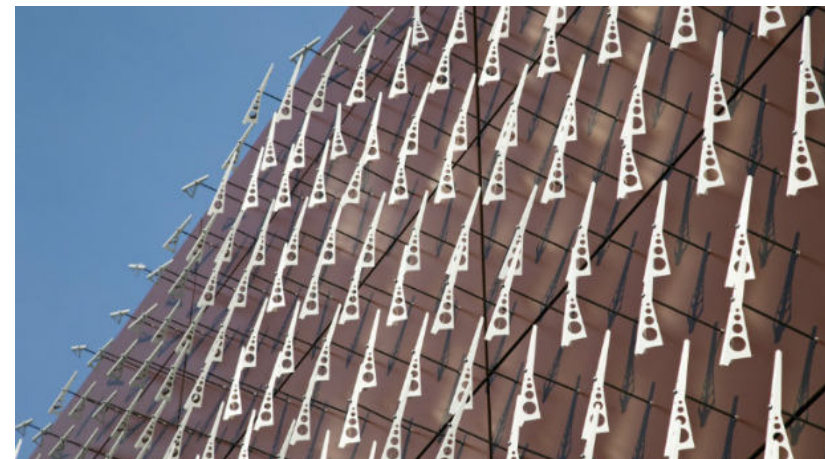
PETTING ZOO FRAC CENTRE

The project is speculative life-like robotic environment that raises questions of how future environments could actively enable new forms of communication with the everyday. Artificial intelligent creatures have been designed with the capacity to learn and explore behaviors through interaction with participants



WINDSWEPT

Windswept consists of 612 freely rotating wind direction indicators mounted parallel to the wall creating an architectural scale instrument for observing the complex interaction between wind and the building. Wind gusts, rippling and swirling through the sculpture, visually reveal the complex and ever-changing ways the wind interacts with the building and the environment.



Case Studies

A MILLION TIMES

With this kinetic installation, Humans since 1982 present clocks as objects unleashed from a solely pragmatic existence. Locked in its functionality to show the time, the natural character inherent to an analogue clock with its two arms constantly dancing in slow motion around the center, unveils hidden figurative qualities without denying its primary purpose



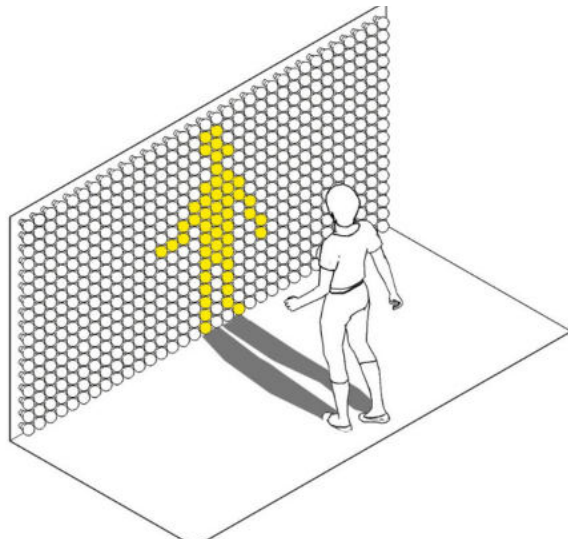
WOODEN MIRROR

“Wooden Mirror” is an interactive sculpture made up of non-reflective square wooden pixels. The piece reflects any object or person in front of it, moving fast enough to create live animation. Mechanical mirrors are a platform in which the designer ‘Rozin’ investigates the borderline and contrasts between digital and analog worlds, virtual and physical experience, or order versus chaos.



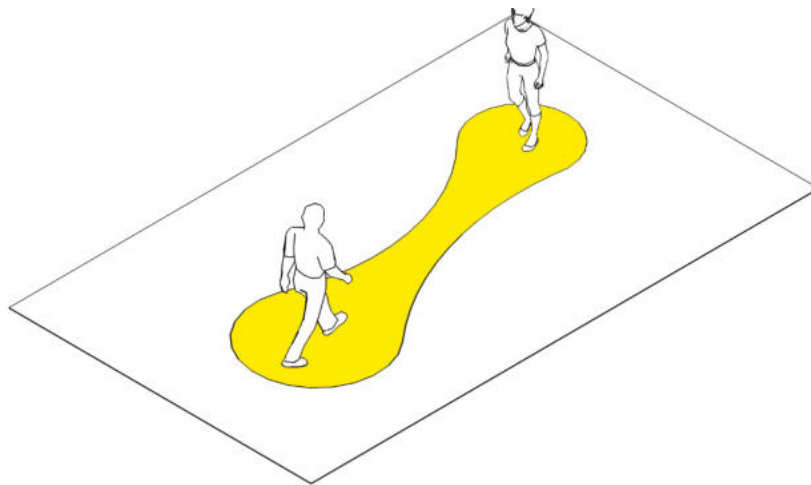
Ideation

Ideation #1 *LIGHT AND SHADOW*



It's an interactive wall composed of tungsten bulbs in a grid, where each can be individually controlled. These bulbs activate when the shadow of a person standing in front falls into them, creating light instead of darkness.

Ideation #2 *SOCIAL*

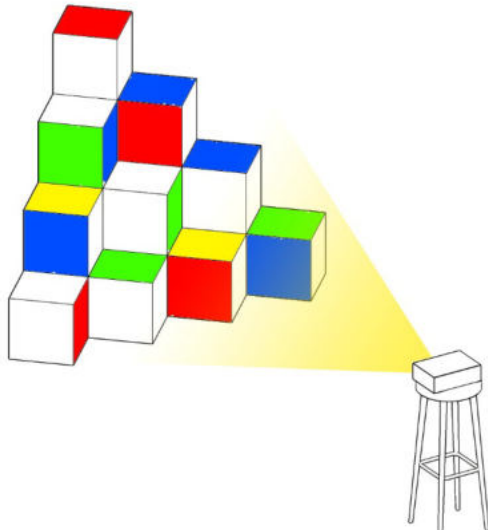


A circle will be formed around each person in the space and will be connected to every individual by a fluidic connection and the width of the connection will be determined by the distance between two persons.

Ideations

Ideation #3

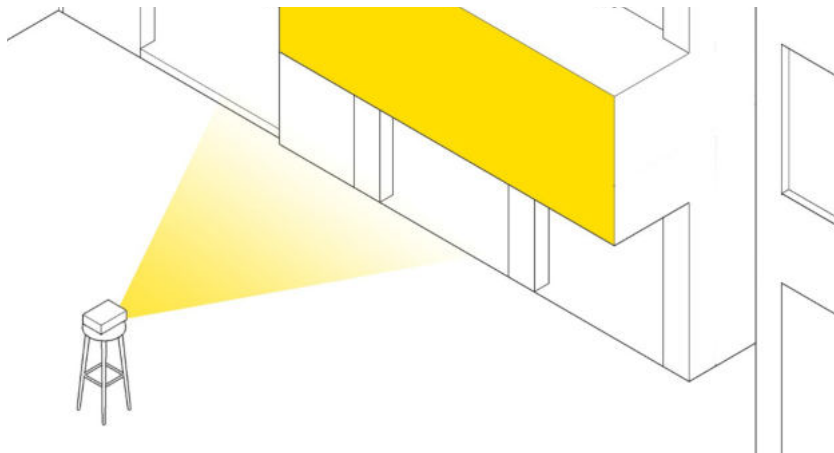
PROJECTION MAPPING ON 3D SCULPTURE



Projection mapping can be done on a physical 3-dimensional sculpture and can be made interactive by making a game which can be physically played in the projected space.

Ideation #4

PROJECTION MAPPING ON BUILDING FACADE



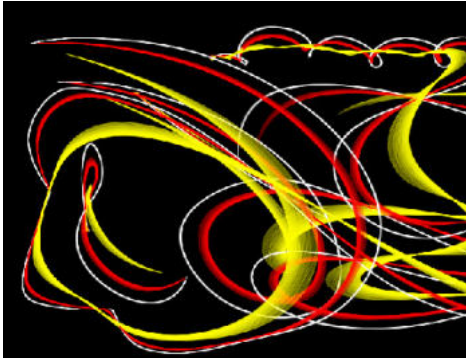
Like previous ideation, projection mapping can be done on much larger spaces like building facades. The user will have sense of inclusiveness and can be made interactive by developing a 3D game in the space

Conceptualization

We tried out live projection mapping in IDC, where we sketched on walls and organic surfaces like trees and roads, we have used photoshop and by manipulation of sketches, tried out many mapped projections on different surfaces, the idea behind this concept was to narrate a story through different projections and also giving virtual life to static walls and surfaces. The above picture



Visual Source codes



<http://openprocessing.org/sketch/48672>

This code creates color pattern elongated waves wherever the cursor is pressed and moved.



<http://openprocessing.org/sketch/6818>

Bounce is an interactive game which have arrays of rectangles to be bounced upon and playing the game.



<http://openprocessing.org/sketch/10435>

Computing motion of objects in the capture video image. The motion vector (optical flow) is drawn at each grid point (default: 10 pixels grid). One can hit a ball in the video by moving yourself.

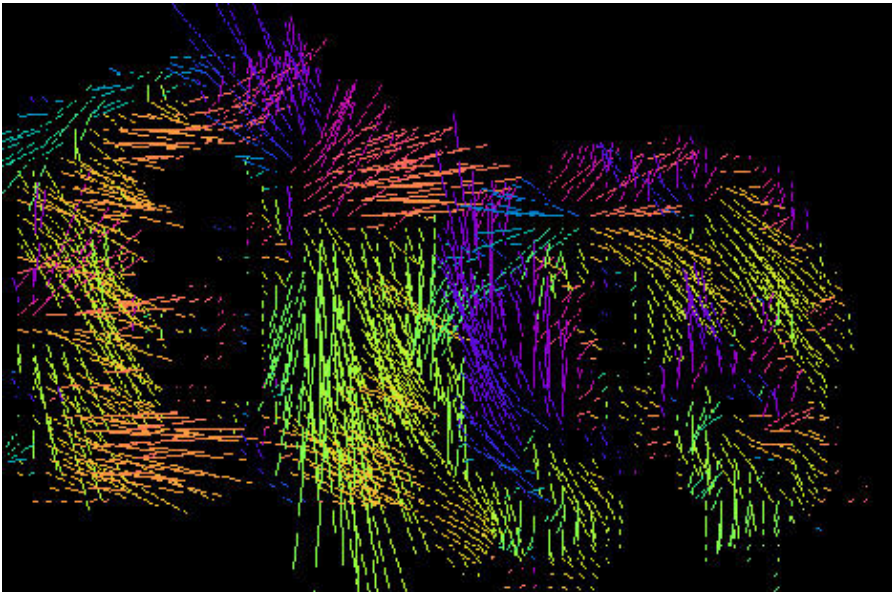
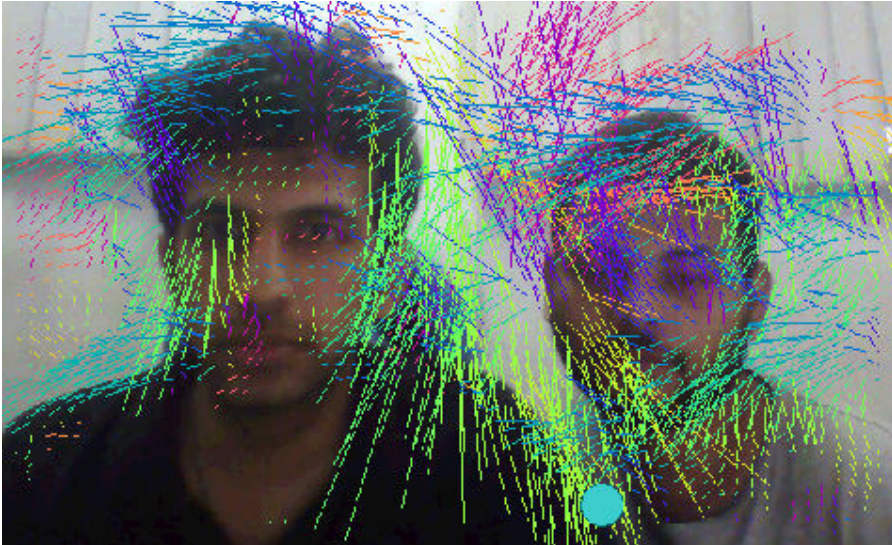


<http://openprocessing.org/sketch/6753>

Dillusive cloud creates effects of cloud and can be rotated in 3d view with the effect getting immersed.

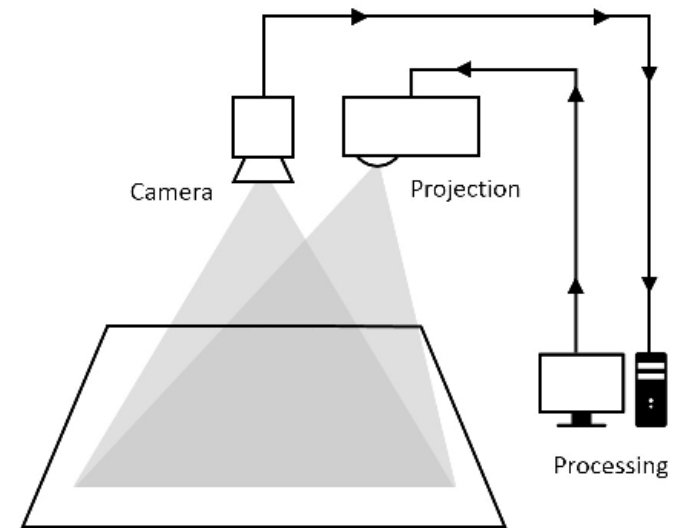
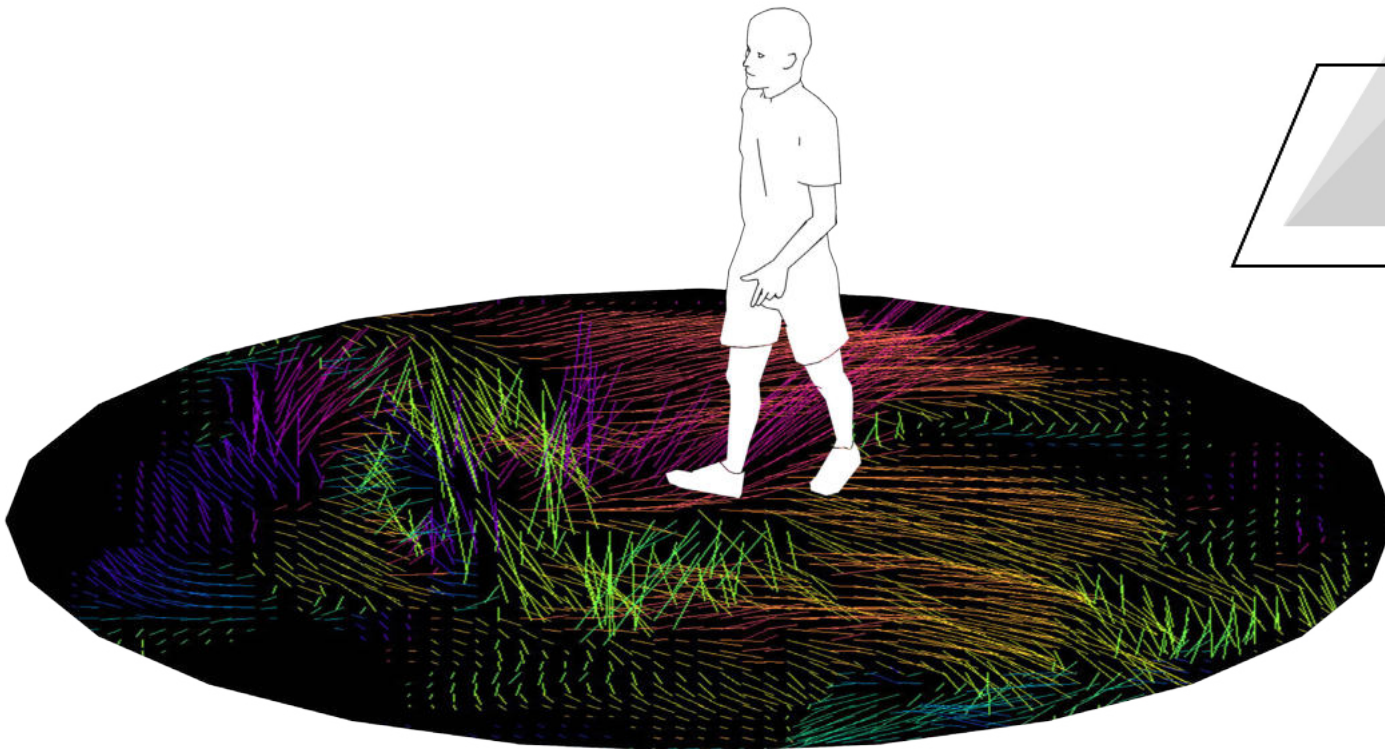
Final Concept

After trying out some open source codes we found a code which generates interesting pattern with response to moving objects. So to make it implementable in design circle with object in motion detection we did some tweaks in code and generated output as shown in picture below. The intention was to create a spatial experience of fields with colorful grass which will sway in response to object/human moment.

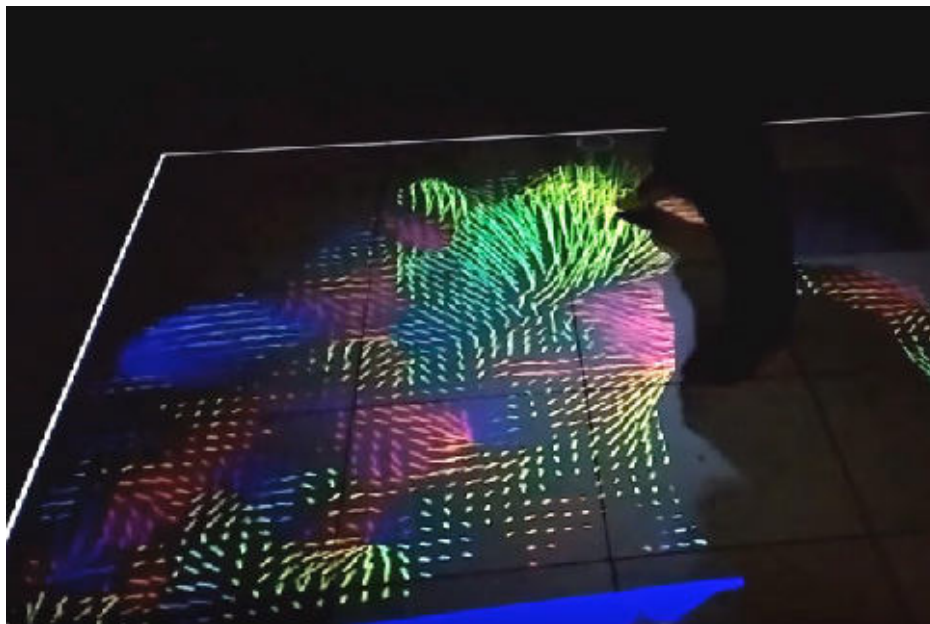
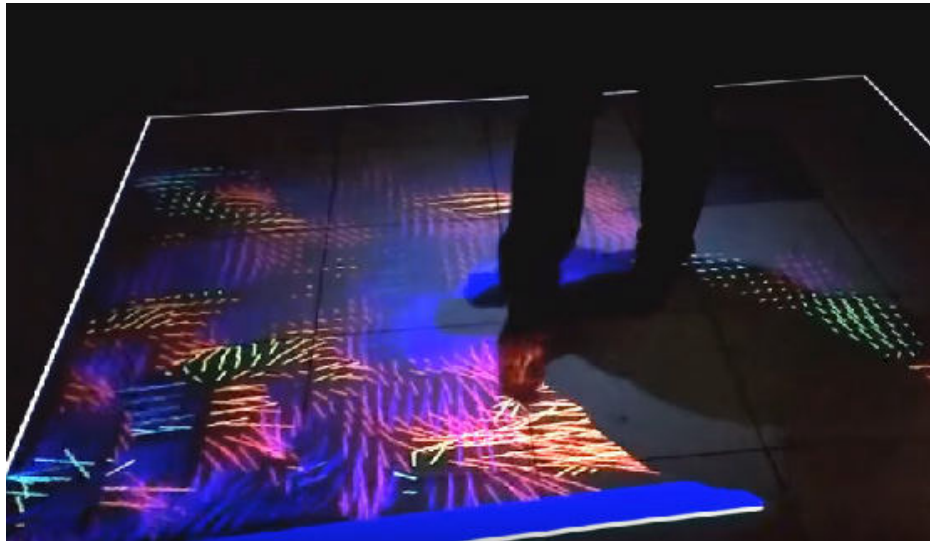


Installation

We planned a setup for a installation as a proof of concept. We used an already installaed projector on ceiling of conference room, We mounted a night vision camera on projector and turned it to face the ground, We tried to align projection frame of projector with frame of camera, such that the response will behave as real-time experience in human scale.



Implementation



We installed the setup at Conference room in IDC ,using Ceiling mounted projector and connecting it with laptop and camera, We created an environment with white box and invited people to come and interact, We noted there reactions and observations, People seems to get engaged and found it very playful. It comes out be a nice immersive and experiential interactive installation where generative art was an output with user interaction.

Video For this experiment is uploaded on given link below:

<https://www.youtube.com/watch?v=1AGdF0xJHOA>

Conclusion

- The project helped in developing an understanding about Generative art and progression of data driven generative art by other people.
- We got to learn about image processing and using processing to generate graphics.
- The project will be implemented in upcoming DDS 2016 and further observations will be updated.

References

- a million times. (2016, Dec). Retrieved from Humans Since 1982: <http://www.humanssince1982.com/a-million-times/>
- LIGHT KINETICS, in the loop. (2016, December 04). Retrieved from www.espadaysantacruz.com/: <http://www.espadaysantacruz.com/Light-Kinetics-in-the-loop>
- Optical Flow. (2016, Dec). Retrieved from Open Processing: <http://www.openprocessing.org/sketch/10435>
- petting zoo frac. (2016, Dec). Retrieved from minimaforms: <http://minimaforms.com/petting-zoo-frac/>
- Unnumbered Sparks. (2016, Dec). Retrieved from Unnumbered Sparks: <http://www.unnumberedsparks.com/>
- Windswept is a Fascinating Kinetic Façade That Reveals the Direction of the Wind. (2016, Dec). Retrieved from inhabitat: <http://inhabitat.com/windswept-is-a-fascinating-kinetic-facade-that-reveals-the-direction-of-the-wind/>
- Wooden Mirror. (2016, Dec). Retrieved from Smoothware: <http://www.smoothware.com/danny/woodenmirror.html>