V 2022 08

DATA & DESIGN

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Architecture design, Computation, Visualization specialist

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Director and founder of

NJ Design Lab / http://www.njstudio.co.kr

NJSLabs/ http://njslab.com/wp/

Member of

Korean Institute of Computation, Design and Technology(KICDT) / http:/www/KICDT.org

DATA at

geometry

architecture

urban

Landscape

computation

visualization

material

Interaction

building energy

Fabrication

...

METHODOLOGY

Discretizing information

numerical descriptions as design tools

data structure

graph

pixel

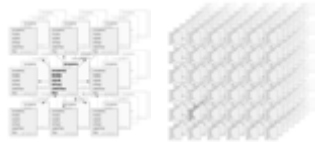
voxel

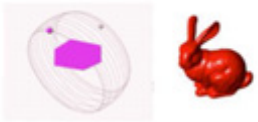
...

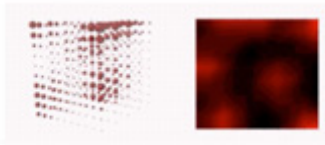
Graph

Pixel

Voxel







SYSTEM FOR DESIGN

translating information to insights for design decisions

Optimization

Automation

Agent-Based / multi agent based design system

Rule-Based

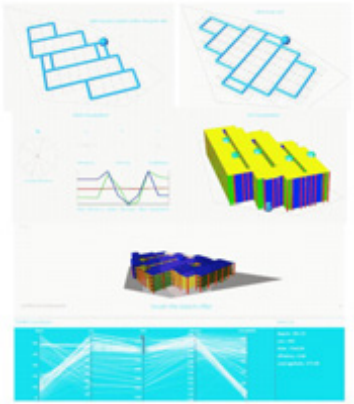
Generative Design System

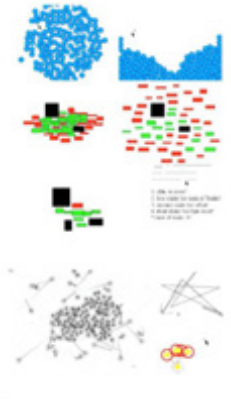
Interaction in design

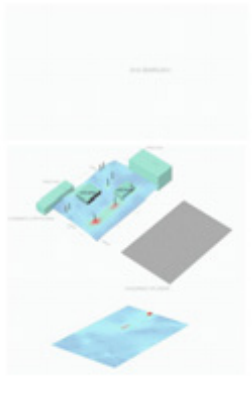
Data driven decision making process

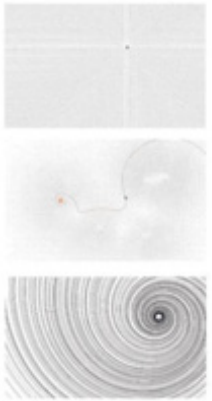
Complex system in design

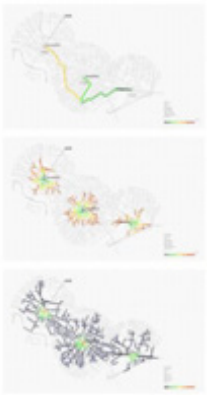
...











DATA & PROCESS

COMPUTATIONAL THINKING

Computational Design Thinking

Writing, Medium - [redacted]

Lecture Video - https://youtu.be/oGSqyYpEnp8

1. Question
2. Methodology & Approach
3. Policy
4. Implementation : algorithm

THE QUESTION / IMAGINATION / HYPOTHESIS

> ***Understanding*** *Problem, Concern & Issue*
> ***Declaring*** *Inputs & Outputs*
> ***Writing*** *Instructions*

. . .

THE METHODOLOGY & APPROACH

> *from* ***Whole*** *to* ***Parts*** *&* *from* ***Part*** *to* ***Whole***
> *from* ***Simple*** *to* ***Complex*** *&* *from* ***Complex*** *to* ***Simple***
> *from* ***Generic*** *to* ***Specific*** *&* *from* ***Specific*** *to* ***Generic***

. . .

THE MANIFESTO & POLICY

> ***Deterministic*** *or* ***Stochastic***
> ***Converge*** *or* ***Diverge*** *— Design Space, Optimization, Pareto efficiency*
> ***Top-down*** *&* ***Button-up***
> ***Holistic*** *or* ***Partial***
> ***Existing*** *or* ***Emerging*** *(Revealing)*
> ***Oriented*** *or* ***Disoriented***
> ***Centralized*** *or* ***Decentralized***
> ***Procedural*** *or* ***Iterative***
> ***Ultimate(Best)*** *or* ***Optimal***

. . .

THE IMPLEMENTATION

> *from* ***Infinite*** *to* ***Finite*** *— FEM, Structure Analysis*
> *from* ***Implicit*** *to* ***Explicit***
> *from* ***Ambiguous*** *to* ***Certain***
> *from* ***Entangled*** *to* ***Separated*** *— Pipeline*
> *from* ***Inactive*** *to* ***Interactive*** *— Complex system*
> *from* ***Phenomenological****(Observation)* *to* ***Predictable****(Model & System)*
> *from* ***Intuition****(Imagination, Hypothesis)* *to* ***Implementation***

SPATIAL DATA MANIPULATION

> ***Dumb*** *or* ***Smart*** *— Component Oriented Programming, React, Unity3d*
> ***Reciprocal*** *(Mutual & Dependent)or* ***Isolation****(independent)*
> ***Public*** *or* ***Protected*** *or* ***Private***
> ***Abstract*** *or* ***Concrete*** *— Implementation and Inherent*
> ***Connected*** *or* ***Disconnected***
> ***Static*** *or* ***Dynamic(Instance)***

. . .

THE TOOL & THE PRINCIPAL

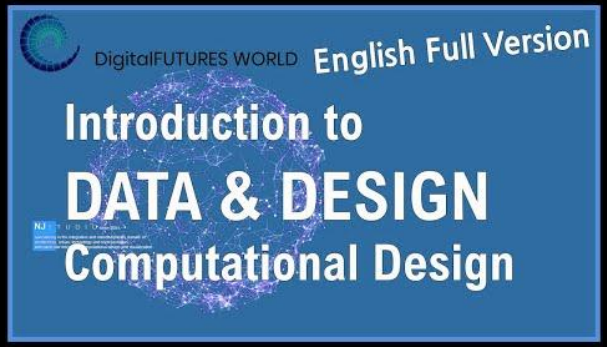
> *Analytic-Oriented & Object-Oriented & Functional & Procedural & Component...*
> *Relational Hierarchy*
> *Properties and Behaviors*
> *Pure & Impure*
> *Condition & Loop*
> *Coordinate system, distortion, projection remap interpolation ...*

. . .

1. Differentiating Issues, Problems, and Tasks
2. Developing Spatial Data Structures
3. Deploying Algorithms

Data & Design, Computational Design

Workshop: Introduction to Computational Design: Data, Geometry, and Visualization Using Digital Media - link



00:24 - overview : data, methodology, and system
06:43 - urban data / network
08:46 - urban data / machine learning
11:00 - geometry data / deep learning
13:00 - optimization / parametric design
15:58 - structure data / optimization
18:41 - geometry data / dynamics
20:24 - landscape data / environmental data
22:28 - image data processing
25:13 - fabrication data / digital mockup
26:07 - material data / computation
28:20 - interaction / robotics
31:56 - particle simulation / data

33:16 - other interests
34:53 - lecture and workshop series
35:24 - domains and technologies
36:37 - keywords
37:02 - thank you

ENG: https://nj-namju.medium.com/data-design-c21457dc8dc

KOR: https://brunch.co.kr/@njnamju/88

DESIGN & DATA

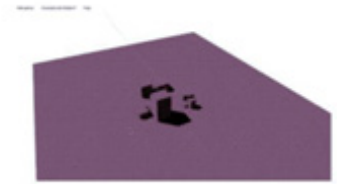
selected researches and projects

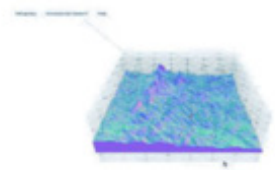
URBAN ANALYSIS & AI, ML

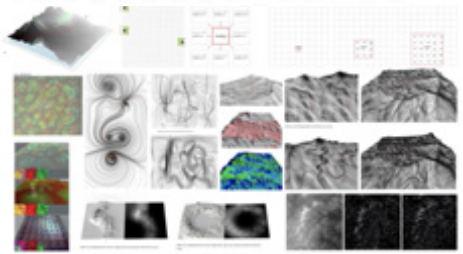
http://www.njstudio.co.kr/main/project/2016_MobilityEnergyConsumptionMITMediaLab/index.html

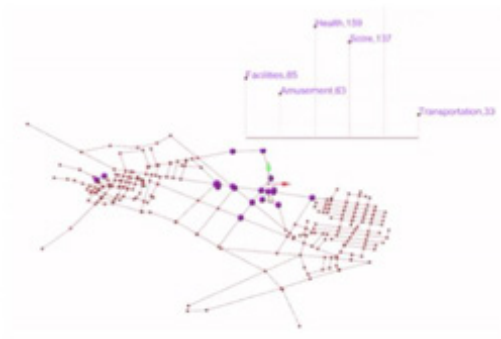
Addon for Grasshopper
https://www.food4rhino.com/app/numerical-urban-utility

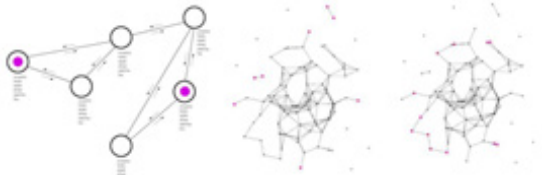
Paper: https://www.springer.com/gp/book/9789813343993
https://link.springer.com/chapter/10.1007/978-981-33-4400-6_11

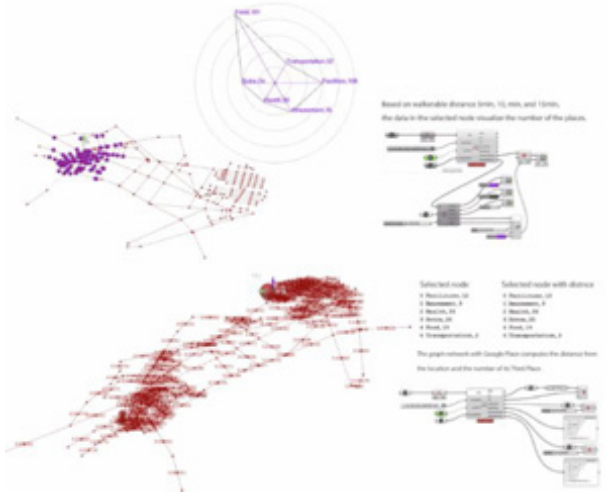


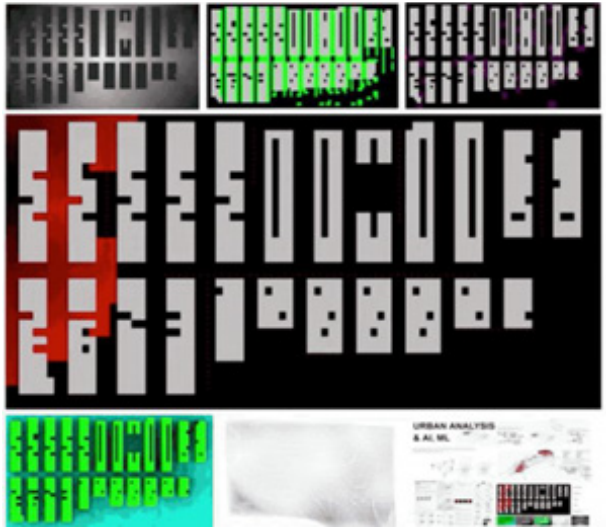












Properties

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park)

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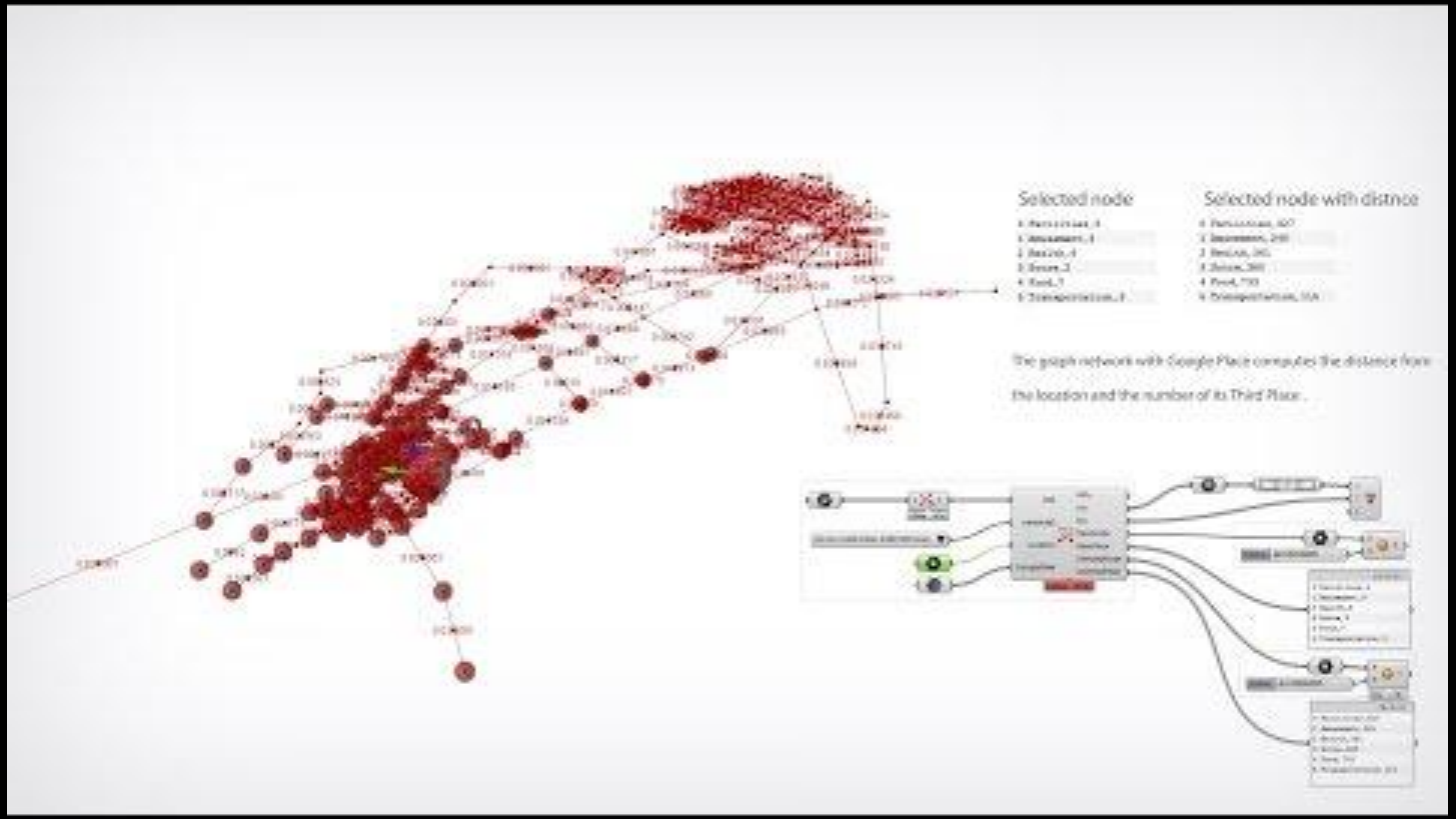
Comfort

view


Selected node
Selected node with distnce
The graph network with Google Place computes the distance from
the location and the number of its Third Place .

02. Built Environment Assessment for the Housing Value Prediction

Date : 2016 Fall
Type : CS 109 Data Science, John A. Paulson School of Engineering and Applied Sciences, Harvard University
Role taken : **research, design, drawing ,modeling, visualization**
Critic : Prof. Pavlos Protopapas, Kevin Rader, Weiwei Pan
Team: Jia Gu, Edle Jungmin Han

http://www.nistudio.co.kr/main/project/2016_HarvardCS109_DataScience/index.html

Is there any relationship between Built environment and housing and rent prices?

This question motivates us to investigate to emerge the relationship between social economic aspect housing and rent price data) and urban spatial data (Built environment data) in City of Boston.

Methodology

We define city infrastructural data such as the current housing price, energy consumption of the area, income of neighborhoods, transportation accessibility, green space in the neighborhoods, specific housing features, and crime rates as "top-down data".We also define informal crowd-sourcing data such as, twitter texts, Instagram tags, or yelp reviews as "bottom up data" . There is a third category of data that has not been widely deployed yet which we define as the "holistic visual data".It is the general impression to your visual surroundings when you at a specific spot that we believe can be captured by google street views.

By testing on the data of visual surroundings as dependent variables, we hope to capture missing information from the top down data and therefore tell if the visual environment is a significant feature in a housing prediction analytical model. We use machine learning methodology to pre process Google street views to give certain attributes. To combine different data sets from top-down to bottom-up) into one file for machine learning, we use graph data structure. Basically, we collect information on different locations and merge them together in specific pixelized grid based data points utilizing graph structure.

Step 1 :Data Parsing
Parsing, cleaning, and data structure

Step 2 :Data Exploration
Data Visualization and Exploration

Step 3 :Leraning Housing Price
Lasso, ridge, RandomForest Regression, and ETC

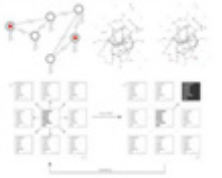
Step 4 :Leraning Renting Price
KNN, Lasso, ridge, RandomForest Regressor, PCA for Logistic Regression, Decision Tree, Random Forest Classifier, and ETC

Step 5 :Conclusion
the conclusion of the research.

1. Data Parsing

There are two different data sets: 1) social economic data representing city of boston as a social aspect such as land price, crime, energy usage, and so on, 2) Urban spatial data representing city of boston as a urban.

Data Structure : Graph and Pixel Data



[SOCIAL ECONOMIC DATA]
Renting Prices Data From Trulia
data type : numeric and category

Housing Prices Data From Zillow
data type : numeric and category

Energy data in Boston from Boston Data
data type: numeric and category

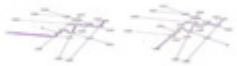
Crime data in Boston from Boston Data
data type: numeric, string, and category

Properties Assessment in Boston from Boston Craigslist
data type: numeric, string, and category

House and Room post data in Boston from Boston Craigslist
data type: numeric, string, and category

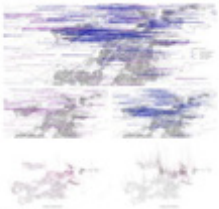
[URBAN SPATIAL DATA]
google place from Google place API
data type: numeric, string, and category

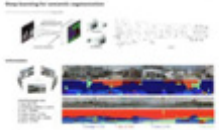
google street view from Google street API
data type: image



2. Data Exploration

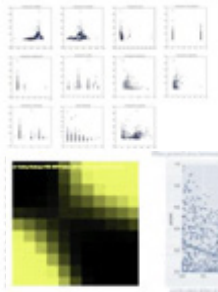
On top of the top down data (generated by the local government), the bottom-up data (post processing of Google Street Views, Google Places, and Craigslist Boston), and the top-down data(Crime data from Data Boston and hosing price data from Zillow) can be mapped and deployed for train and contrive the analytical model of predicting housing price. To process the google street view data, there are two data structures (pixel and graph data structure) where individual data are populated and calculated. Pixel data structure is a matrix, discretizing an urban or district into a finite setting for analysis, in which each pixel has the relationship with its neighbors, and each one computes its own data on the basis of neighbors' settings, so that urban data can be naturally addressed and computed in spatial context.

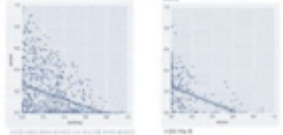




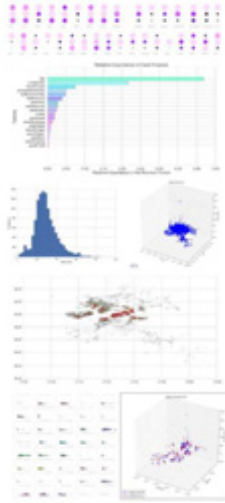
3. Learning Housing Price

We explored housing prices statistics and the relationships between Boston housing price and our dataset features. Boston's average housing price is around $6k/m2 and the median is about $6k/m2 while it has a range from $9.4k/m2 to $447/m2, which ranks quite high nationally.According to Zillow home values report , the national average housin gprice is $13.2/m2.(http://www.zillow.com/home-values/)



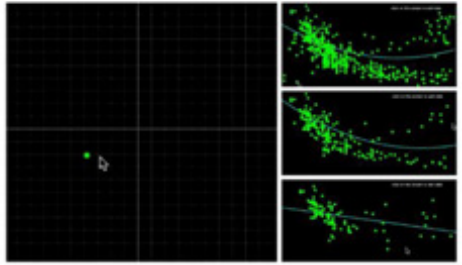


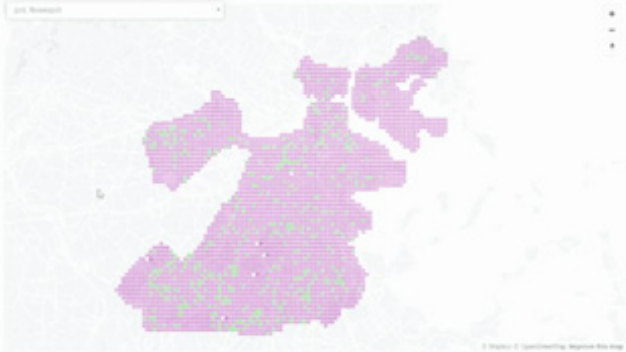
4. Learning Renting Price

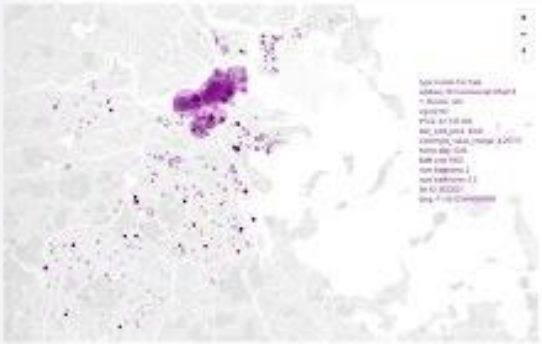


5. Conclusion

Intricated urban matrix needs to be organized such an order, but there are multiple factors affecting urban issues including land values and housing prices. From our project, it can be said that decision







Housing Price data from Zillow

number of data used: 988 houses

Rent Price data from Trulia

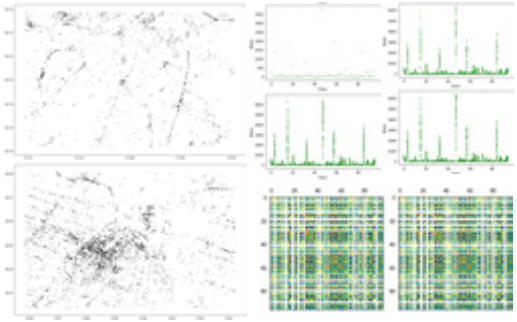
number of data used: 13049 rents

Third Place Prediction model, Boston, LA, Redlands

Data process, Model A, Model B, Implementation

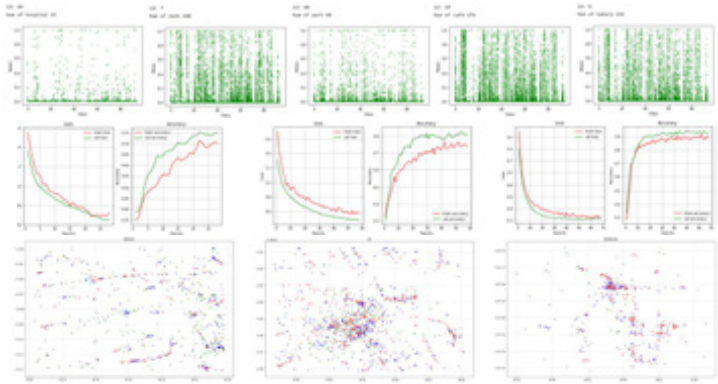
Medium(Eng): https://lnkd.in/gEzKJxYu
Brunch(Kor): https://brunch.co.kr/@njnamju/148
Source code: https://lnkd.in/qdf6d8j7

95 Class

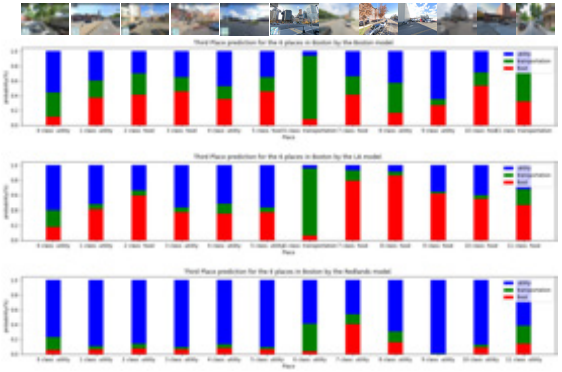


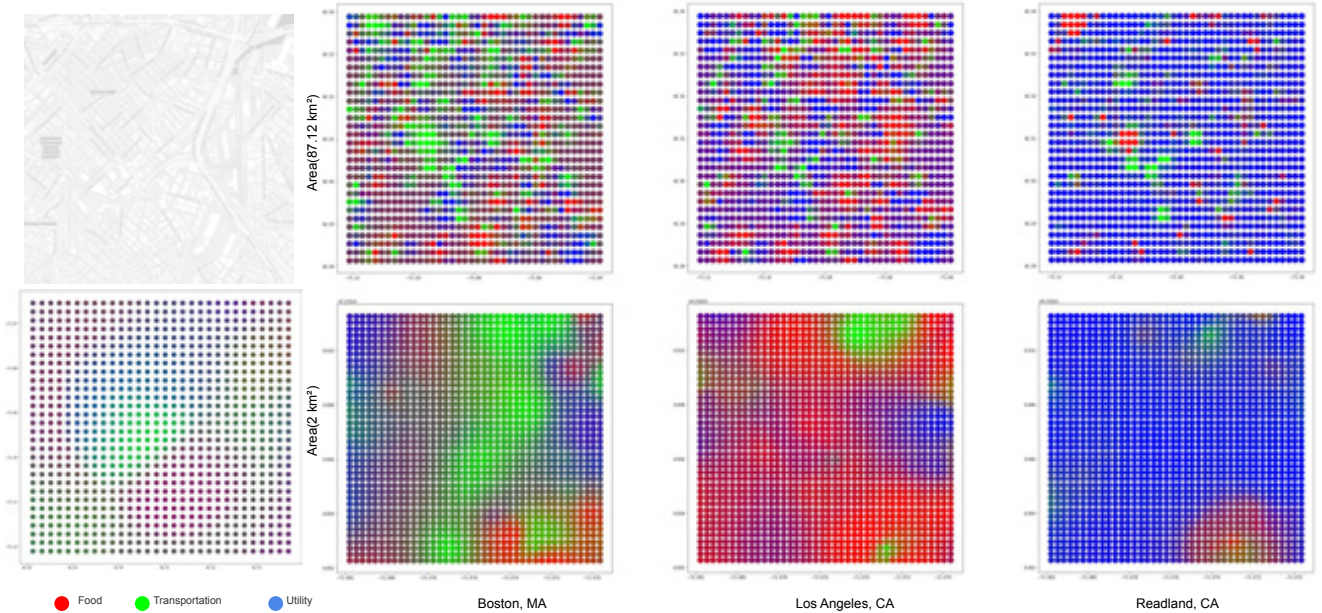
Third Place prediction results in Boston

South Station Boston, MA　5 Southampton St, MA　797 Columbia Rd, Boston, MA



Boston, MA　Los Angeles, CA　Readland, CA





"Politics of Space and its Shadows" in the Seoul Biennale International Studios (SBIS):

Date : 2017
Type : architectural urban research exhibition
Role taken : **Research and Visualization**

Link

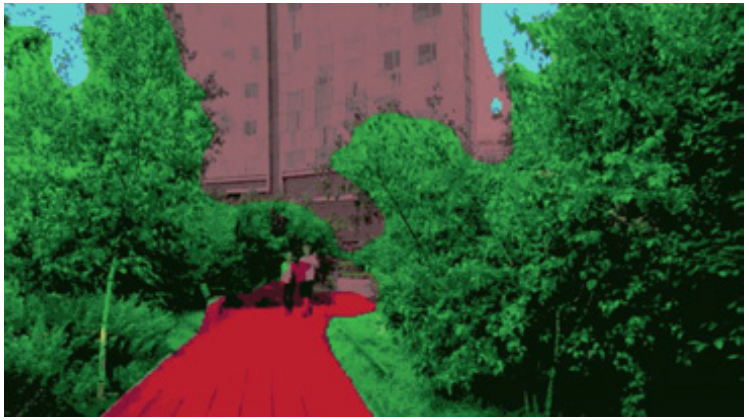
Overview of Project

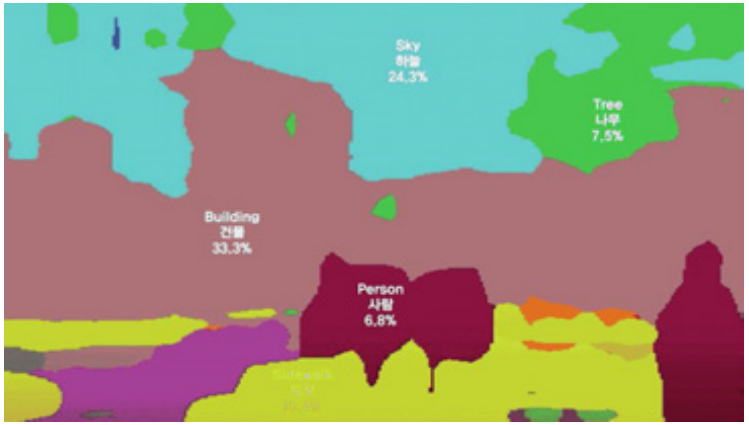
This project examines how the changing urban environment is perceived by the public and how they are represented through new emerging technologies. I developed a design pipeline for the project that enabled analyzing and visualizing big-data available to the public.

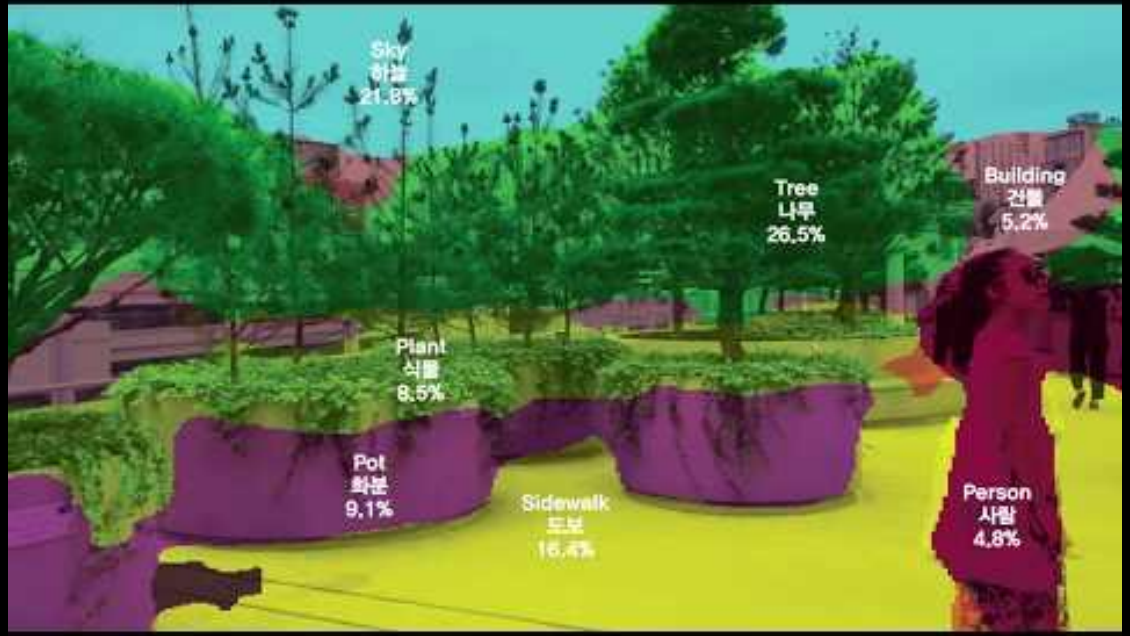
There are an enormous amount of big data being produced by the public, images posted on Instagram is such example. In parallel, there are emerging computational algorithms that process such big-data. However, the urban design discipline has not been able to meaningfully bridge the gap between these emerging technologies and the accumulating big-data. This project attempts to bridge this gap by examining new methods to use big data to better understand public spaces.

The technical workflow is as follows: 1) parse data 2) process data 3) analyze emerging result from the raw data. In the first step, I developed a program to download all images that people upload on the web in the site. By using Deep Learning, I analyzed the image data and converted them into numerical data for processing. As the last step, I classified the results using important keywords associated with the images. The result of this research was invited and exhibited at the Seoul Biennale International Studios (SBIS) exhibition curated by John Hong (SNU) at the inaugural Seoul Biennale of Architecture and Urbanism directed by Hyungmin Pai and Alejandro Zaera-Polo.

Link:
http://www.njstudio.co.kr/main/project/2017_PoliticsofSpaceAndItsShadows/2017_PoliticsofSpaceAndItsShadows.html






Sky
하늘
21.8%
Tree
나무
26.5%
Building
건물
5.2%
Plant
식물
8.5%
Pot
화분
9.1%
Sidewalk
도보
16.4%
Person
사람
4.8%

AERIAL SEMANTIC SEGMENTATION

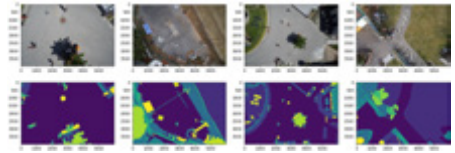
Machine Learning & Implementation

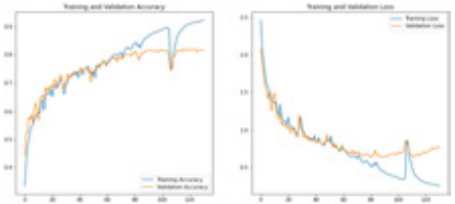
Link: https://computationaldesign.tistory.com/29

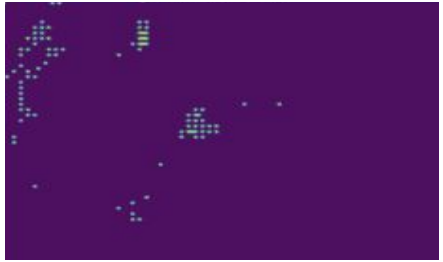
Reference: https://www.kaggle.com/datasets/bulentsiyah/semantic-drone-dataset

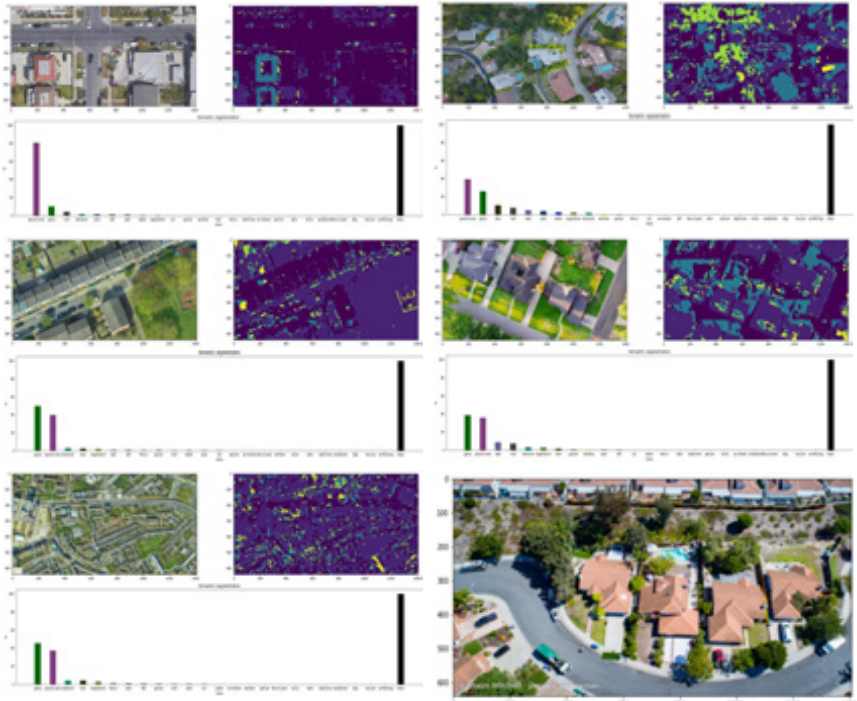
Classes

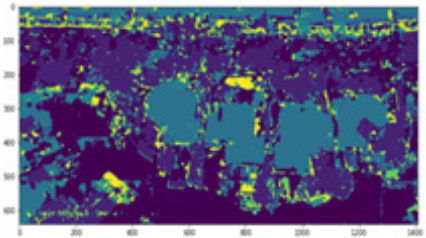
[unlabeled, paved-area, dirt, grass, gravel, water, rocks, pool, vegetation, roof, wall, window, door, fence, fence-pole, person, dog, car, bicycle, tree, bald-tree, ar-marker, obstacle, conflicting]

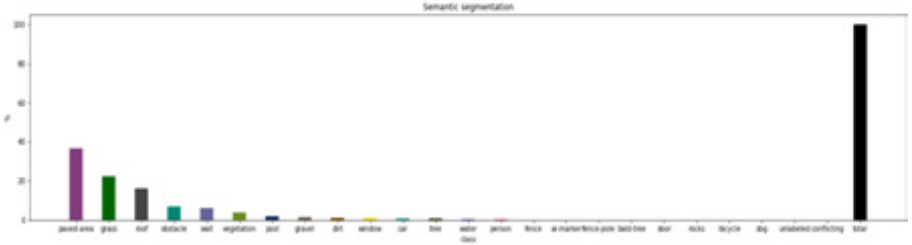












NNA, NUMERIC NETWORK ANALYSIS TOOLBOX

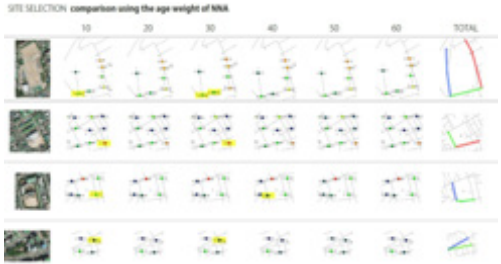
Medium:
https://nj-namju.medium.com/numeric-network-analysis-post-covid-19-urbanism-6-ft-rule-de267886b028

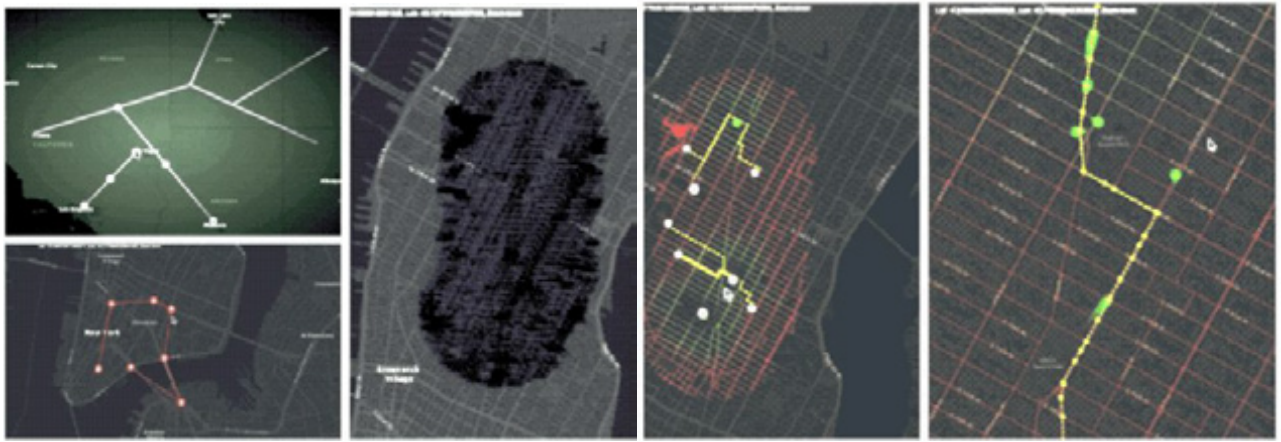
Addon For Grasshopper
https://www.food4rhino.com/app/numeric-network-analysis-nna

Lecture, NYIT
https://youtu.be/_9l7dp5q6A0

Accessibility Analysis
Reach, Gravity, Huff-model

Centrality Analysis
Betweenness, Closeness, Straightness, Degree



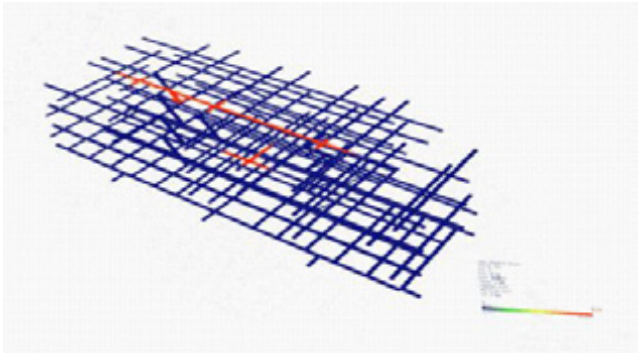


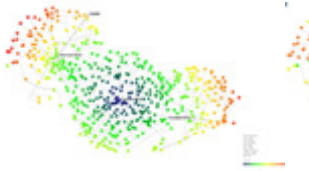
Graphic User Interface for the GH implementation

Degree
(No. connectivity at each node)

In graph theory, **Centrality** estimates to determine the **hierarchy of nodes or edge within a network**. The centrality analysis uses for diverse urban scales for local and global. A local centrality defines the distance between nodes within a given radius and a global centrality calculates the distance between nodes in a whole system. The Centrality Index is useful to understand the operational analysis of network flow tendency in transportation geographies, such as airline networks, road networks, and canal networks. As well as it measures to understand a node (location) importance in space.

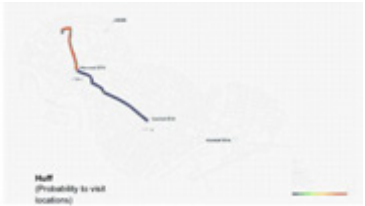
Betweenness
(Home to MBTAs)



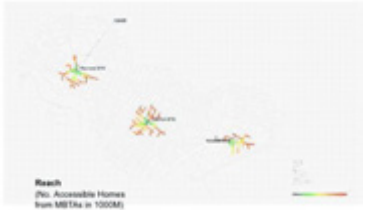


Closeness
(Home to MBTAs)

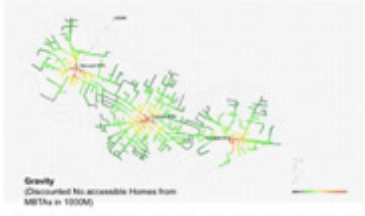
Straightness
(Home to MBTAs)



Huff
(Probability to visit locations)



Reach
(No. Accessible Homes from MBTAs in 1000M)



Gravity
(Discounted No.accessible Homes from MBTAs in 1000M)

Accessibility analysis has been researched in the field of physical planning and spatial modeling for over 50 years. The concept of accessibility explains both **activity patterns in space** and the **connections between activities** linked to Newton's law of gravity. Hansen's "How Accessibility Shapes Land Use" (1959) was the first defined paper about accessibility as a potential of using urban planning.

PARAMETRIC & OPTIMIZATION

http://www.nistudio.co.kr/main/project/2016_FluxFactoryParkerator/2016_FluxFactoryParkerator.html

PARKERATOR in Flux Factory [Data Driven Design]

Date : 2016
position : Application Engineer intern (Computational Designer) in Flux Factory
Role taken : **research, design, modeling, visualization**

Web Link Parkerator 1 Link Parkerator 2 Link

Rule-based design system

As a first project at Flux, I developped a multi-story car park (MSCP) configurator for SJ in Singapore. Among other requests, the idea of a "Parkerator"(Parking + Configurator; it is a plugin running on Flux flow and Grasshopper to generate parking buildings) was one of the most suitable projects for the implementation of computational design workflow for the following reasons:

(1) it should be fully automated process before decision making phase,
(2) it should be modularized because the company uses precast modules in the construction phase,
(3) it should provide the maximum usage capacity possible for an arbitrary site

Singapore being one of the densest city in the world, the whole objective of the project was to leverage computer intelligence to provide the most optimized parking design for space allocation.

Parkerator Phase 1

The aim of the initial phase is to give users a volumetric and numerical sense of what a basic rectangular parking building would be based on the number of cars that can be parked and the number of floors. In short, users input the number of car and the height of building, and the script automatically generates a 3D building modal with an associated set of descriptive metrics.

Objective and problem:

- Provide a volumetric sense of a basic rectangular parking building
- Flesh-out the generated circulation in the parking building
- Rapid prototyping for design spaces with the number of cars and the length of building
- Simple descriptive metrics about the building

Parameters:

- Number of Car
- Number of floor

Class hierarchy in the c# code

* Building class
  - -Build (function related to create mesh and lines)
* Lot class
  - - isParkingLot (check for the status for building)
  - - isCore (check for the status for building)
  - - isRamp (check for the status for building)

Parkerator Phase 2

The phase 2 was build to achieve 3 objectives:

(1) how to interact random site condition efficiently
(2) how to shape design space as a data, and provide users with the data for their intuitive design
(3) how can we discretize and improve the algorithms from Parkerator Phase 1

Grid Optimizer

To achieve 1st objective, we contrive a Grid Optimizer that shapes a grid system in which cell can be populated, in arbitrary boundary conditions. Basically, using brute force algorithm, it create a data set ranging from 0 to 360 degree to find a suitable grid where the rules apply, and find a best ratio and optimal situation in the given site context. In addition, it also provide users with a manual mode to explore the design space tracking individual set of parameters by shifting the parameter. Then, using "Find" option it automatically restore the optimal parameter in the data that user produce.

Data Listener for design space

For 2nd one, we create Data Listener which records parameters and visualize them as a graph. It draws a novel visualization which re-maps data to circular coordinate system to directly visualize data based on their own direction from 0 to 360 degree with the brute force algorithm. For the Manual mode, the listener keep recode every single change of parameter and visualize a 2D graph and circular graph so that designer create their own data visualization by play with the parameters.

Blue Printer & Constructor

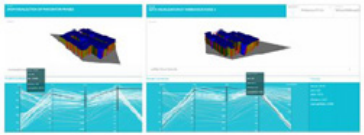
For 3rd goal, the holistic process is discretized as two parts (1) Blue Print part (2) Construction part. This modification makes it more effective and parameterizable in the more complex programming. In the Blue Print phase, the algorithms concentrate on mathematical computation to shape semantic data of a parking building as a blue print. In that period, the grid optimization also happen. Once you create your own blue print, the data can be inject into Constructor to create actual geometries and draw them on viewport based on the API. For the implamentation for different platform, we need to simply execute a function switching the API such as Flux Geometry API, RhinoCommon API, WebGL, or OpenGL in the Construction phase.

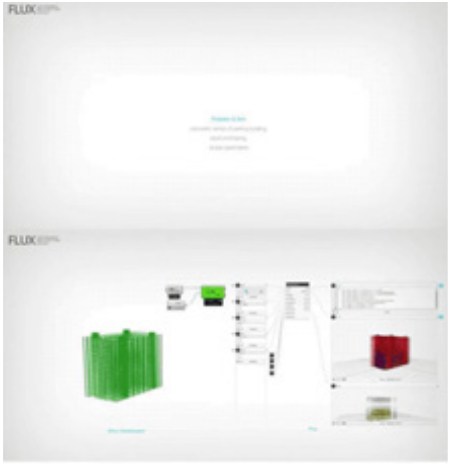
Objective and problem:

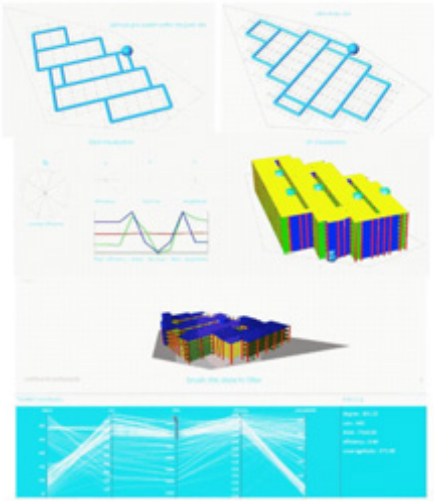
- Design building footprint based on an arbitrary site boundary conditions
- Include an arbitrary entry point
- Manual mode for those who want to explore the design space
- Optimal mode for those who want to find the optimal option in a mouse click

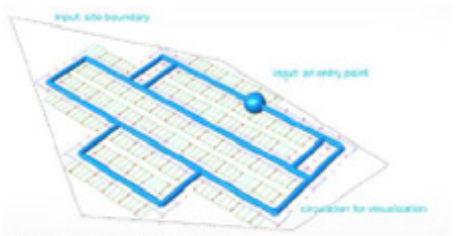
Parameter

- Site boundary condition (polyline)
- A entry point (point or vector)
- Auto mode / Manual Mode with degree (bool / number)



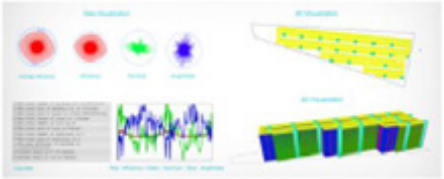






Different Blue Print in the same boundry condition

Different entry point and deck of the building

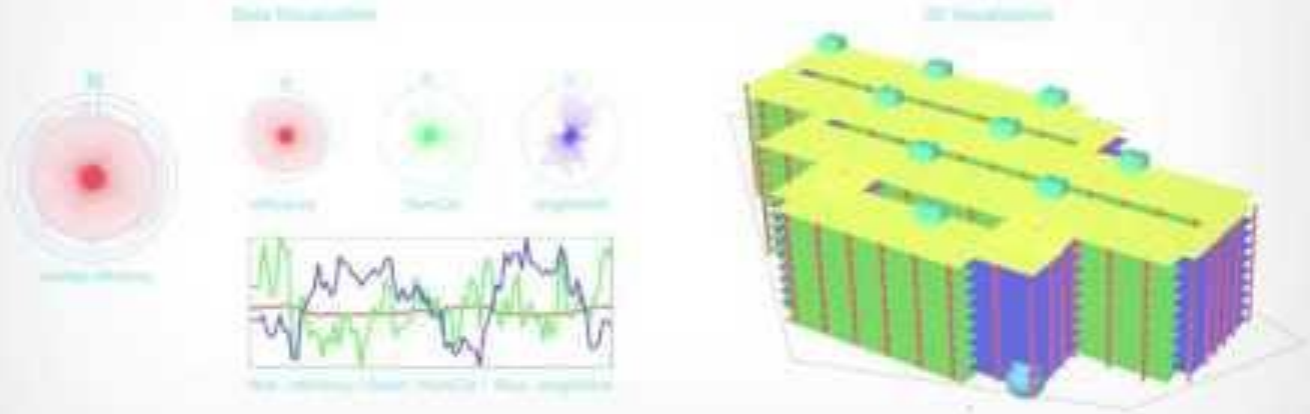


Manual mode of Blue Print for multiple sites

Auto mode of Blue Print for multiple sites

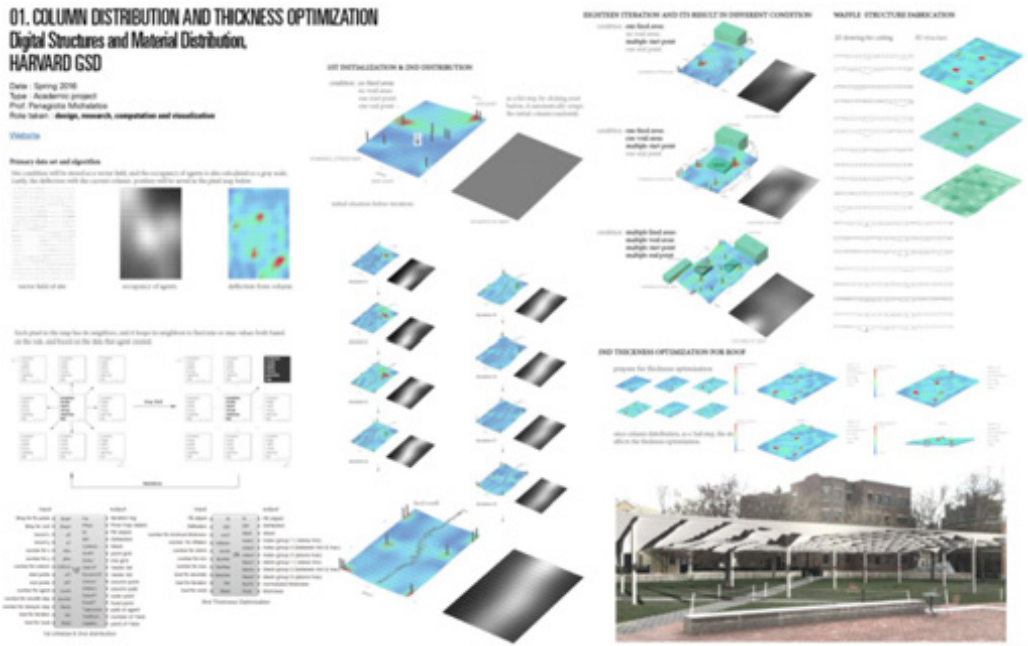
Auto mode for Construction for multiple sites

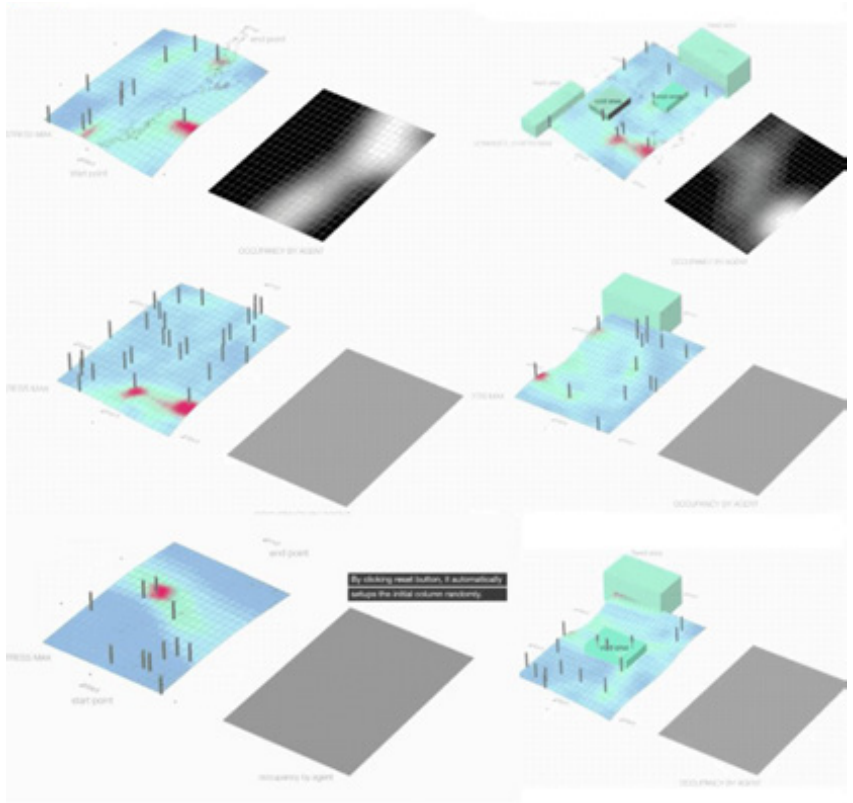
FLUX

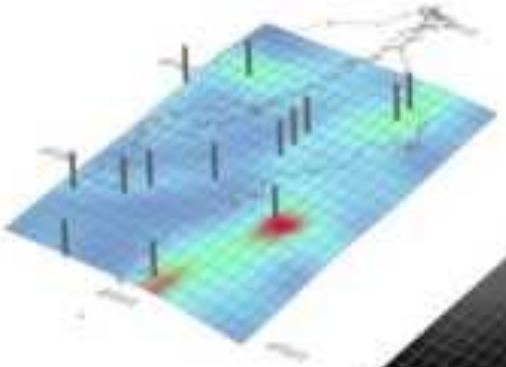


STRUCTURE & OPTIMIZATION

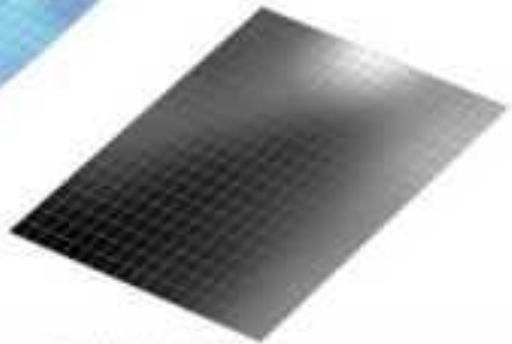
http://www.njstudio.co.kr/main/project/2016_ColumnDistribution/2016_ColumnDistribution.html







different number of inital column



OCCUPANCY BY AGENT

DESIGN SYSTEM & AI, ML
VOXEL REPRESENTATION

http://www.njstudio.co.kr/main/project/2017_thesisVoxelHarvardGSD/public/


REMIXING & RESAMPLING THREE DIMENSIONAL OBJECTS
Use of Volumetric Representations and Machine Learning in design

Date : 2016 – 2017
Type : thesis project at Harvard GSD
Role taken : independent project
Website

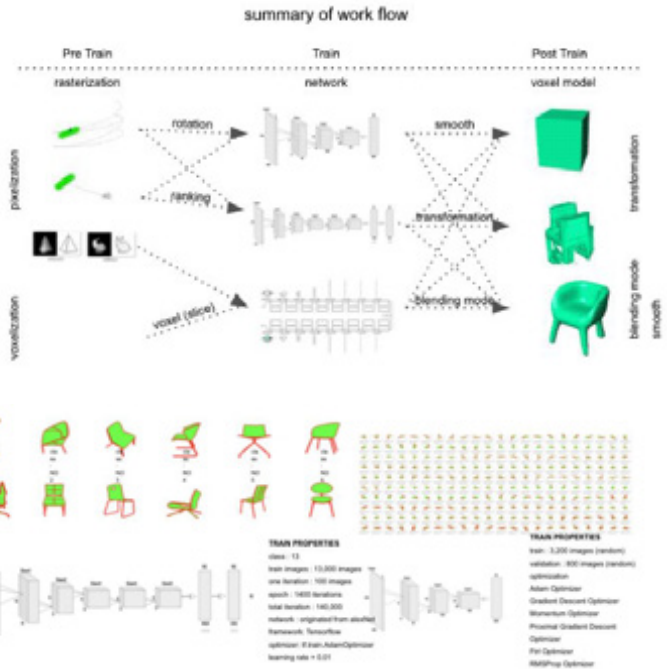
Digital Design Prize, class of 2017, Harvard GSD

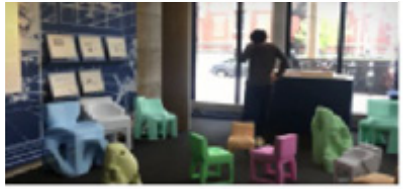
ABSTRACT

This thesis aims to explore the opportunities of remixing and resampling three-dimensional geometry data with the use of volumetric representations and machine learning in design. A voxel is a volumetric element representing a fragment of space. There are various types of implementations of voxel representations in different fields such as game design, simulations, architecture, fabrication, medical or computational design.

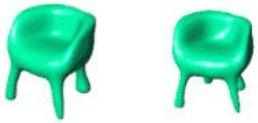
This thesis consists of the following parts: First, it introduces what voxel modeling is, compared to traditional modeling techniques. It looks at the advantages and disadvantages of a voxel representation compared to conventional digital modeling techniques such as Mesh or NURBS modeling paradigms. It also describes characteristics of voxel space covering as pixelated and voxelated space, as a dense representation (implicit relations) compared to sparse representation (explicit relations), and its data manipulation in relation to voxel space.
Similarities of voxel representations and two-dimensional images, enable us to leverage the developments of the past few years in the field of image analysis and machine learning and extend them into the third dimension. Therefore, the second part of the thesis investigates the use of machine learning techniques with the opportunities for pixelated and voxelated representation of 3D geometry by analytical inference, numerical modification, and blending multiple volumetric geometries.

The thesis examines several prototypical implementations of proposed design systems or workflows, as a series of experiments based on the process from rasterization, (1) pixelated, (2) voxelated (3) depth, of 3D geometry with machine learning, (1) convolutional neural network(CNN) and Generative Adversarial Networks(GAN), in order to show new types of geometries by voxel blending.

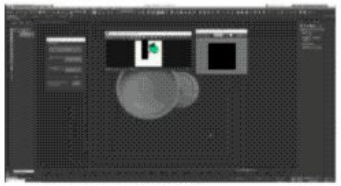





voxel by slicing
blend modes
blend A to B




voxelated geometry
smooth
smooth

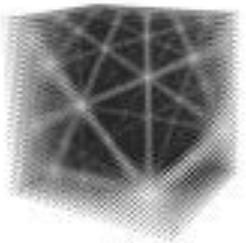

rendering


slice mesh with Monolith

Harvard University
Graduate School of Design

Design workflows integrating Machine Learning and voxel representations

Remixing & Resampling Three Dimensional Objects
Use of Volumetric Representations and Machine Learning in Design



Advisor: Prof. Panagiotis Michalatos Harvard GSD

Advisor Prof. Takehiko Nagakura, MIT

NU Namju Lee

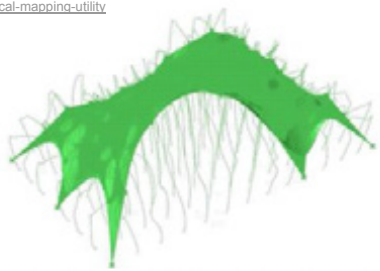
Thesis project, MDes

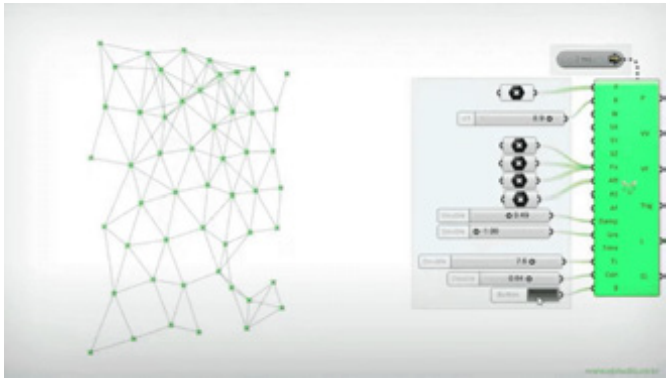
GEOMETRY & DYNAMICS

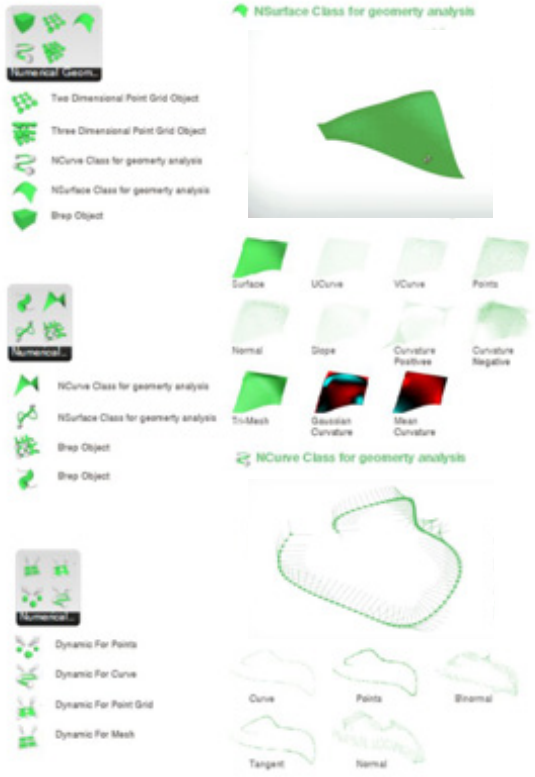
http://www.njstudio.co.kr/main/project/2015_NGU_Development/2015_NGU_Development.html

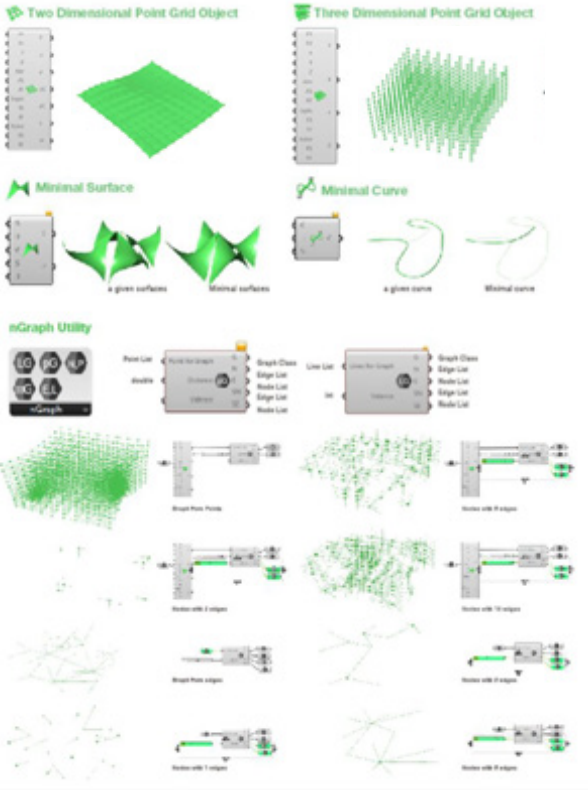
Geometry, Addon for Grasshopper
https://www.food4rhino.com/app/numerical-geometry-utility

Dynamics, Addon for Grasshopper
https://www.food4rhino.com/app/numerical-mapping-utility









Numerical Geomery and Graph Utility

computational analysis, Version 2015

www.njstudio.co.kr

Numerical Dynamic Utility

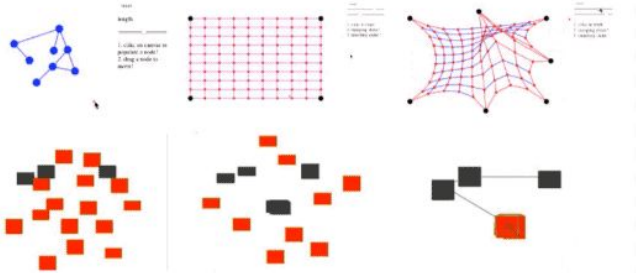
computational spring mode, Version 2015

www.njstudio.co.kr

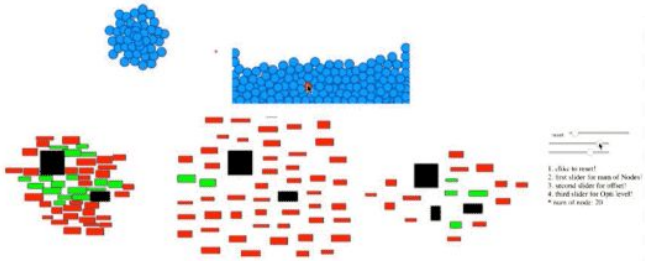
Geometry and Position Optimization

based on graph and spring model physics

Position Optimization
based on graph and spring model physics
Experimentation for overlapping text boxes
with constraints

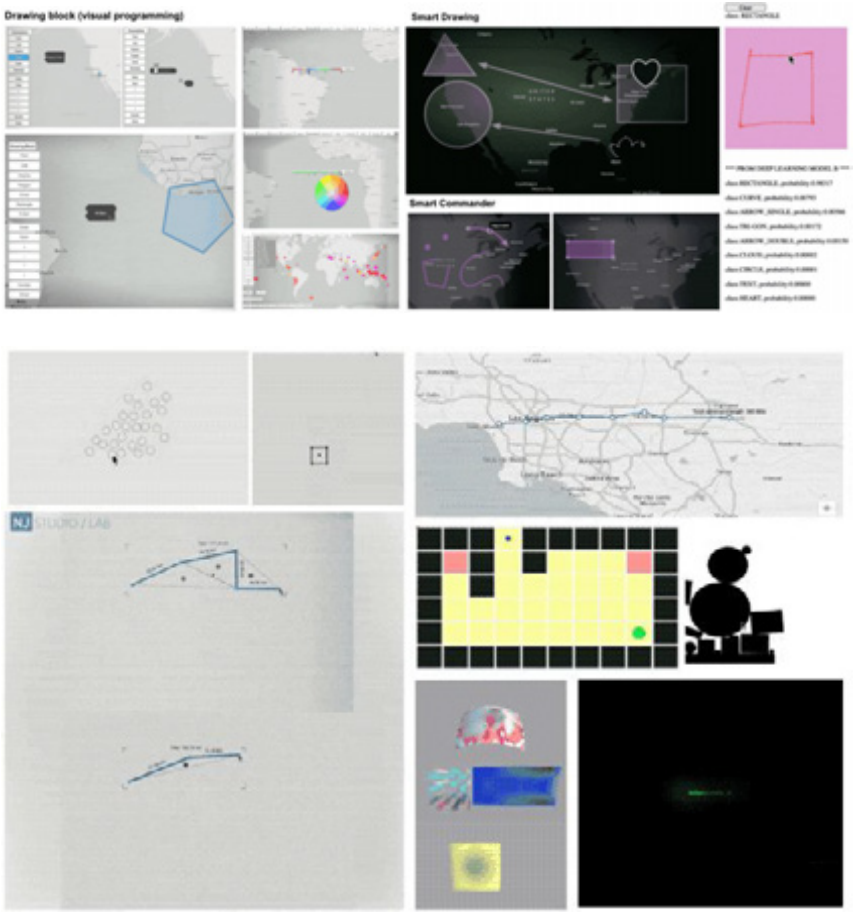


Position Optimization, Second
agent-based optimization
and physics engine
with different level of optimization and offset



Advanced Geometry manipulations

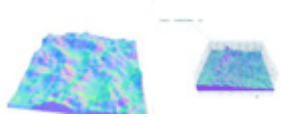
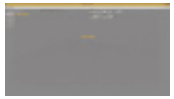
Dynamics, Spring, Voxel, Shader ...

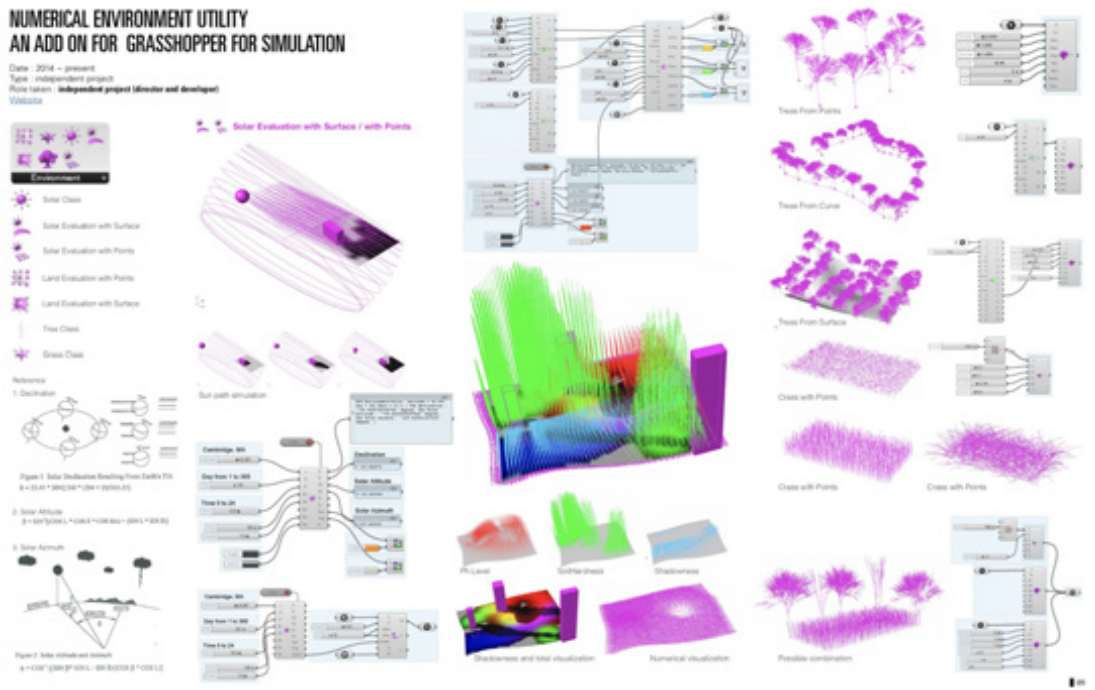


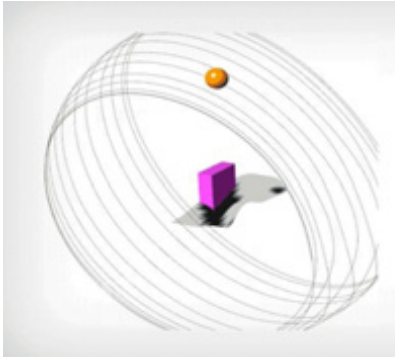
LANDSCAPE & ENVIRONMENT

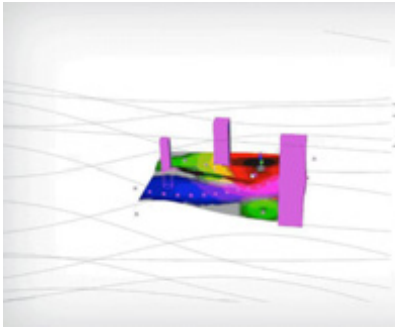
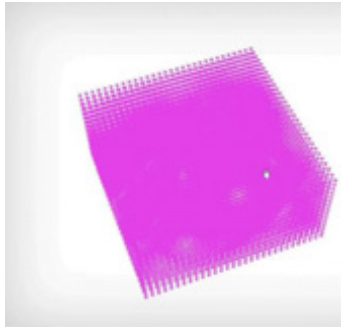
http://www.njstudio.co.kr/main/project/2015_NEU_Development/2015_NEU_Development.html

Addon for GH
https://www.food4rhino.com/app/numerical-landscape-utility



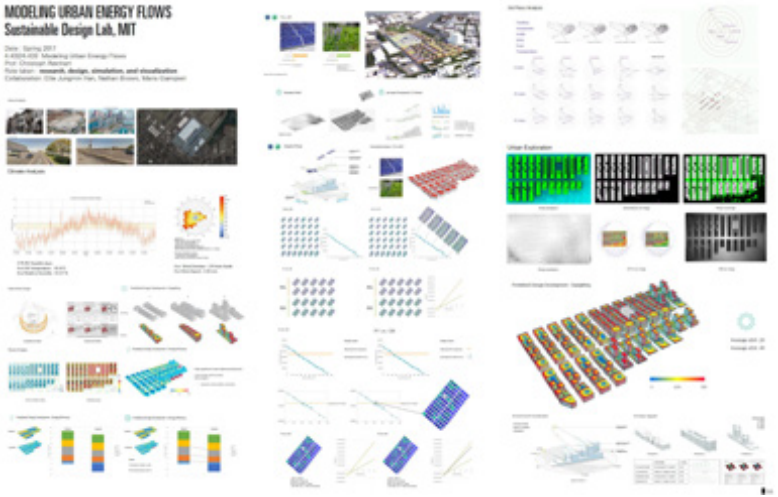


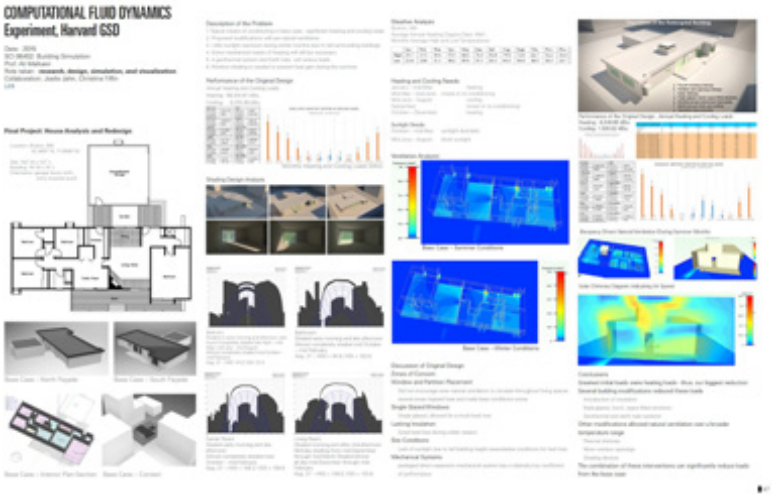



Numerical Environment Utility

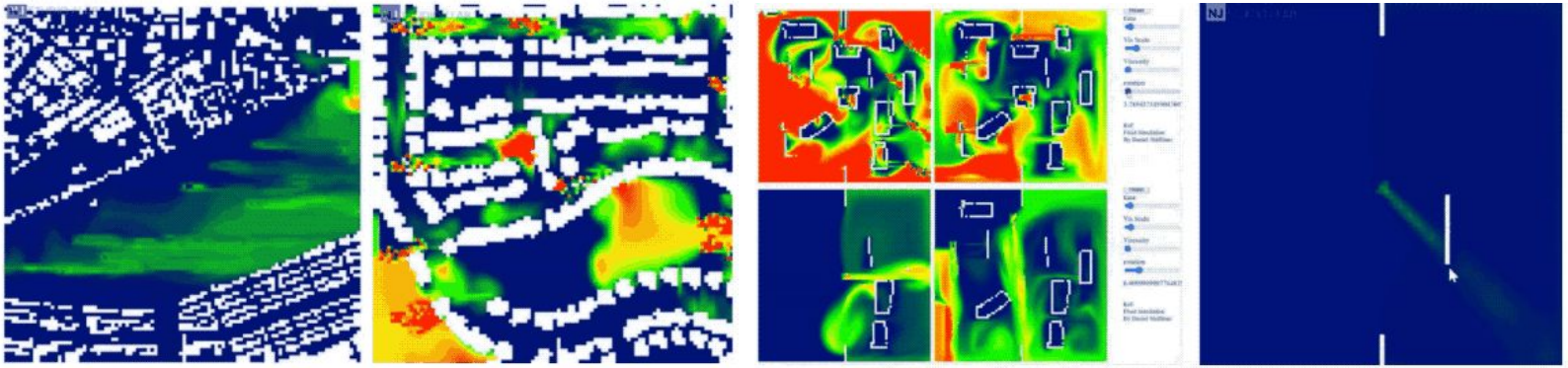
data in pixel and voxel, Version 2015

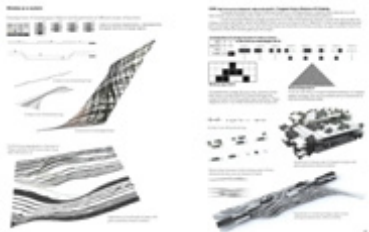
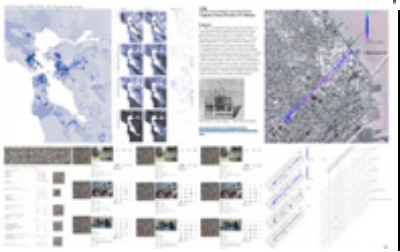
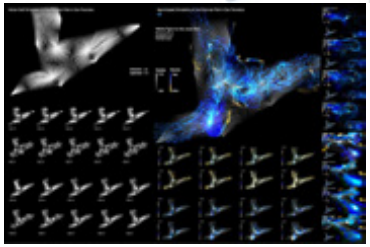
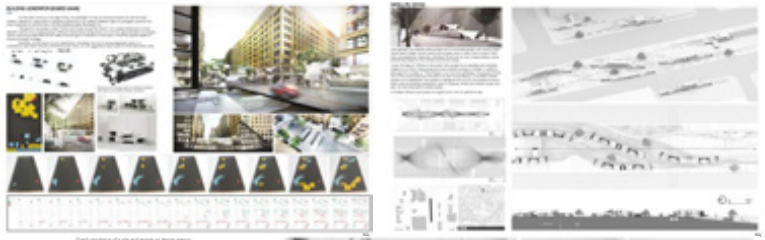
www.rjstudio.co.kr



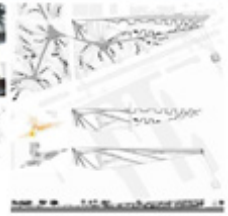
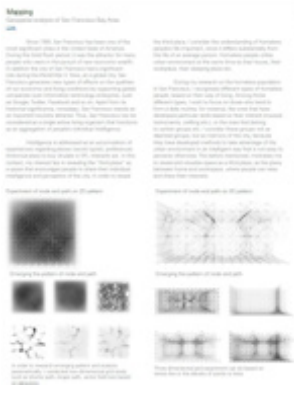


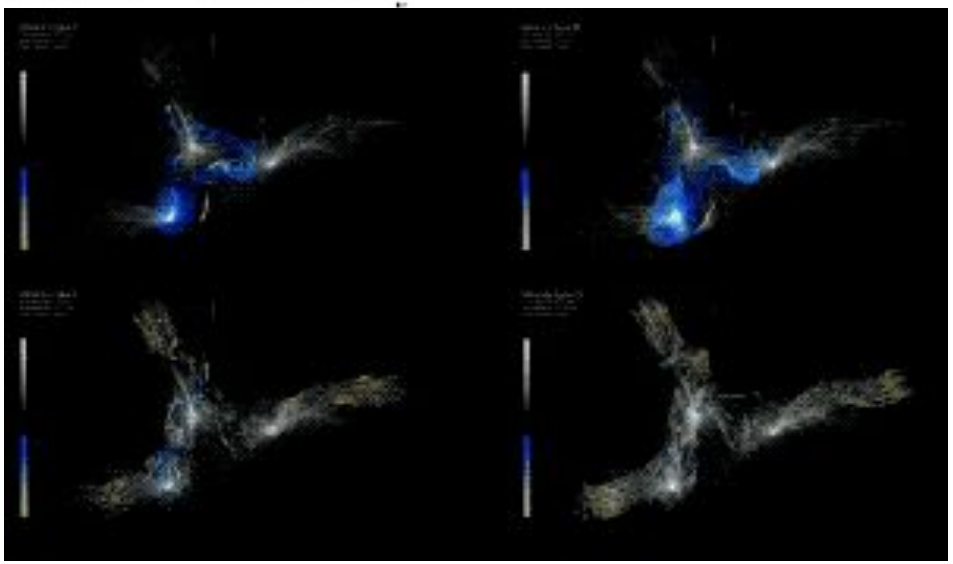
Fluid dynamics simulation







DESIGN SYSTEM & COMPLEX SYSTEM

http://www.nistudio.co.kr/main/project/2016_SmallEnvironments/2016_SmallEnvironments.html

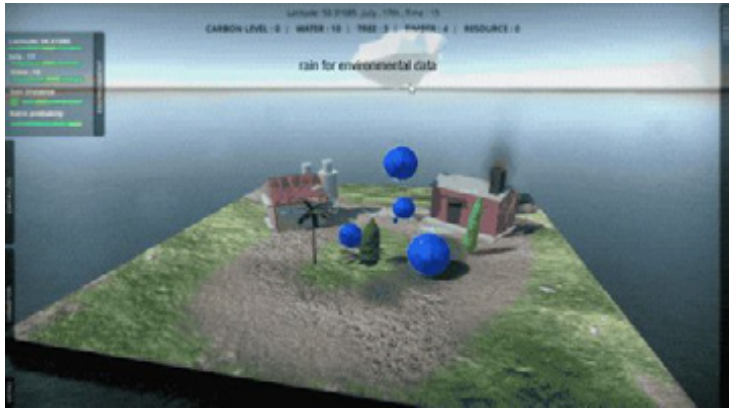
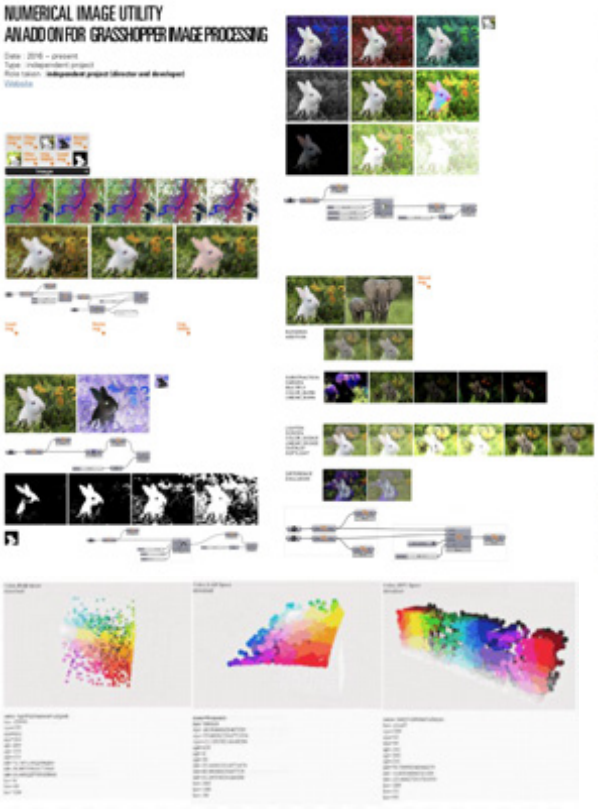


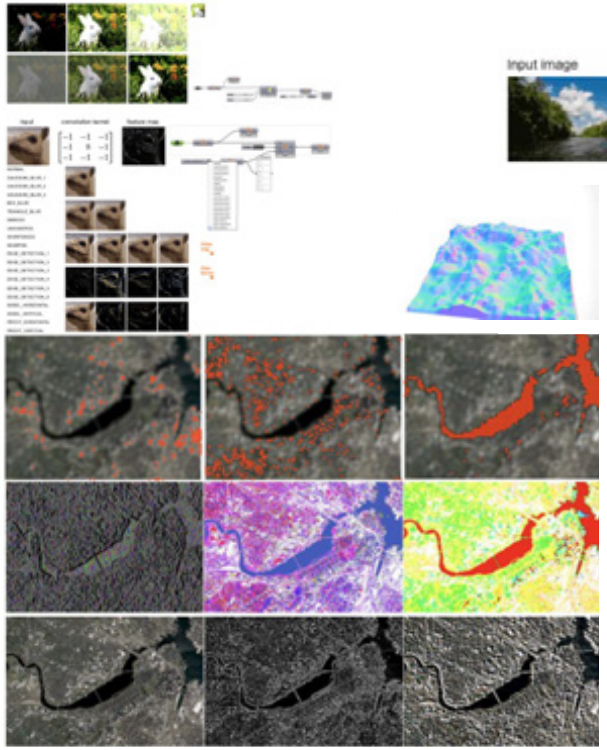
IMAGE PROCESSING

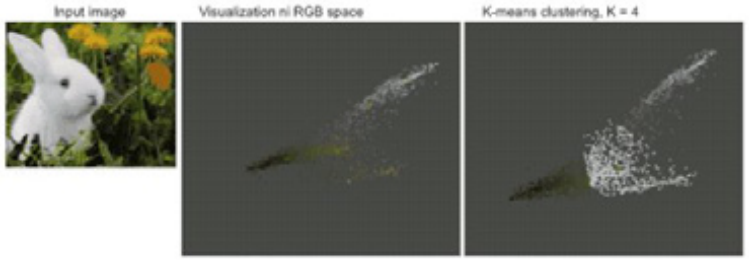
remote sensing / color processing

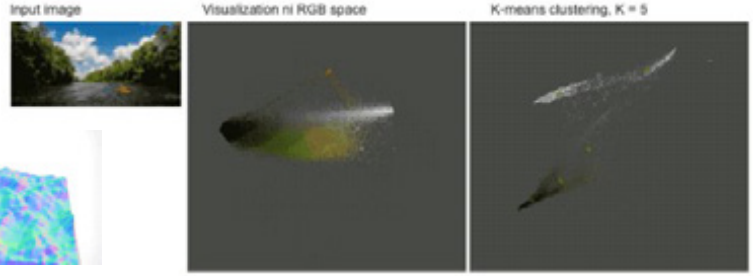
http://www.njstudio.co.kr/main/project/2018_NIU_Development/2018_NIU_Development.html

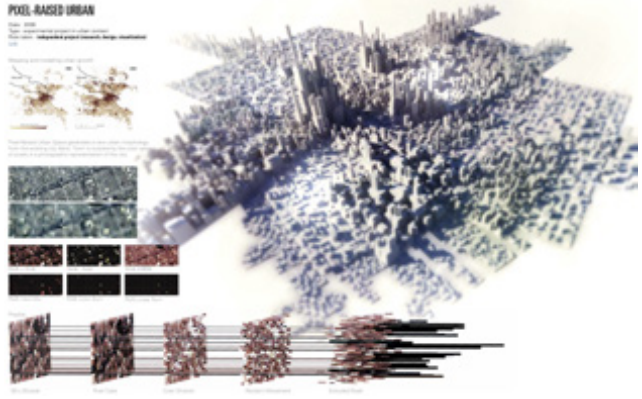
Addon for Grasshopper
https://www.food4rhino.com/app/numerical-image-utility









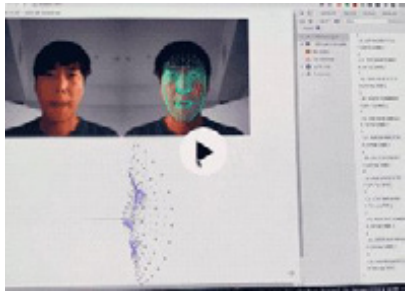


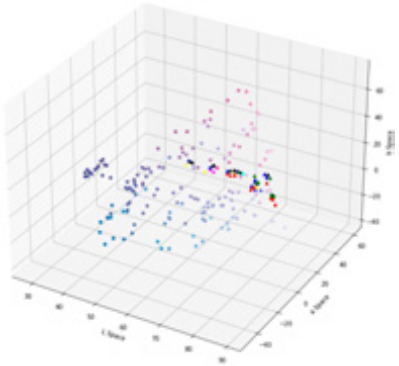
THE COLOR AI

Machine Learning & Implementation

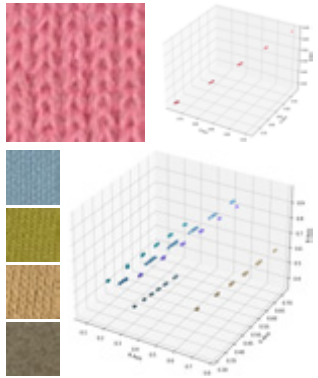
Link: https://computationaldesign.tistory.com/29

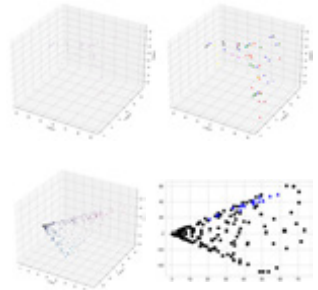
Personal Color & prediction and implementation





Texture detection





SMTracer

Sketch to Map Translator

ESRI Storymaps Hackathon
Link: https://computationaldesign.tistory.com/29

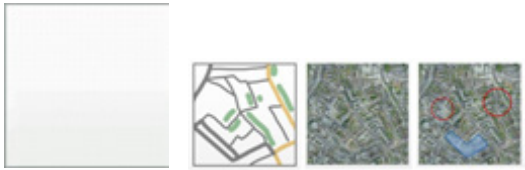
LANGUAGE
Python
Typescript

LIBRARY
Tensorflow, 2.5.0
CV2, numpy, PIL, ...
HTML Canvas, NJSCoreLib

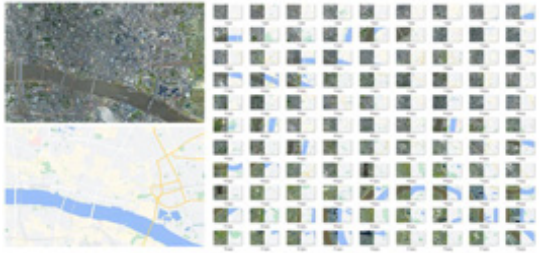
PROCESS
1. Data Collections and Preprocessing:
2. Trains and Validations for each model:
3. Design, Visualization and Video:
4. Development for Sketch App:

MODEL(NETWORK)
pix2pix: Image-to-image translation with a conditional GAN (a modified U-Net)

Sketch-to-Map Translator

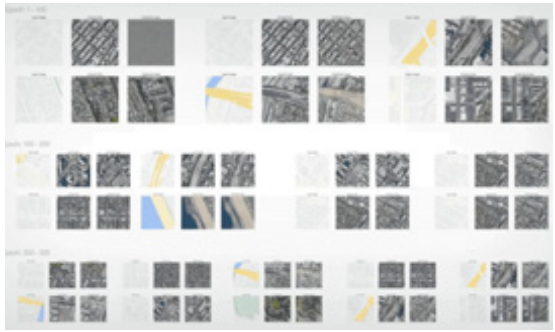


Data collection and preprocessing

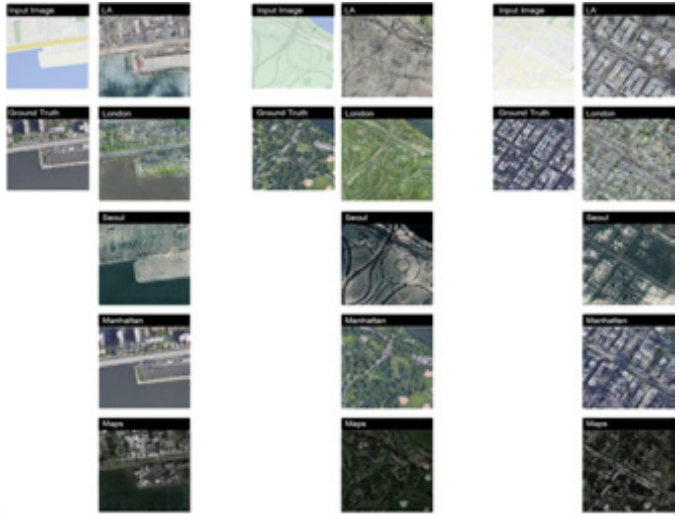


Sketch App

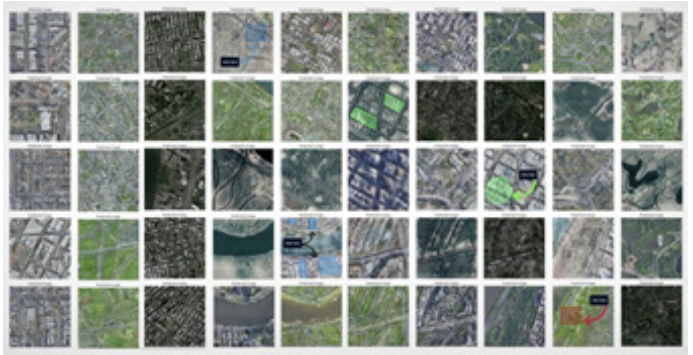
Training and Predictions



Generated maps by different city looks(Seoul, London, Manhattan, LA ...)



Generated maps by the machine

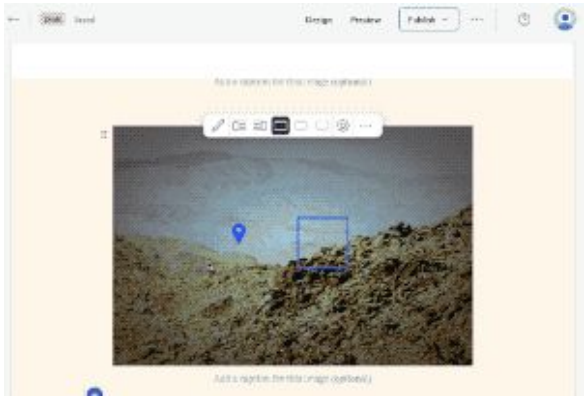


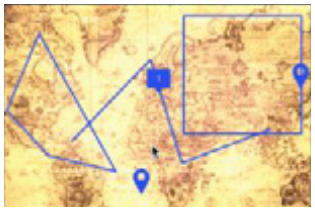
esri Hackathon

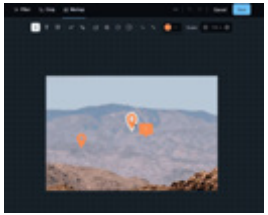
Generated maps by the machine

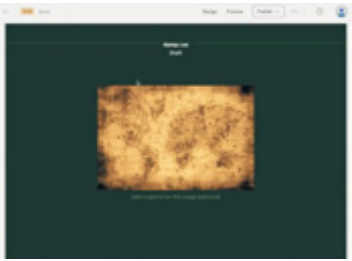
Express Image app

[ESRI StoryMaps](#) [Storymaps](#)









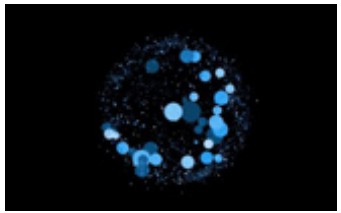
DATA / GEOMETRY / VISUALIZATION / MAPPING

selected researches and projects

DIGITAL MAPPING
DATA VISUALIZATION

http://www.njstudio.co.kr/main/project/2018_NMU_Development/2018_NMU_Development.html

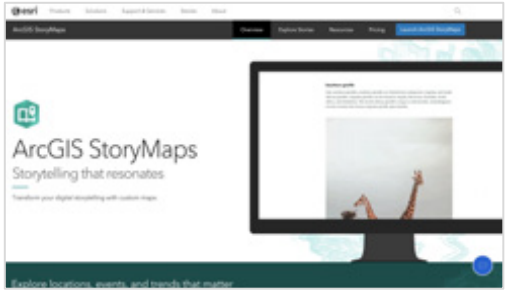
Addon for Grasshopper
https://www.food4rhino.com/app/numerical-mapping-utility



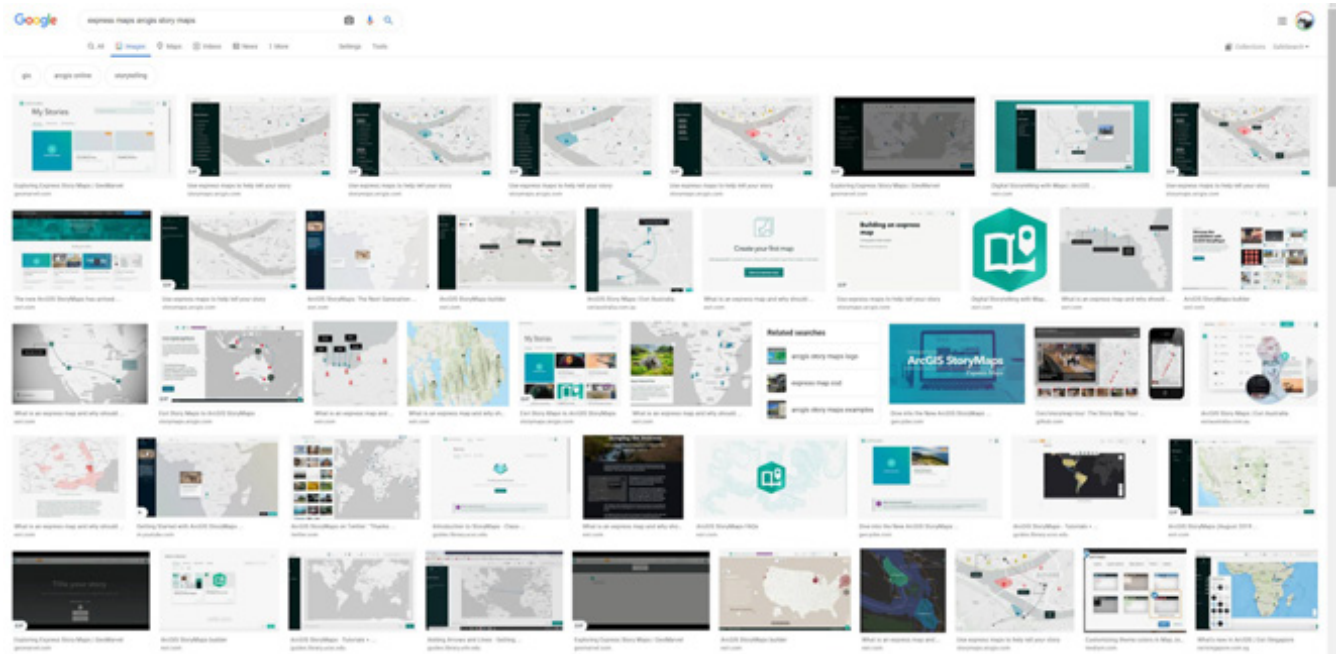
MAPPING & CAD SYSTEM

Storymaps, ESRI

https://storymaps.arcgis.com/



Google Image
https://www.google.com/search?q=express+maps+arcgis+story+maps&sxsrf=ALeKk03iTMNsrw0iC_iqa5GjizWuwt6YUQ:1612574029256&source=lnms&tbm=isch&sa=X&ved=2ahUKEwj-77-xitTuAhXHhOAKHSf0Cv4Q_AUoAXoECBQQAw&biw=1556&bih=884



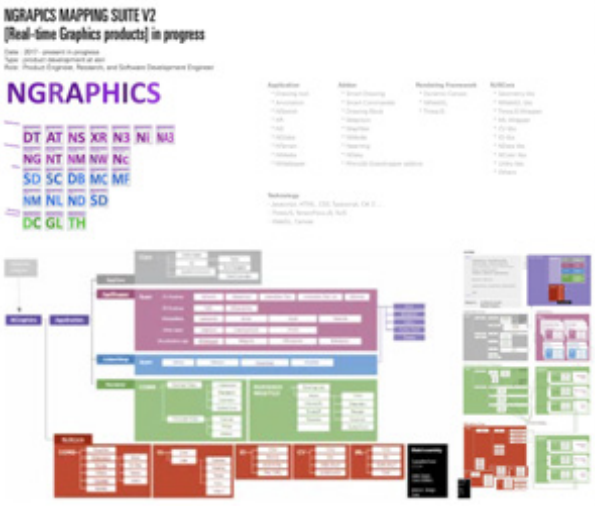
Youtube
https://www.youtube.com/results?search_query=express+maps+arcgis+story+maps+

Others
https://www.youtube.com/watch?v=wwb5iLeex9M

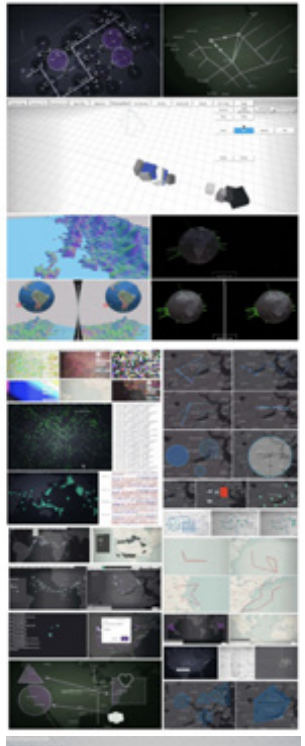
https://www.youtube.com/watch?v=qdn05wkgYw0

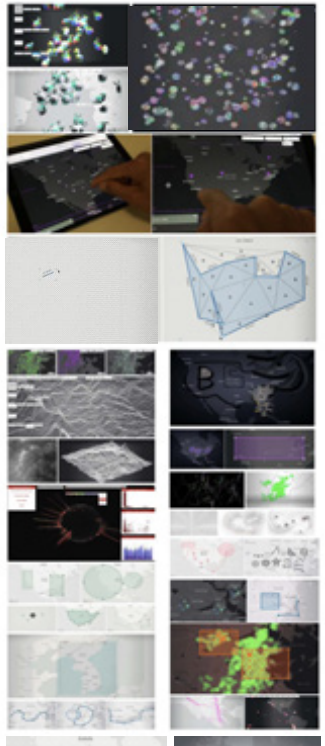
MAPPING & CAD SYSTEM

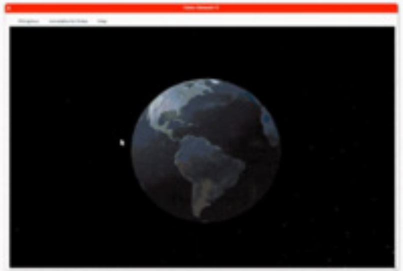
NGraphics Mapping suite

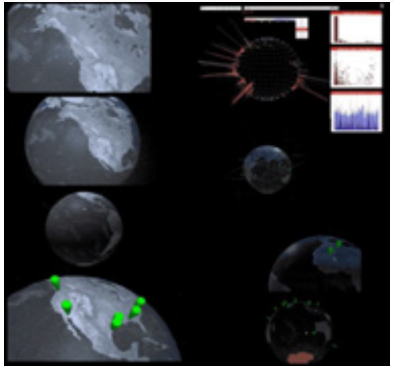


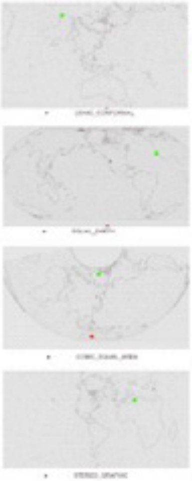
00:03 - NGraphics Package / Mapping suite
00:05 - App: Drawing Tool
01:05 - Advanced Drawing
01:40 - App: Annotation Tool
02:21 - App: Annotation Globe 3D
03:10 - App: NGraphics XR(VR/AR)
03:24 - App: NSketch: bitmap drawings
03:35 - App: N3 WebGL Based Data and Geometry Vis
03:51 - App: NGlobe Vis
04:16 - App: NTerrain Vis
04:42 - App: NMap
05:16 - Addon: NWallpaper
05:39 - Addon: Smart Drawing
05:54 - Addon: Smart Commander
06:13 - Addon: Drawing Block
06:44 - Addon: Mapticon
07:19 - Addon: Mapfilter
07:46 - App: NImageshop
08:08 - Environment: Creative Coding
08:23 - Addon: NMedia, Voice Controller, Camera and CV
08:39 - Addon: NLearning(ML),
08:43 - Framework: Dynamic Canvas
08:53 - Framework: WebGL / Three
08:58 - Overview / Diagrams of the architecture and pipeline

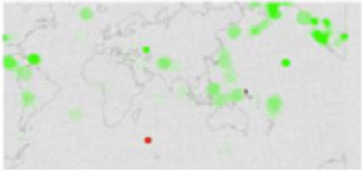


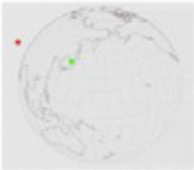


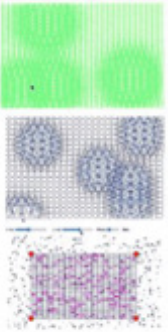




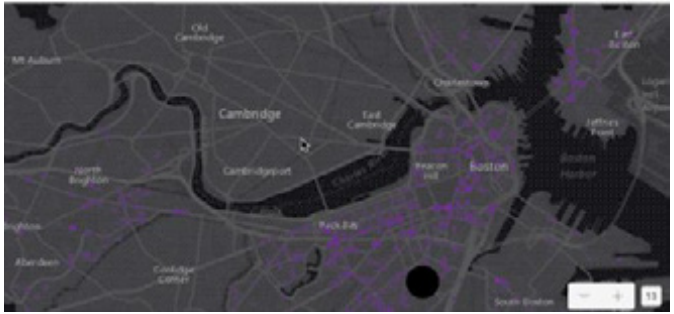









Cambridge
Cambridgeport


Cambridge
Cambridgeport
Boston

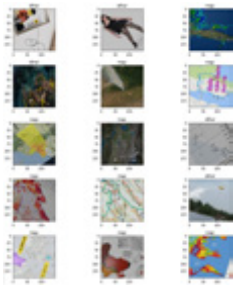
Map Classifier

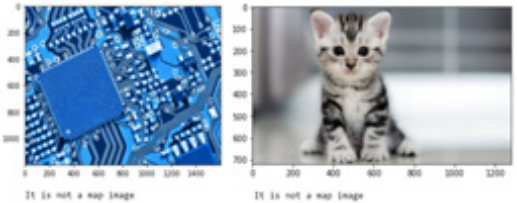
Machine Learning & Implementation

Link: https://computationaldesign.tistory.com/29

Classes

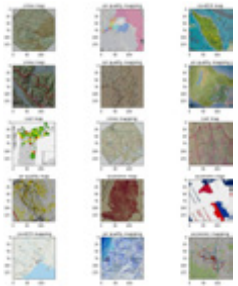
2 : [map, other]

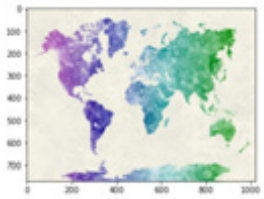




Classes

22: [air quality map, air quality mapping, cool map, cool mapping, covid19 map, covid19 mapping, crime map, crime mapping, economic map, economic mapping, fire map, fire mapping, forest map, forest mapping, national park map, national park mapping, population map, population mapping, traffic map, traffic mapping, weather map, weather mapping]





weather map

	air quality map	cool map	covid19 map	crime map	economic map	fire map
0	0.000085	0.000079	0.000001	0.005158	0.00055	0.000002

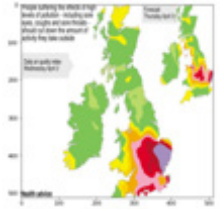
	forest map	national park map	population map	traffic map	weather map
0	0.000012	0.000017	0.00068	0.000472	0.992143

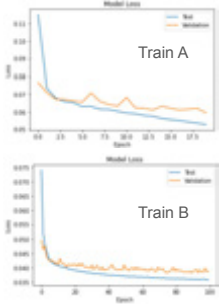
Map Super Sampling

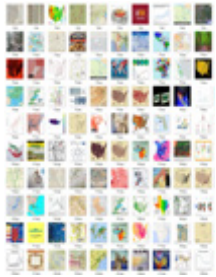
Machine Learning & Implementation

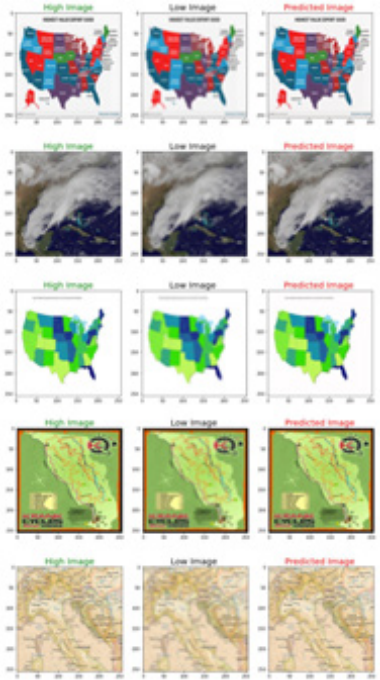
Link: https://computationaldesign.tistory.com/29

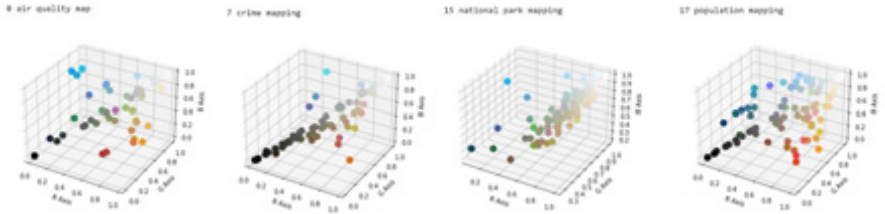
Train data : 3,000 (maps)









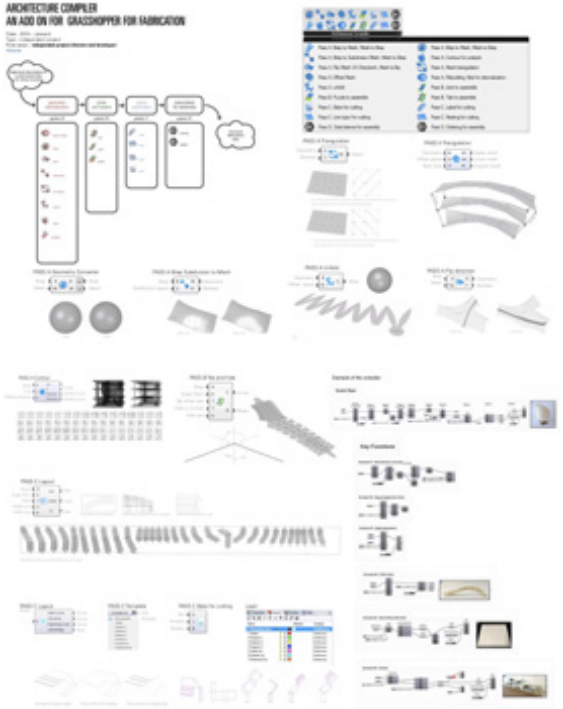


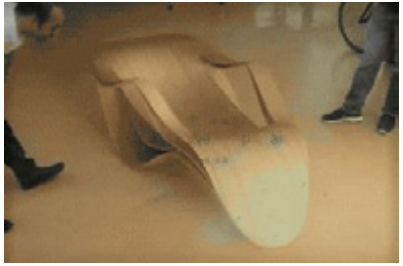
FABRICATION & DIGITAL MOCKUP

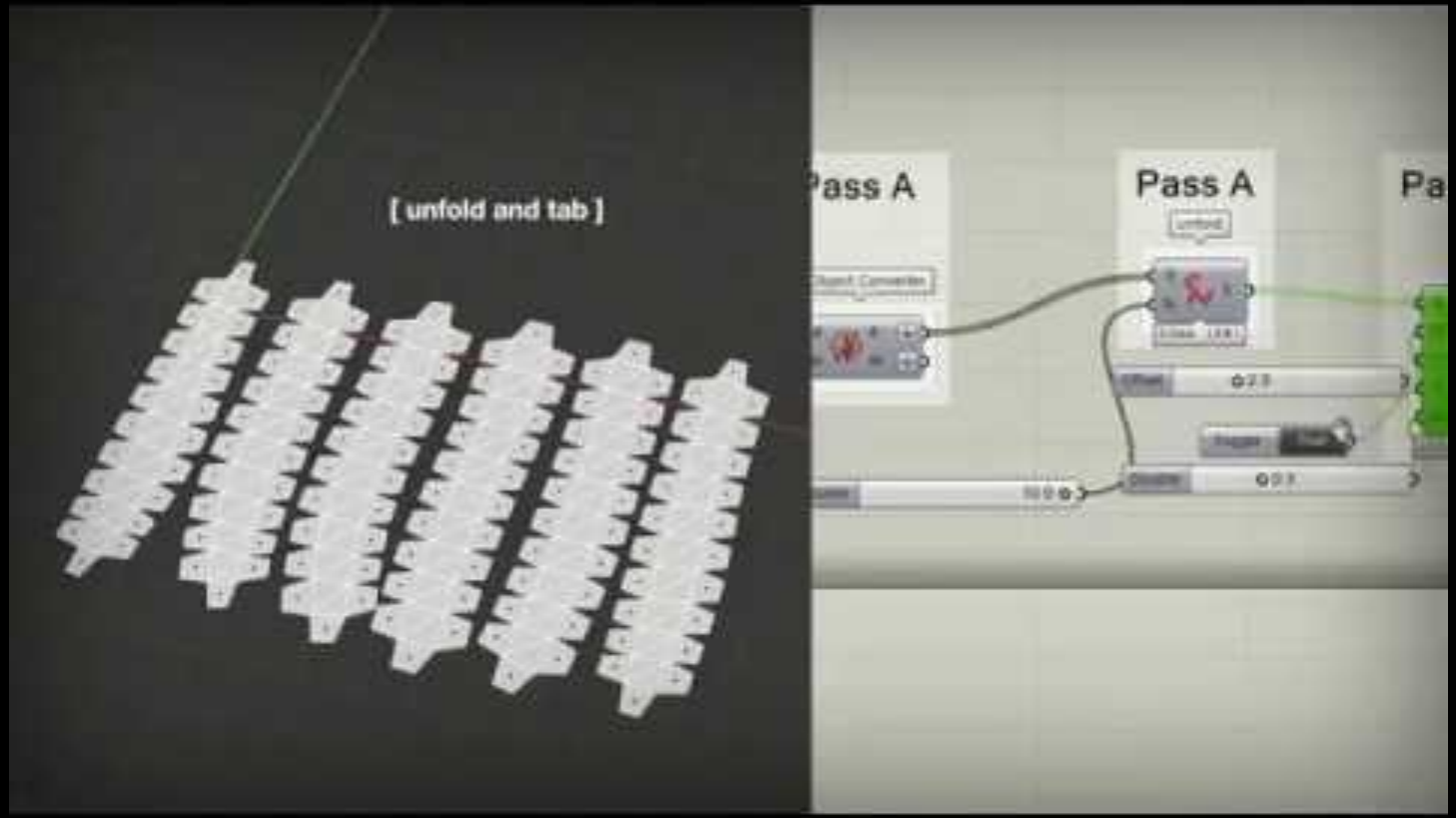
http://www.njstudio.co.kr/main/project/2015_AC_Development/2015_AC_Development.html

http://www.njstudio.co.kr/main/project/2015_STRIP-BASED_FABRICATION|RESEARCH|/2015_STRIP-BASED_FABRICATION%20|RESEARCH|.html

Addon for GH
https://www.food4rhino.com/app/architectural-compiler-digital-fabrication



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ass A
Pass A
Pa

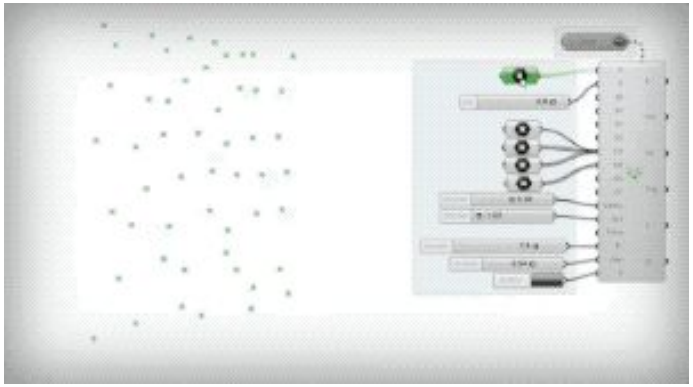
NJSTUDIO 2015 DIGITAL MOCKUP DEMO REEL

FIFTH EDITION, SELECTED WORKS SINCE 2004

n.ninja@gmail.com
www.njstudio.co.kr

MATERIAL & COMPUTATION

http://www.njstudio.co.kr/main/project/2015_NanoMicroMacro/2015_NanoMicroMacro.html



TRMORESPONSIVE FABRIC AND BLIND

Nano Micro Macro: Adaptive Material Laboratory.

HARVARD GSD

Date : Fall 2015

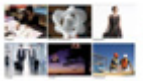
Type : Academic project

Prof. Martin Bechthold, James Weaver

Role taken : **design, research, computation and visualization**

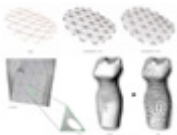
Collaboration : Ji Hyuk Choi, Taehyun Jeon

Website Link



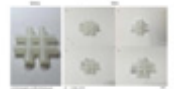
Concept

This design responds to thermal changes by varying the scale of porosities. The system consists of two separate membrane: one is rigid and the other is swelling. Basically, as the second membrane swells, cavities within the surface gets smaller to respond to outside thermal conditions.



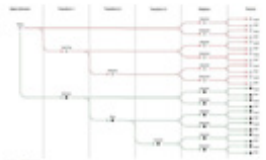
Core Technology

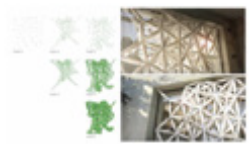
Thermo-responsive Swelling

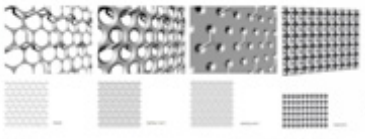


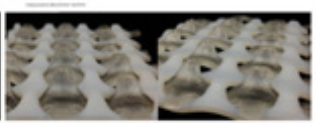
Material & Process

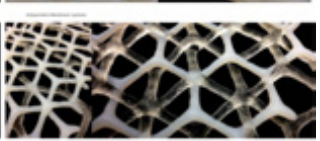
This experimentation is mainly done by 3d printing with the swelling materials. It was started from a basic shape for measuring the capacity of swelling toward more complex structures to maximize transformation by catalysis. Then, the computational model was created based on the measured data, and it was simulated in the digital setting.

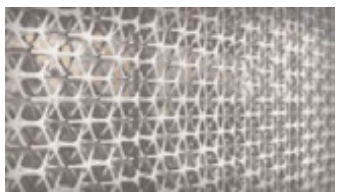


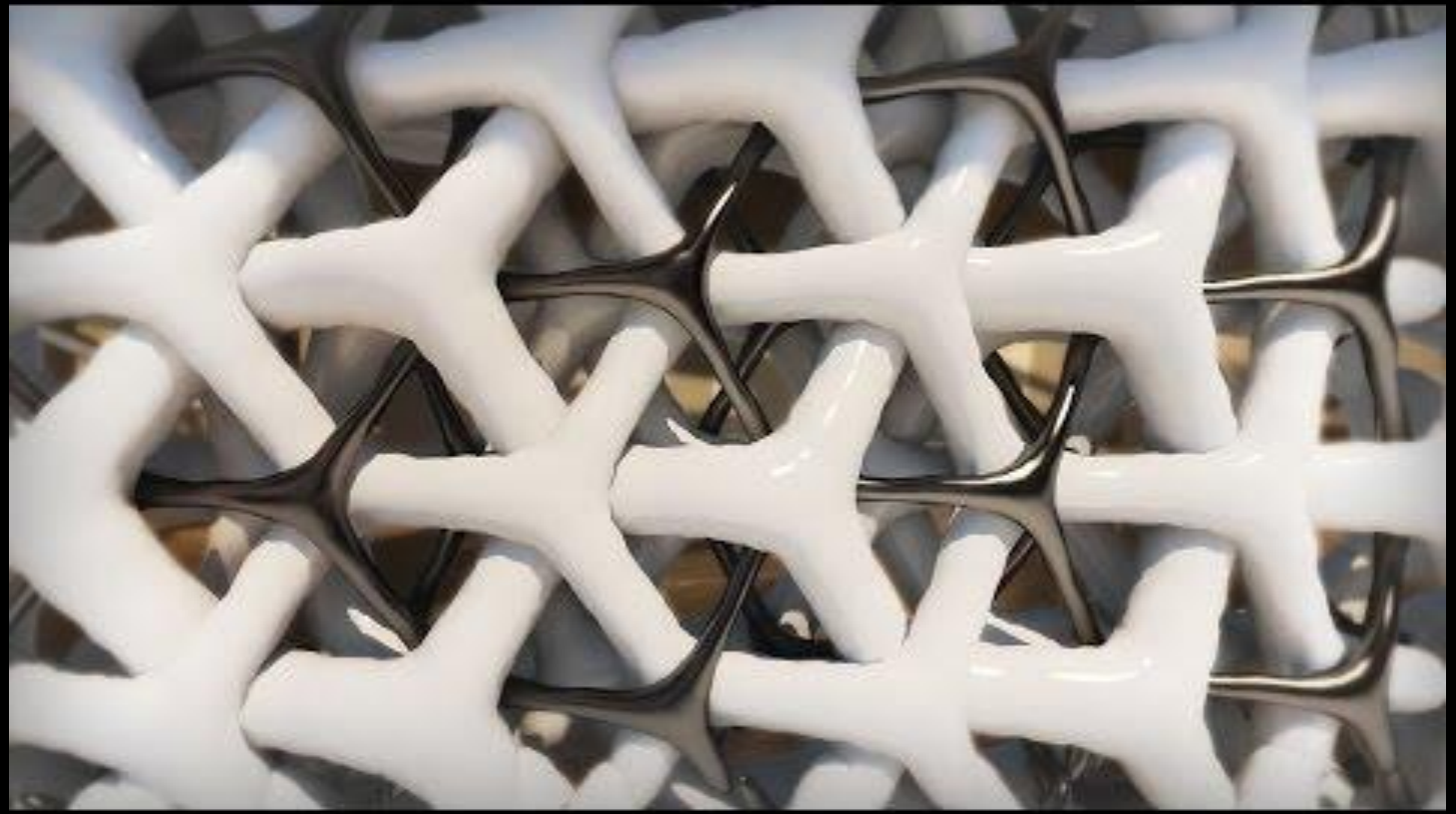








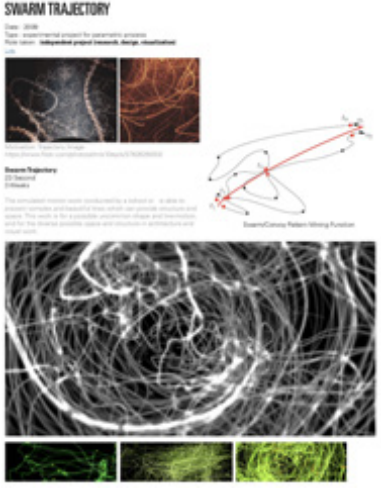


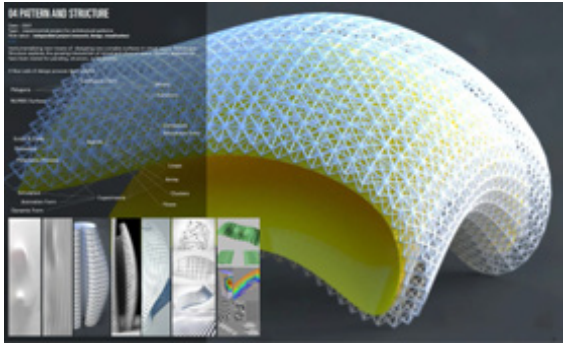


PATTERN & SURFACES

3D Printing & trajectories of motions

Facade design & panelization





FABRICATION & COMPUTATION

https://research.gsd.harvard.edu/maps/portfolio/cevisama-2017/

CERAMIC MORPHOLOGIES
Cevisama Installation 2017
HARVARD GSD

Project Team: Professor Martin Bechthold, Director; Salmaan Craig, Lecturer in Environmental Technology; Nono Martinez Alonso; Jose Luis Garcia Del Castillo; Tiffany Cheng; Kevin Hinz; Namju Lee, Zhiwei Liao; Matan Mayer; Saurabh Mhatre; Zadh Seibold; Santiago Serna Gonzalez; Juan Pablo Ugarte.

Role taken : **computation design and visualization**

Sponsor: ASCER Tile of Spain & Cevisama

Coordinator: ITC, Javier Mira Pedro

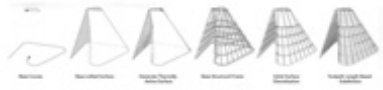
Production: Instituto de Tecnología Cerámica, Pilar Gómez Tena, Carmen Segarra Ferrando, Aroa García Cobos

Installation: Grupo on Market

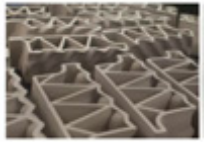
Documentation: Fernando García del Castillo López

Link

Ceramic Morphologies explores the design opportunities of a novel ceramic 3d printing strategy. The project was developed by researchers and students from the Material Processes and Systems (MaP+S) Group at the Harvard University Graduate School of Design. Supplemented with production and material research by the Instituto de Tecnología Cerámica in Castellón, Spain, the project is a prototype for the additive manufacturing of ceramic building components at the industrial scale.

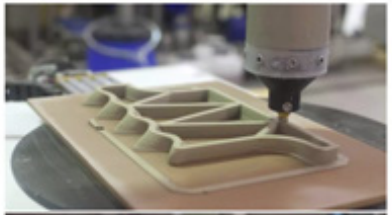


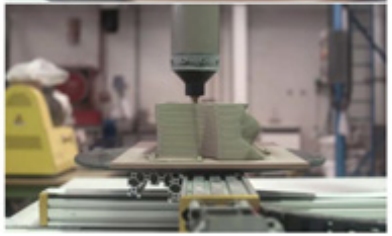
The pavilion is meant to showcase the expressive potential of ceramic 3d printing, and test the adaptation of principles of thermodynamic heat transfer to 3d printed geometry. The shape and design are products of current research related to the thermal performance of naturally ventilated spaces – the result of our collaboration with our colleagues Salmaan Craig and Matan Mayer from the Harvard Center for Green Buildings and Cities. While the exterior surface of the pavilion is smooth and uniform, the interior surface is heavily contoured and 3d textured. In addition to creating a unique relationship between interior and exterior space, the geometry of this undulating surface relates to research on the optimal dimensions for thermodynamic heat transfer.



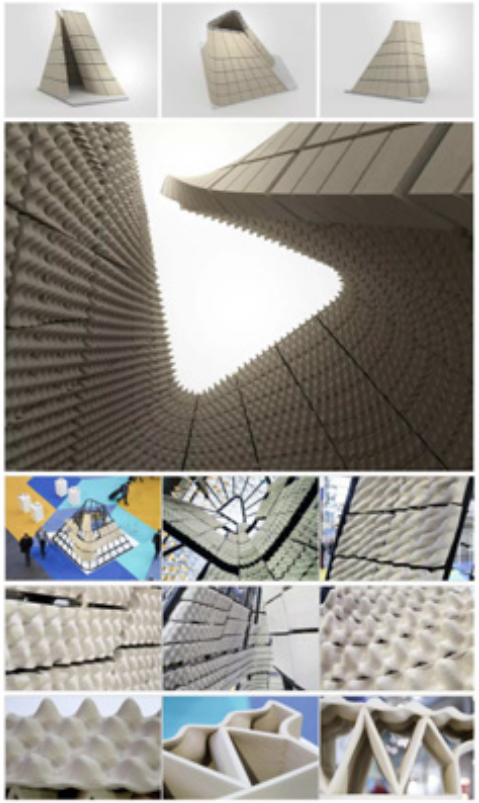
The thermal agenda is embedded in the logic of both the pavilion's interior surface geometry and the configuration of its overall form. Its pyramidal shape facilitates upward air movement, and the interior geometry impacts the thermal exchange between ambient air and the interior mass/surface. The contoured, sinusoidal texture of the interior surface is designed to optimize the ratio of surface area to thermal mass, and maximize the potential for cooling through natural ventilation and buoyancy effects. The project team has created mathematical models to predict the thermal behavior of the system.

The project utilizes a proprietary clay extrusion system and 3-axis armature to produce each of the pavilion's 352 unique ceramic elements. Each element is sized according to its position within the structure, the dimensional constraints of the printing bed, and a maximum allowable toolpath length. The team developed a novel computational approach to generate the surface geometry of the pavilion, discretize the form into individual bricks, and accommodate for the structural metal frame. Toolpath geometry and machine code is also generated directly within the parametric model. The digital workflow enabled the research team to account for shrinkage during the drying and firing process, reduce overall printing time and material consumption, and tune the stability of individual bricks.



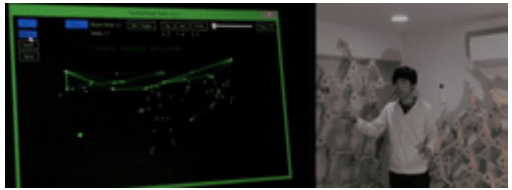


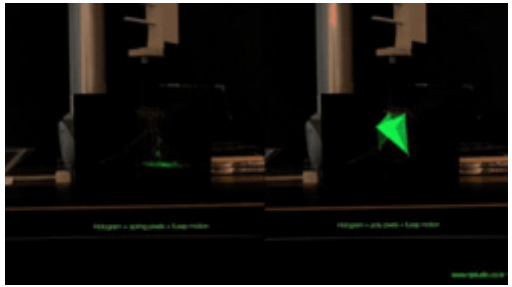
Measuring 5 m tall, with a footprint of 3.2m x 3.6m, the pavilion consists of 552 unique elements ranging from 260-545 mm in length, and 70-150 mm in height. 184 elements, representing 1/3 of the entire structure, are displayed in the current configuration shown at the 2017 Cevisama Fair in Valencia, Spain. Gaps between pieces allow for tolerances in the production. The modules can be bonded with mortar for permanent installations or, for temporary applications such as Cevisama 2017, can be dry-stacked and secured to a support frame. In total, the 184 printed elements displayed required 358 hours of printing time, and include 19.84km (12.33 miles) of extruded clay bead.

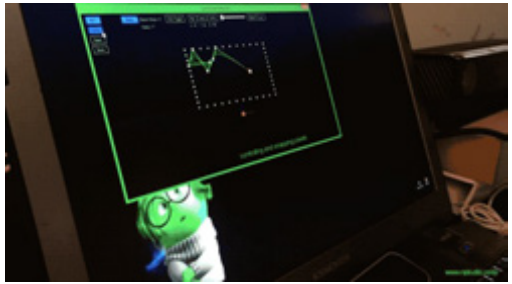


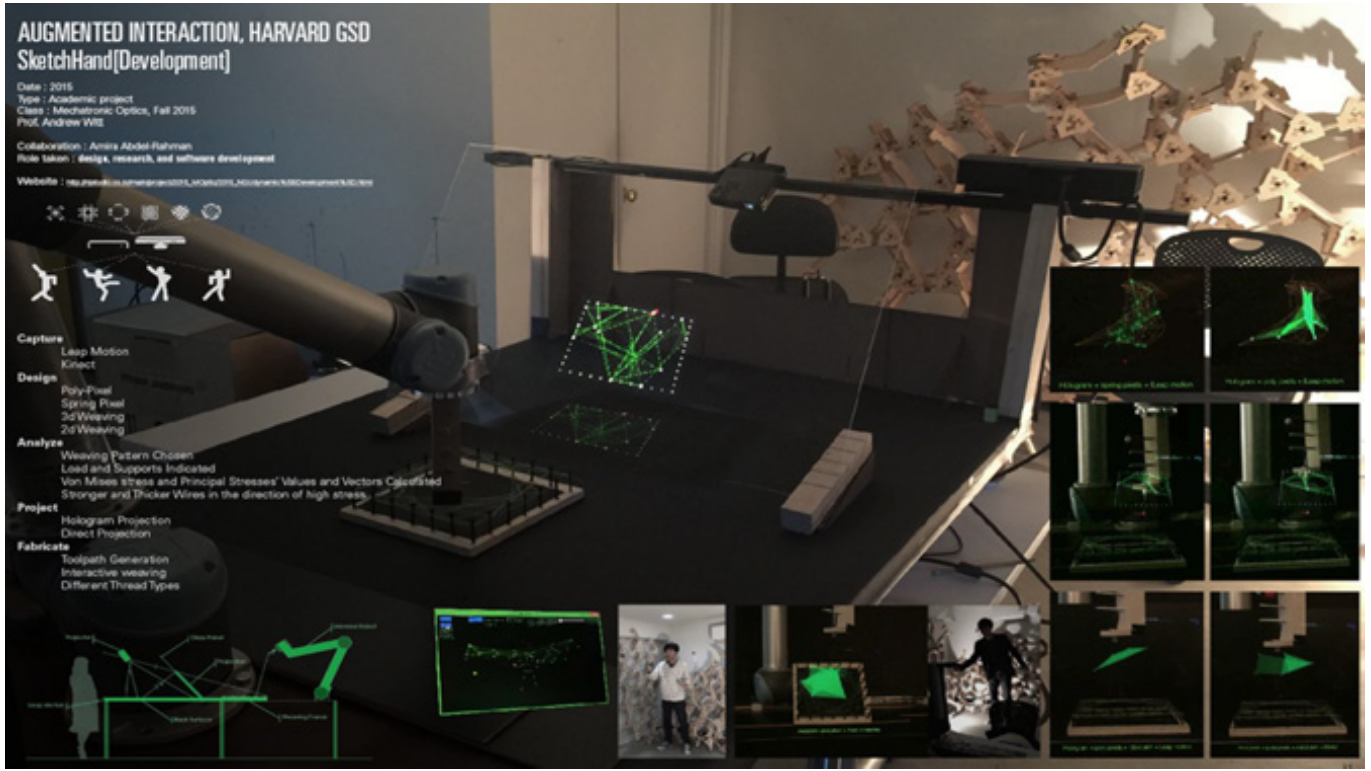
INTERACTION & ROBOTICS

http://www.njstudio.co.kr/main/project/2015_MOptic/2015_SktechHand_Development.html







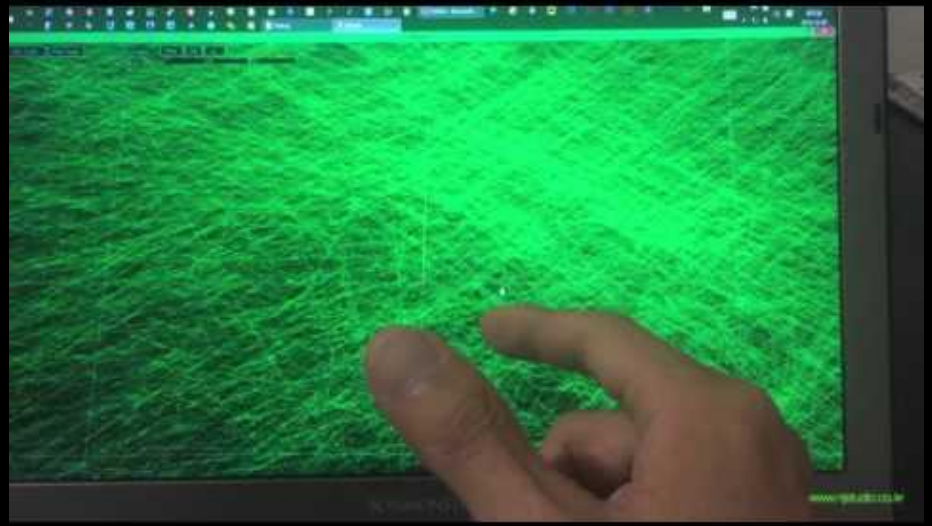


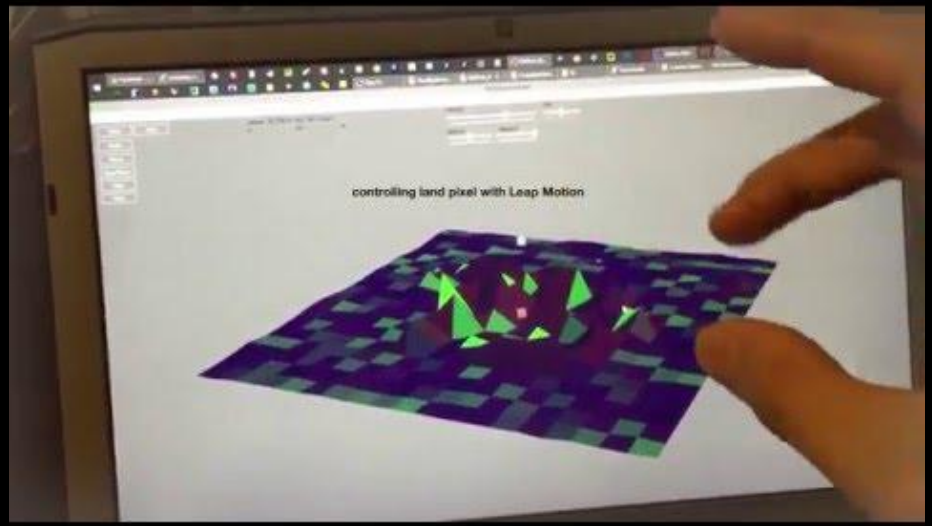
Harvard University GSD

Mechatronic Optics (SCI 0945003)

SKETCHHAND

beta 0.0.5 , version for hologram




controlling land pixel with Leap Motion


For AR, experiment

DEVELOPMENT

selected researches and projects

INTERFACE DEVELOPMENT

Drawing block (visual programming)

Smart Drawing

Smart Commander

Clear

class: RECTANGLE

*** FROM DEEP LEARNING MODEL B ***

class:RECTANGLE, probability:0.99391

class:CURVE, probability:0.00502

class:CIRCLE, probability:0.00036

class:TRI-GON, probability:0.00032

class:ARROW_SINGLE, probability:0.00025

class:ARROW_DOUBLE, probability:0.00014

class:CLOUD, probability:0.00000

class:TEXT, probability:0.00000

class:HEART, probability:0.00000

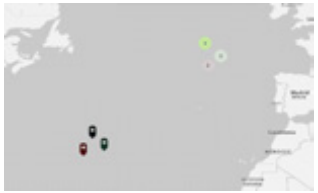
ENGINEERING

Software developments

Clustering Points: Collision-Based Dynamic Graph method

https://nj-namju.medium.com/clustering-points-collision-based-dynamic-grid-graph-method-f602d0152cd2

(1) Collision-based Clustering
(2) Cluster graphs
(3) recursive update of graphs
(4) Hierarchical sub-graphs and
(5) Merged graphs



HTML Canvas Optimization of Rendering Loop with JSAPI for Drawing on Map

https://medium.com/analytics-vidhya/html-canvas-optimization-of-rendering-loop-with-jsapi-for-drawing-on-map-71cb0500a213


NJSTUDIO 2016
STAND-ALONE
DEVELOPMENT
DEMO REEL
SIXTH EDITION, SELECTED WORKS SINCE 2009


NJSTUDIO 2016
DESIGN SCRIPT
DEVELOPMENT
DEMO REEL
SIXTH EDITION, SELECTED WORKS SINCE 2009

NJSTUDIO 2015 DEVELOPMENT PROJECT DEMO REEL

FIFTH EDITION, SELECTED WORKS SINCE 2009

nj.ranju@gmail.com
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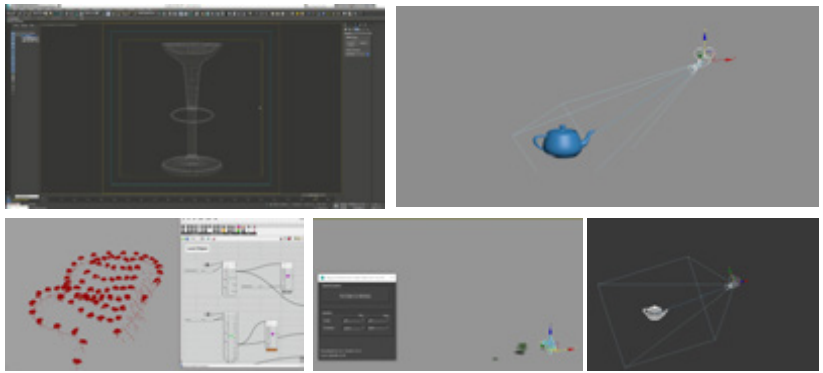
DESIGN VISUALIZATION

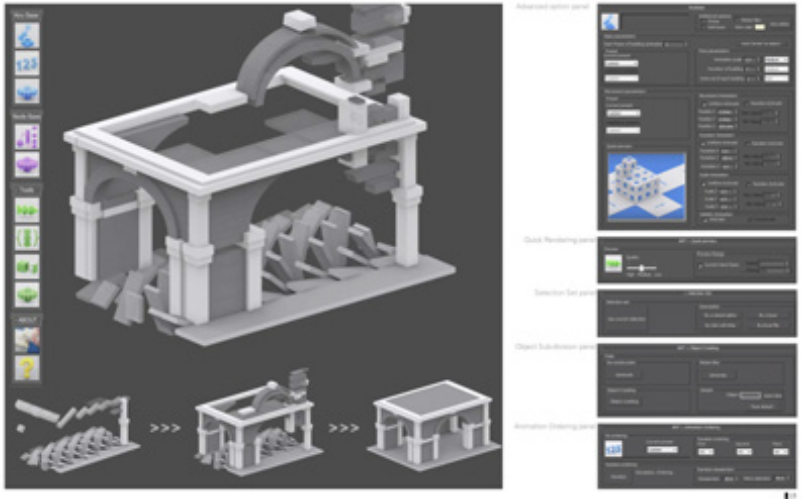
as a director, selected researches and projects

ANIMATION & VISUALIZATION

http://www.njstudio.co.kr/main/project/2015_Demo_Vis/2015_Demo_Vis.html

http://www.njstudio.co.kr/maain/project/2013_Ants[Development]/2013_Ants[Development].html



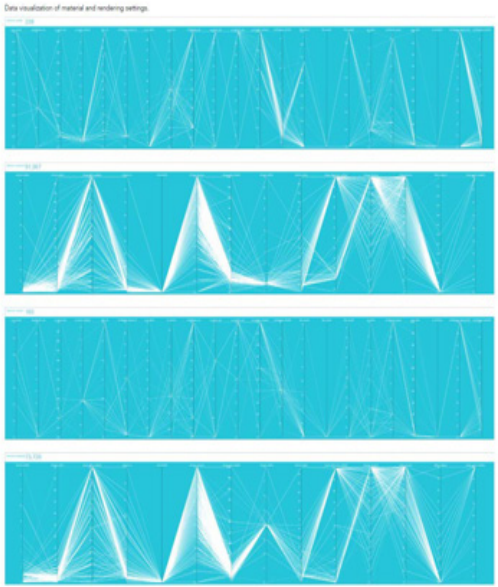


Visualization Demo reels playlist:
https://www.youtube.com/playlist?list=PLIyZNoxG7nmn8G9DGZh76WEYkqEghrvok

DIGITAL MATERIAL

Machine Learning & Implementation

Link: https://computationaldesign.tistory.com/29



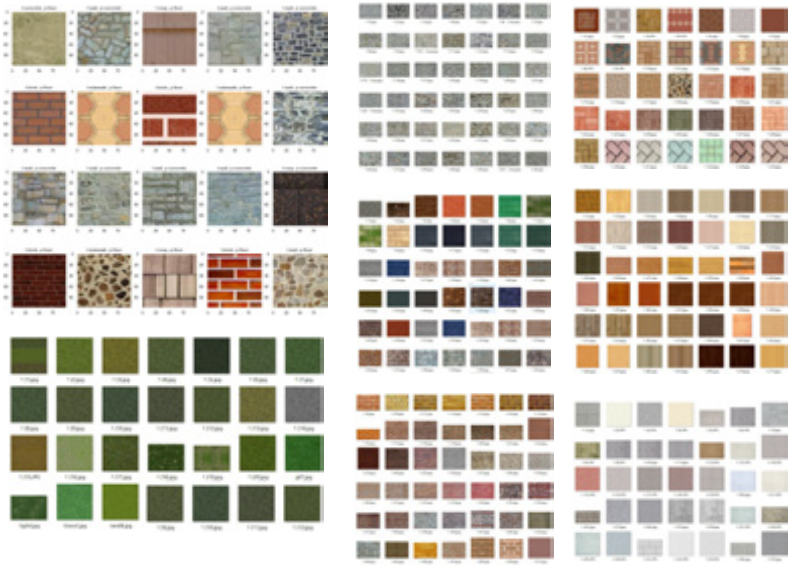
TEXTURE & MATERIAL

Machine Learning & Implementation

Link: https://computationaldesign.tistory.com/29

Classes

[Brick, Concrete, Floor, Grass, Roof, SideWalk, Wall]



DESIGN VISUALIZATION

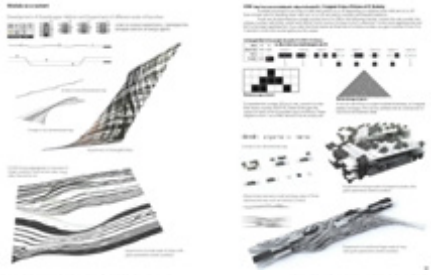
ARCHITECTURAL DESIGN

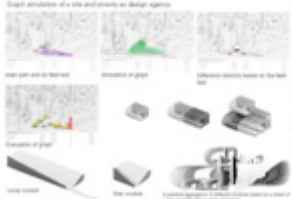
as a architectural designer, selected researches and projects

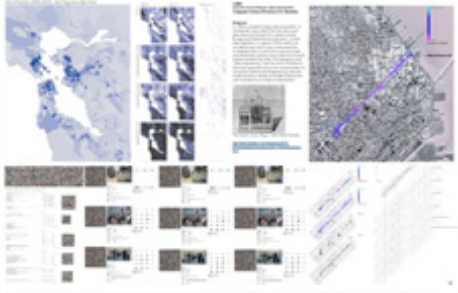
01. STREET IN OFFICE / OFFICE ON THE STREET

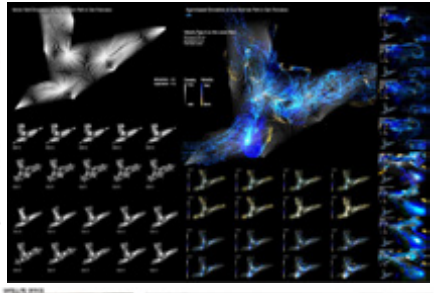
Data-driven design research, M.Arch program

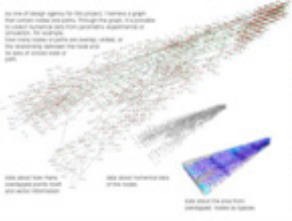
Date : December, 2014 – 2015
Type : Academic work, STUDIO ONE, GSD, UC BERKELEY
Role taken : **independent project research, design, drawing, modeling, visualization**
Critic : Kyle Steinfeld, Sara Dean, Shanna Tuyen
Link

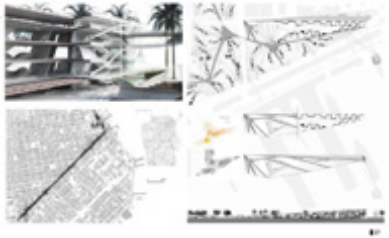


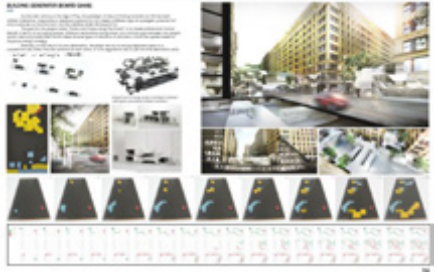


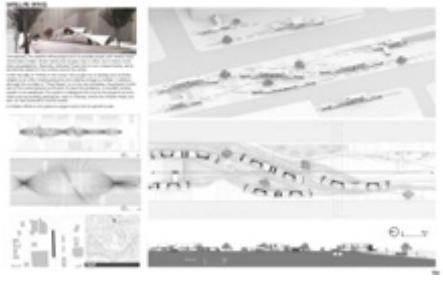


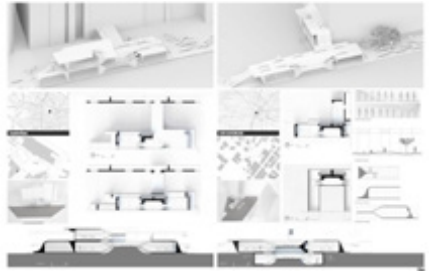








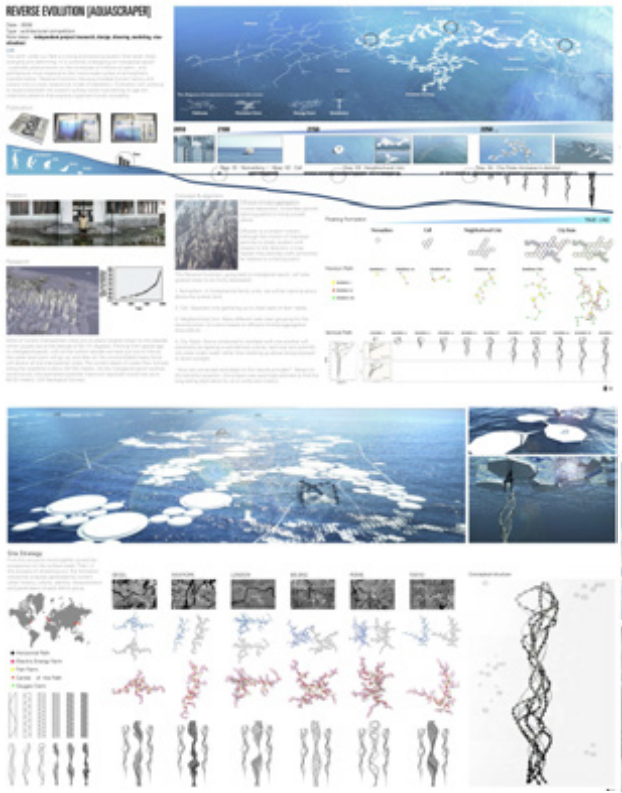





Time lapse for February, 2015
Quantity: Illuminance
Style: colored
scale: Logarithmic
Min
Max
5000 lx
10000 lx
Physical Scale: 10 cm
Shadow simulation
MAPPING
DESIGN AGENCY
MODULE , DETAIL
IMPLEMENTATION

ARCHITECTURAL DESIGN

collaborative works



* The Reverse Evolution of Walls

While the walls standing on the firm ground supported the weight, protected from strong wind, and separated the space, the walls that will be taking those responsibilities under the ocean shall be examined in different aspects.

Roles of the wall module:
a) Each of air bladder like soft wall modules will minimize the impact from outer forces which will eventually reduce the possibility of structures getting inundated.

a) These wall modules will also be able to protect the structures from extreme temperatures and direct sunlight coming down from surface of the water.

* The Reverse Evolution of Columns

Columns are very important supporting component of a building. The formation and roles of these columns will have to be changed as they go deep inside the ocean. Rather than supporting against the movement of ocean currents, the columns will be linking each unit and pathways like chains.

* The Reverse Evolution of Paths

Our movements on the ground have limits, since we only move in two-dimensional pathways affected by gravity. However, in water, with the forces of gravity and buoyancy, we will be able to move in three-dimensional. For an instance, elevators in water will not be limiting its moving directions to up and down, but to expanding its movements in many different directions.

* The Reverse Evolution of Units

Usually we stack up the units on the ground, but in water, we can hang. Some units are job components, i.e. livingroom, kitchen, bathroom, bedroom, etc., and some, just taking the part as joint. Each unit will not only be able to move around as a single unit, but to maintain itself by taking old modules out and putting new modules in.

* Energy Strategy

There are three main sources of energy: sea level, inside of ocean and ground.

Sea Level

From the surface of the water, the electric power will be generated by solar, wind and tidal power. Also, several different types of farming, like fish/oxygen farming, floating greenhouse, etc., will be possible for us to have feasible underwater living spaces.

In the Ocean

Under water, there will be a serious research like thermal difference generation using the temperature differences of upper and lower parts of the ocean. Not only was that, swirling water created by the temperature differences was used for the means of transport. Furthermore, for visual entertainment, and also for the natural source of food, the customized fish farming will be stimulated around the structures that are stretched out under water.

Under the Ocean Floor

Geothermal energy and fossil fuel were extracted from the ocean floor and were used for generating the energy we can utilize.
The unique moving space, that can be transferred and multiply, will be used as a link to connect to buildings on the ground that will be sunken under the ocean.

* Sustainable Interaction

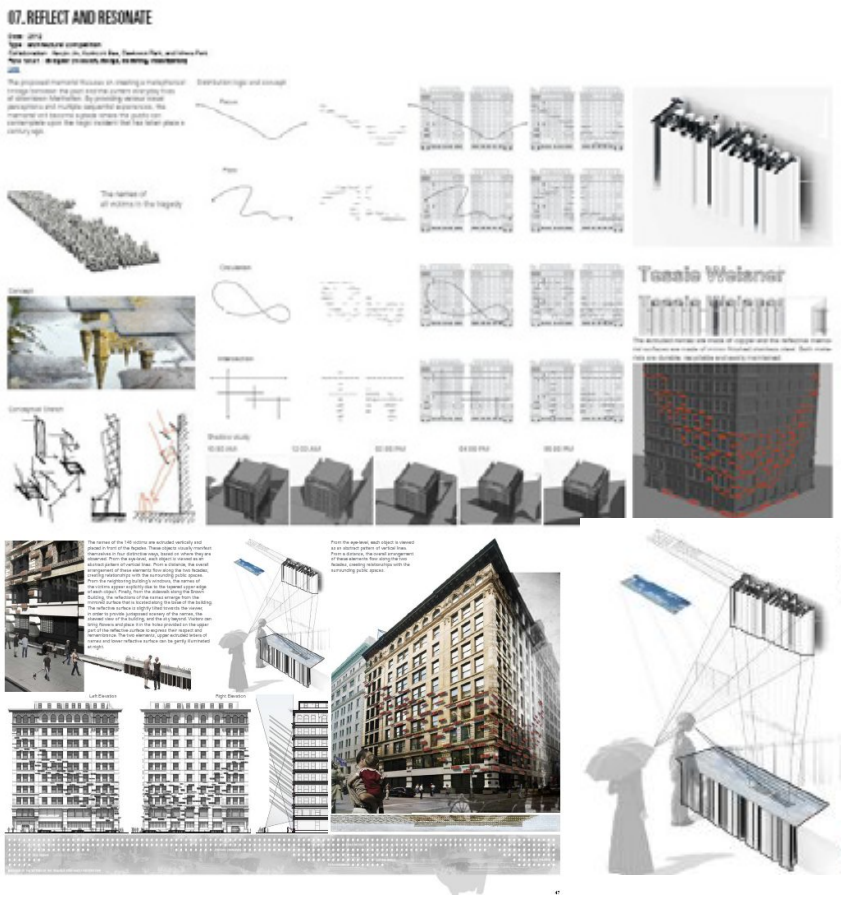
We, human beings are one of the living beings like earth ground, mountain, water, plant, river, tree and etc. that must accept and adapt the changes in the future. The changes accelerated by accelerated global warming and imbalance of ecosystem, man demand can modify our life style, and maybe, even more.

Unexpected epoch will definitely come, and we need to use the available natural resources from the given elements. Rather than using our natural resources for our selfish needs, we need to learn the ways to live with our natural elements.

* PLAN

ARCHITECTURAL DESIGN

collaborative works



ARCHITECTURAL DESIGN

collaborative works

06. HELSINKI GUGGENHEIM MUSEUM

Date : 2014
Type : architectural competition
Collaboration : Taekyung Kim, Patricia Correa Velasquez, Dashawn Park, Seoul Kang, Ale Rosso
Role taken : Research, design, visualization
Link

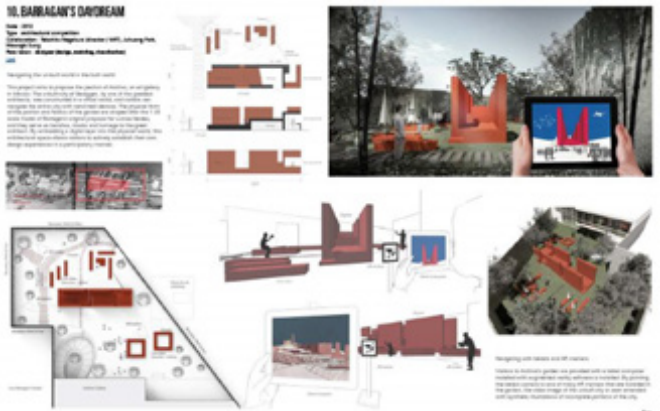
CONCEPT DESCRIPTION, GH-HMD07/0915

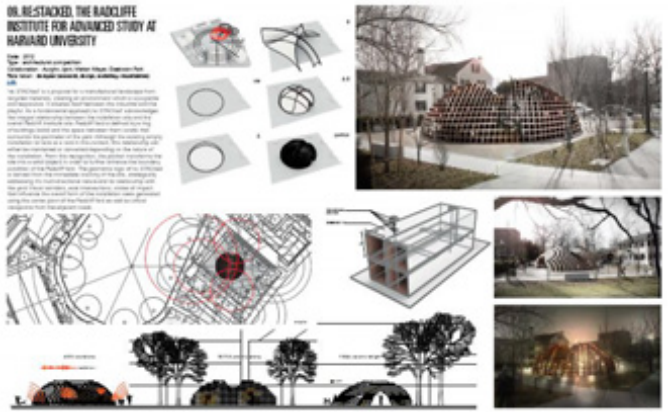
Based on the rich cultural and geographical context of the site, the project strives to answer the following question throughout the design process: "How can the Helsinki Guggenheim Museum physically and symbolically expand its cultural presence beyond the boundary of the building itself towards the city and public realm?" In response to this key question this proposal initiates from a broader urban framework rather than from the museum configuration.

The unique urban context of the site demands a set of calibrated responses to integrate both the waterfront and the cityscape. As part of the Eteläsatama (South Harbor) waterfront development and adjacent to the Olympia Terminal, the site acts as the urban node between a maritime, pedestrian and public transportation axis. Situated between the seaport and park, the proposed museum frames the views toward the major city landmarks and key public spaces. The project is carefully integrated with the existing urban fabric and strengthens the identity of the vibrant cityscape of Helsinki. In order to create a timeless yet active cultural civic space, two core concepts are implemented. To question the privacy and enclosure of a typical museum by proposing a public park located around the exhibition space, and a building composition that withstands and takes advantage of the local climate conditions for an optimal sustainable approach.

The ascending public park is conveyed as a linear path spiraling around the exhibition gallery volumes, expanding and contracting to generate a rich set of interconnected semi-exterior spaces. The path initiates from the key locations of the main museum plaza and Tähtitorninvuori park, converge inside the museum, and spiral up to the rooftop terrace. This vertical green promenade will not only provide a glimpse into the galleries but also grant dramatic views towards the cityscape. As a result, the experience of art, culture, and the legacy of Guggenheim well expand beyond the confined interior space and into the public realm.

The architectural composition stems from a prismatic geometry that integrates thermodynamic strategies. The building's increased surface exposure to the south accomplished by rotating the main volume seeks to optimize solar radiation gain. Material selection was based on local products and strategies to reduce carbon footprint, minimize life cycle costs, and increase building mass inertia to reduce the energy consumption of heating. Multiple material layers function as thermal buffers between the predominantly cold corridor weather and the highly calibrated temperatures of the exhibit spaces. The concrete core of the building containing the exhibition space is the most thermally stable. The park promenade that spirals up between the concrete boxes and the wooden building skin serves as the thermal buffer zone that maintains a temperature between the interior and exterior environment and reduces the rate of heat loss of the otherwise exposed core. The angle and the positioning of the wooden light shelves on the buildings envelope are defined by the median sun angle at each face and the desired lux level. As a daylight control system, these elements redirect sunlight deep into the building interior space. In relation to water systems, the composition of inclined rooftops allows precipitation harvesting by accumulating and diapering rainwater to reuse in the landscape and grey water structures, and the coastal site of the project encourages the application of ocean thermal energy for seawater cooling/heating.






NJSTUDIO 2015
DESIGN PROJECT
DEMO REEL
FIFTH EDITION, SELECTED WORKS SINCE 2004
nj.namju@gmail.com
www.njstudio.co.kr

EXHIBITION

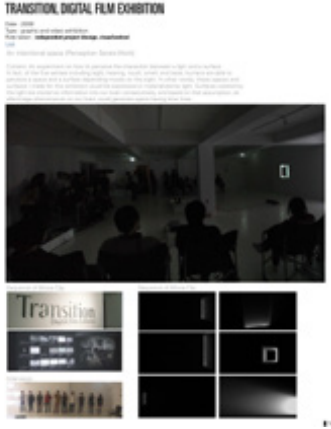
as a design or director, selected researches and projects

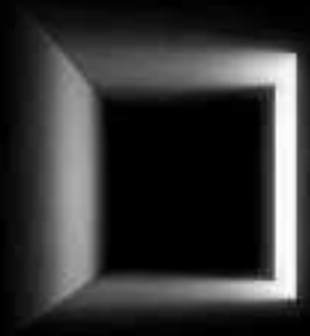
EXHIBITION

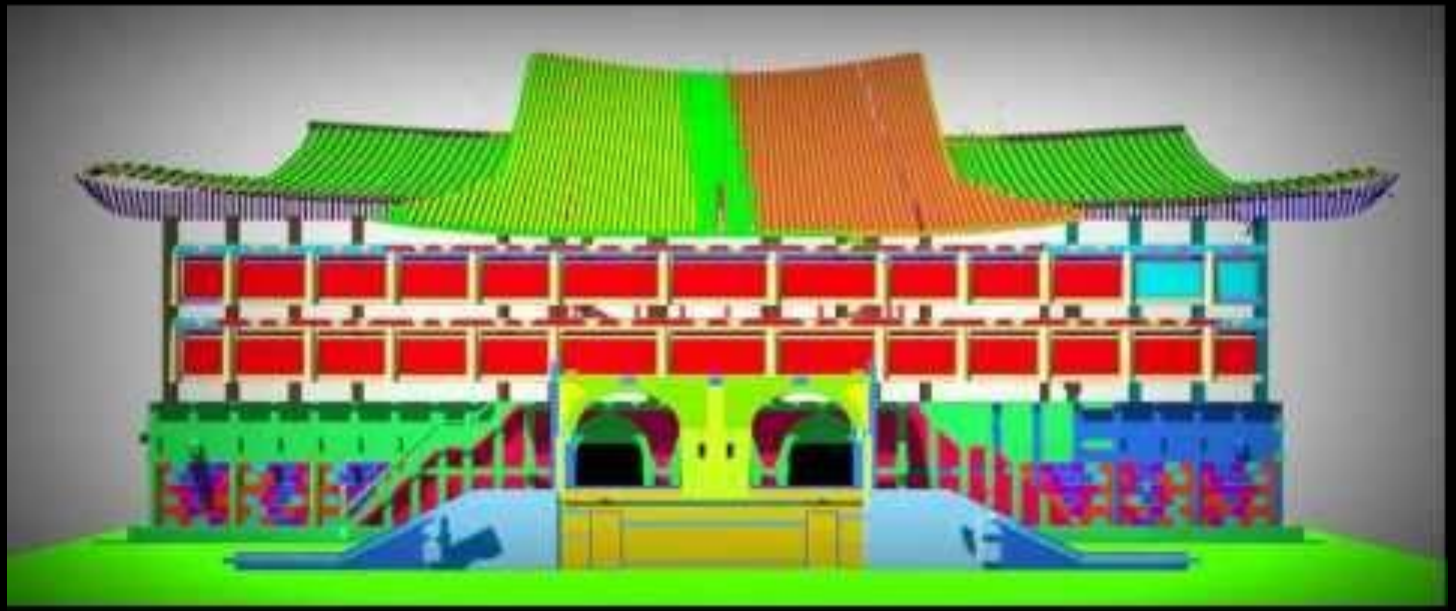
as a director

http://www.njstudio.co.kr/main/project/2010_Korea%20Traditional%20House/2010_Korea%20Traditional%20House.html

http://www.njstudio.co.kr/main/project/2009%20-%20A%20intented%20Spacee/2009_A_intentedSpacee.html







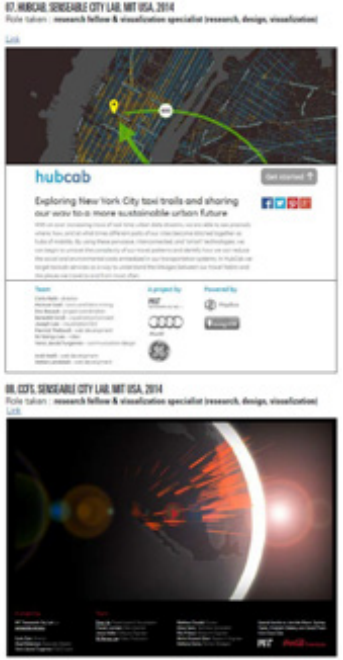
LAB

as a research fellow, selected researches and projects

MIT SENSEable City Lab

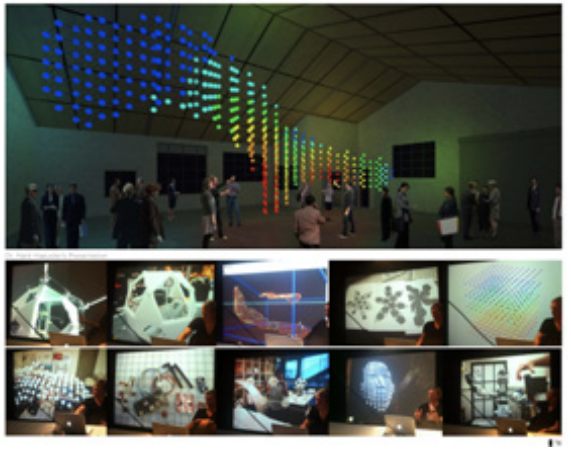
as a 3D and Data Visualization specialist

http://senseable.mit.edu/



URBANAID, UTS

as a researcher



HARVARD GSD

as a researcher

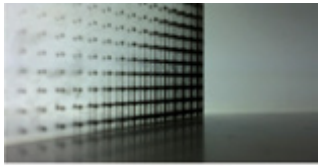
Prof. Martin Bechthold

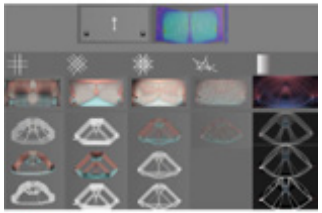
MaP+S Group(Material Processes and Systems)

Prof. Panagiotis Michalatos

Introduction to Computational Design

Digital Structures and Material Distribution





UC Berkeley CED

as a researcher (GSR)

Prof. Kyle Steinfeld

EXTRA

Information

BOOK & CONTRIBUTION & PUBLICATION

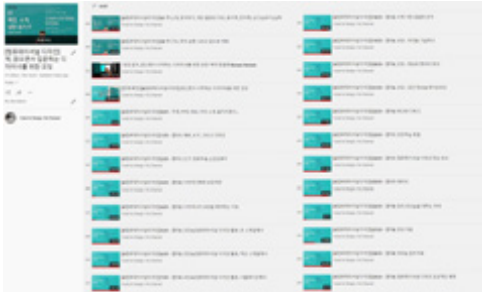
Major Books

Daum Brunch - https://brunch.co.kr/@njnamju/144

Book - https://www.bookk.co.kr/book/view/130128

EBook - https://www.upaper.net/njnamju/1148626

Audio book –



Animation & Simulation for Architectrual presentation

Author

2008
Digital Books
512 Pages

Digital Design Studio Material

Author

2010
Sejong University
52 Pages

Digital Design Studio Material

Author

2010
Sejong University
62 Pages

Digital Design Studio Material

Author

2010
Sejong University
75 Pages

Contributions

link - http://kibim.or.kr/main/

Daum Brunch - https://brunch.co.kr/@njnamju/135

link - https://webzine.kps.or.kr/?p=4&idx=274

Daum Brunch - https://brunch.co.kr/@njnamju/136

Medium(Eng): https://lnkd.in/gEzKJxYu
Brunch(Kor): https://brunch.co.kr/@njnamju/148
Source code: https://lnkd.in/gdf6d8i7

MAJOR ARTICLE CONTRIBUTIONS

'Platform 10: Live Feed' Harvard GSD, 2017

Contributor

Project: Beach, exhibition, 140P

eVolo Limited Edition Book

Contributor

2011
eVolo magazine
New York, NY, USA
One Chapter
562 – 565 page

DAAC II
[Design of Architecture-Aided Computation 2]

Contributor

2005
Koomin University
Simulation Parts
2 Months, Two chapters

3D Artisan

Contributor

2006
3D Artisan
Animation Part
One Chapter
58 – 65 page

Magazine 'Architecture Culture' Seoul, Korea

Korea Traditional House

Contributor

2010
Architecture Culture
One Chapter

Interviews

공을 설계하기 위해, 날아가다 - 1부

공을 설계하기 위해 날아가다

link - https://times.seoultech.ac.kr/reports/?idx=20486&category=34

Daum Brunch - https://brunch.co.kr/@njnamju/140

Publication

http://www.njstudio.co.kr/main/project/2016_MobilityEnergyConsumptionMITMediaLab/index.html

Paper: https://www.springer.com/gp/book/9789813343993
https://link.springer.com/chapter/10.1007/978-981-33-4400-6_11

CLASS & WORKSHOP & MATERIAL

WORKSHOP & LECTURE & TALK

Design Visualization,
JTerm, Harvard Graduate School of Design, MA, USA
Independent Activities Period (IAP), Massachusetts Institute of Technology(MIT), USA

“Design and computation”, Seoul National University of Science and technology, and Hongik University(Master and PhD students), South Korea

3D Visualization and Computation, 4th Semester Arch Core Studio, workshop, Harvard Graduate School of Design, MA, USA

Post-Effect in AfterEffect, Digital Media Workshop, Harvard Graduate School of Design, MA, USA

Architectural Visualization, Digital Media Workshop, Harvard Graduate School of Design, MA, USA

Data and design computation, “Data-driven design methodology”, Seoul National University of Science and technology, South Korea

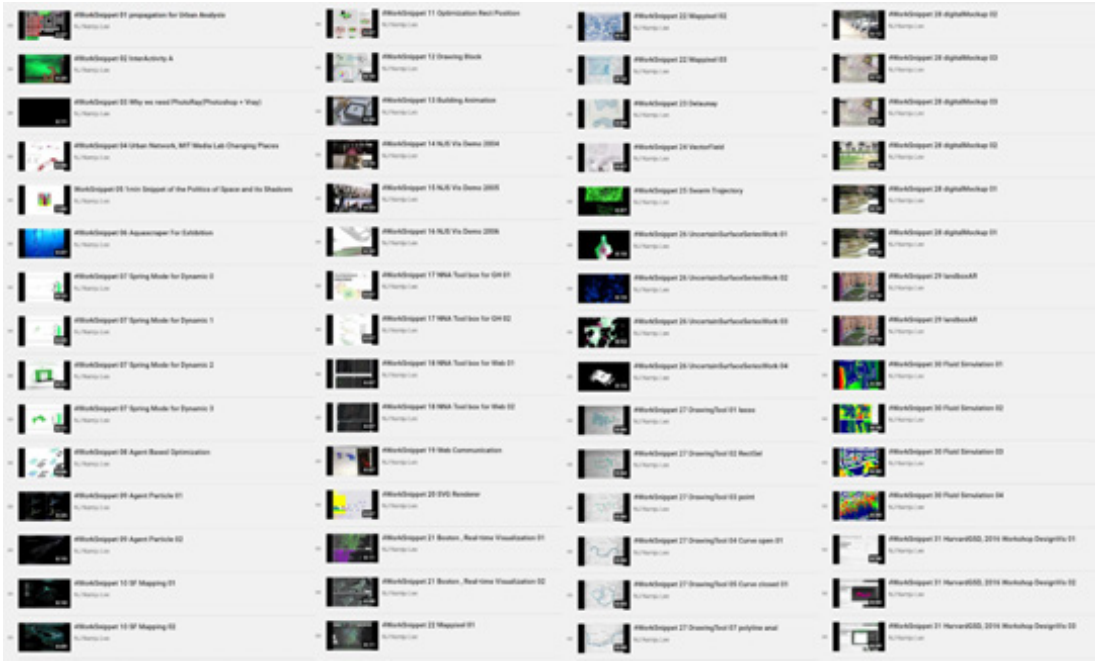
...

WORK SNIPPET

Snippet - Playlist - Instagram

Development Project - Playlist

Design Project - Playlist



WRITING & WORKSHOP

EDUCATION

Medium
https://nj-namju.medium.com/

https://medium.com/me/stories/public

Codepen:
https://codepen.io/NJStudio/collections/

Daum Brunch (Korean)
https://brunch.co.kr/@njnamju

Tistory (Korean)
https://computationaldesign.tistory.com/

Data & Design

https://nj-namju.medium.com/data-design-c21457dc8dc

Computational Design Thinking for Designers

https://nj-namju.medium.com/computational-design-thinking-for-designers-68224bd7ffc

6 Digital Mapping using ArcGIS JSAPI

https://nj-namju.medium.com/6-digital-mapping-using-arcgis-jsapi-626e108d624b

Introduction to Computational Design: Data, Geometry, and Visualization Using Digital Media

https://nj-namju.medium.com/introduction-to-computational-design-data-geometry-and-visualization-using-digital-media-14161fdfd22f

Geometry as Data Structure and Visualization

https://nj-namju.medium.com/geometry-as-data-structure-and-visualization-48bcfdea3851

Discrete Urban Space and Connectivity

https://nj-namju.medium.com/discrete-urban-space-and-connectivity-492b3dbd0a81

APPENDIX

EDUCATION

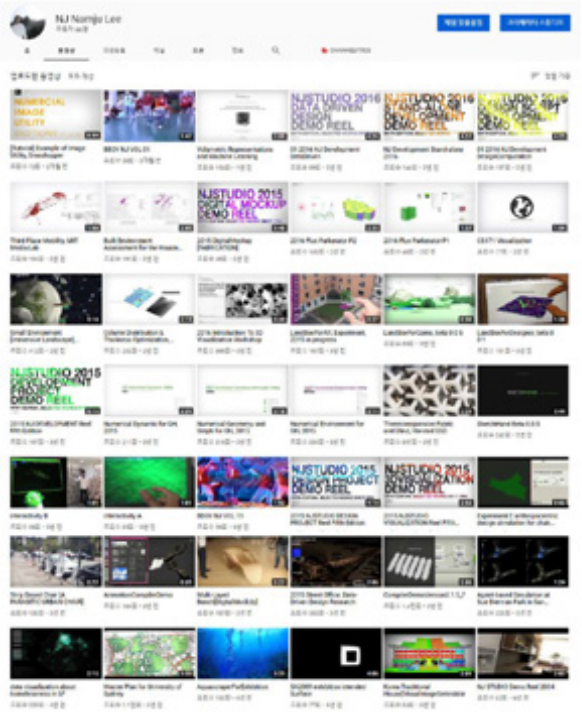
http://www.njstudio.co.kr

Youtube English
https://www.youtube.com/channel/UCP4q3a4ogJN1-SbJclJR3Ww

Youtube Korean
https://www.youtube.com/channel/UC3Z42uoe9C7Et39h5cLK1dw

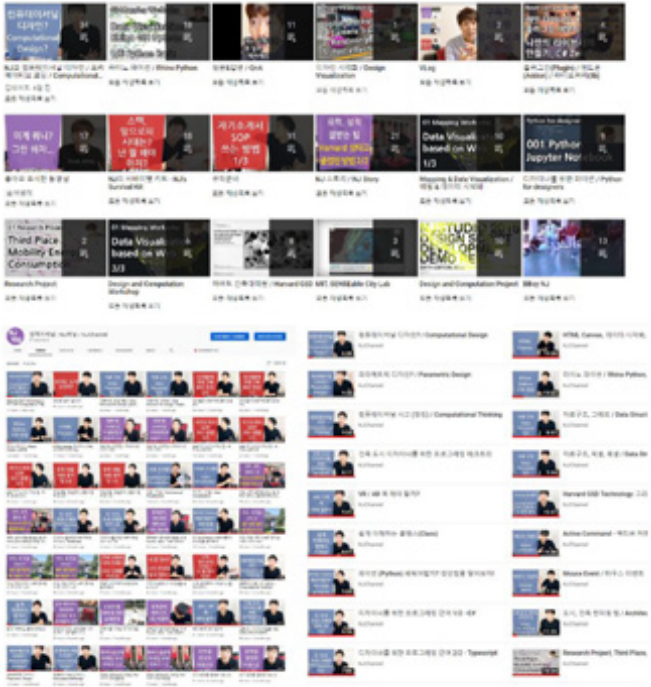
NJSTUDIO project and portfolio channel

Date : 2011 ~ present
Type : independent project
Role taken : **director**
link



Education Channel

Date : 2011 ~ present
Type : independent project
Role taken : **director**
link



NJCHANNEL PROJECT

Education

NJCHANNEL PROJECT

EDUCATION

처음 코딩을 접하는 디자이너에게 - link

NJ Channel Project, 콘텐츠 & 학습 자료 인덱스 - link

Daum Brunch - link

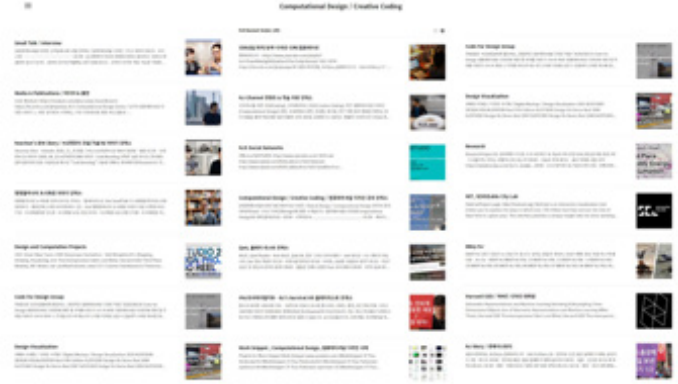
NJ's Computational Design Series

초급: 읽으면서 입문하는, 모두의 디자인 코딩

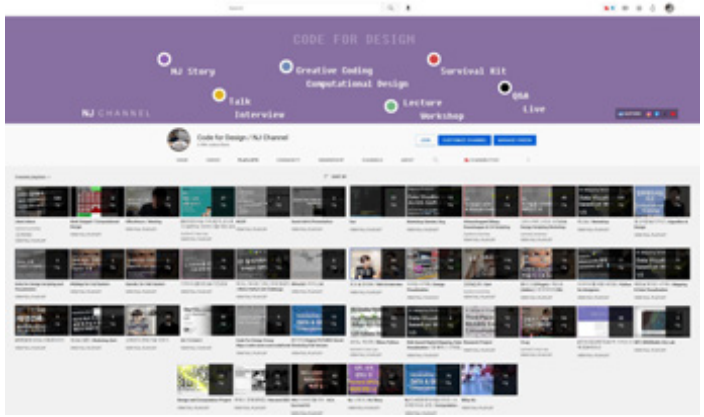
중급: 따라 하며 입문하는, 모두의 디자인 코딩

고급: 데이터 & 디자인 컴퓨테이셔널 디자인

Tistory - link



Youtube - link



Computational Design Lecture Series:

Tistory Search - https://computationaldesign.tistory.com/3?category=937138

NJ's Computational Design Lecture series - http://bit.ly/2SqBRq0

37. 우리는 무엇을 배우면서 사는가 feat. 언어와 컴퓨테이셔널 사고, 그리고 사고의 도약 - link
36. 코딩공부와 수학 그리고 공부할것 Feat. 4차 산업혁명 그리고 디자인 - link
35. 함수호출 By Reference, By Value - link
34. 소프트웨어 어떻게 공부할까? 변할것 변하지 않을것, Feat VR AR AI - link
33. 디자인 엔지니어링 / Design Engineering - link
32. 궁극의 테크트리! 컴퓨테이셔널디자이너로 살아 남기!! - link
31. SA 7.0 Lecture 5. 데이터 구조로서의 지오메트리 그리고 시각화 - link
30. SA 7.0 Lecture 4. 이산 도시공간과 연결성 (그래프)/Discrete Urban Space and Connectivity (Graph) - link
29. SA 7.0 Lecture 3. 캐드, 데이트의 흐름 / CAD data pipeline - link
28. SA 7.0 Lecture 2. 디자이너를 위한 컴퓨테이셔널 팅킹 / Computational Thinking For Designer - link
27. SA 7.0 Lecture 1. 데이터 & 디자인 / Data & Design - link
26. 곱하기 어떻게 볼까? 추상을 통한 상상? 컴퓨테이션/크리에이티브 코딩 - link
25. 힙합문화로 보는 새로운 패러다임 그리고 컴퓨테이셔널 디자인의 운명 - link
24. 정규화 & 보간 & 이상치 / normalization & interpolation & outlier - link
23. 프로젝션 & 리맵 / Projection & Remap - link
서바이벌키트 11. 디자이너에게 코딩이란 / 나에게 코딩이란 / 코딩을 하는 이유 - link
22. 코딩공부 어떻게? (잔소리포함) / 제발 타이핑해보자!! - link
21. 내가 생각하는 컴퓨테이셔널 디자인 / 워크숍 강좌를 만드는 배경 / 디자인 데이터 / Design & Data - link
20. 컴퓨테이셔널디자인을 바라보는 시각과 오해 - link
19. 건축 3D 랜더링에 관한, 어느 건축가의 질문들.../ 건축 시각화 - link
18. 매핑 (건축, 도시) / Mapping for Urban and Architecture - link
17. 도시, 건축 렌더링 팁 / Architectural & Urban Rendering tips / 건축 시각화 - link
16. Mouse Event / 마우스 이벤트, CAD System - 캐드시스템 - link
15. Active Command - 엑티브 커멘드, CAD System - 캐드시스템 - link
14. Harvard GSD Technology 그리고 MIT Computation 지원준비, 프로그램 비교 , 및 컴퓨테이션 공부 준비 방법 - link
13. 자료구조, 픽셀, 복셀 / Data Structure for design , pixel and voxel data structure 2/2 - link
13. 자료구조, 그래프 / Data Structure for design , Graph 1/2 - link
12. 라이노 파이썬 / Rhino Python, 공부법 - link
11. HTML Canvas, 데이터 시각화, 크리에이티브 코딩 - link
10. 건축 시각화 / Architectural Visualization - link
09. 데이터 시각화 / Data Visualization - link
08. 디자이너를 위한 프로그래밍 언어 2/2 - Typescript(Javascript) - link
08. 디자이너를 위한 프로그래밍 언어 1/2 - C# - link
07. 파이썬 (Python) 배워야 할까? 장단점을 알아보자! - link
06. 쉽게 이해하는 클래스(Class) - link
05. VR / AR 꼭 해야 할까? 2019 버젼 - link
04. 건축 도시 디자이너를 위한 프로그래밍 테크트리 - link
03. 컴퓨테이셔널 사고 (띵킹) / Computational Thinking - link
02. 파라메트릭 디자인? / Parametric Design - link
01. 컴퓨테이셔널 디자인? / Computational Design - link

QnA

Tistory Search - https://computationaldesign.tistory.com/2

Video Playlist - https://www.youtube.com/playlist?list=PLweNVwGqDKEYzuT2sezSsQCP-me-1Tb7e

3.1 디자인 그리고 컴퓨테이션

QnA 01, 어느 고등학생의 질문 / 건축 파라메트릭 디자인 예제
QnA 02, 건축가의 일반적인 질문 2차 (건축컴퓨팅실무)
QnA 04, 건축컴퓨팅을 공부하고 싶으신 건축가형님과의 대화
QnA 05, 코딩과 건축컴퓨팅에 관심이 많으신 건축가형님과의 대화
QnA 06, 건축가의 일반적인 질문 (건축컴퓨팅실무응용)
QnA 11, 어떤 젊은 건축 디자이너의 질문
QnA 15, 복셀(Voxel)과 컴퓨테이셔널 디자인 그리고 건축 디자인
QnA 16, 파라메트릭(Parametric Design)과 미적분
QnA 17, 내가 생각하는 그라스하퍼(Grasshopper)의 단점과 개인적인 생각
QnA 19, 파라메트릭 디자인 배우려면 어디서부터 어떻게 시작해야하나요?
QnA 21, 5G기술과 건축산업(설계 협업 및 시각화 VR), 정말 유용 하나?
QnA 22, 내가 생각하는 그라스하퍼(Rhino Grasshopper)의 장점
QnA 23, 디자인 소프트웨어 어떻게 공부할까? / 그 많은 것 언제 다 해요?
QnA 24, 디자인 소프트웨어 어떻게 공부할까? 두 번째, NURBS , Mesh(Polygon)
QnA 25, 디자인 소프트웨어 어떻게 공부할까? - 알고리즘 공부 방법 / 그리고 브런치!
QnA 31. 대학생의 질문, 대학교, 대학원, 파라메트릭 디자인 스튜디오 어떻게 접근 할까?
QnA 36, 파이썬 그리고 그래픽 툴(맥스, 마야, 라이노...)
QnA 37, 프로덕트디자인 위한 코딩 그리고 3D 소프트웨어 공부 질문, 그리고 개인적인 생각
QnA 43, SA 7.0 Unit 2 관련 질문 / 스스로 공부하는 방법

3.2 코딩

QnA 33, 코딩 시작 시에, 필요한 수학? 과연 뭐가 필요할까?
QnA 38, 너는 어떤 프로그래밍 언어를 쓰니?
QnA 39, 데크니컬 아티스트 공부 방법? 책? 학원?
QnA 44, 네이버 카페, 그래서호퍼 챌린지 질문 / 코딩을 공부하는 자세

3.3 인공지능, 데이터 그리고 시각화

QnA 07, 데이터 시각화 도구(tools) 그리고 개인적인 생각
QnA 12, 데이터시각화가 꿈인 카이스트 학생의 질문
QnA 14, 디자인(건축), 빅 데이터, 그리고 인공지능(머신러닝)에 대한 질문
QnA 42 시각디자인 전공, 학생의 질문, 데이터 시각화 어떻게 공부할 것인가?
QnA 46 지도위에 데이터 시각화, 어떤 제품으로 개발을 하면 좋을까?
QnA 47, AI, ML(머신러닝), GL(그래픽), CV(비전), 컴퓨테이셔널 전공을 시작하는 학생 질문

3.4 취직 / 진학 / 유학

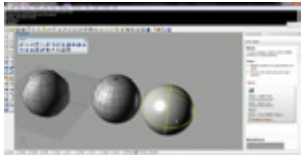
QnA 08, 컴퓨테이션 직업군 및 준비 자세
QnA 09, 직장상사가 내 미래에 도움이 안될 때, 회사를 떠나야하나? 존윅에서 배울점
QnA 13, 미국, 호주, 유학준비와 그에 따른 생각들...
QnA 20, SOP 작성 유의사항 (취직 커버레터 / 자기소개서)
QnA 26, 대학원 진학, 유학에 대한 질문, 그리고 개인적인 생각, feat MIT Media Lab
QnA 28, 건축과 학생의 질문, 건축, 디자인 유학 준비 그리고 주관적 생각
QnA 29, 건축 & 디자인, 포트폴리오 그리고 취직, 유학
QnA 30. 건축 유학 & 학비 그리고 개인적인 생각
QnA 32, 건축/컴퓨테이션/뉴미디어/디자인 직업군, 어떻게 준비하면 좋을까요?
QnA 34, 유학 고민 많을 때, 실내건축학과 전공자의 M.Arch 유학에 대한 고민
QnA 35, 컴퓨테이셔널 디자인 유학을 준비하는 학생의 질문
QnA 40, 건축 컴퓨테이셔널 유학 그리고 파이썬 코딩 공부
QnA 41, 데이터를 활용한 도시 설계? 공부 전략? 그리고 (MIT SENSEable City Lab 연구소
QnA 45, 컴퓨테이셔널 직장 구하기? 마음가짐?
QnA 48, 유학? 얻는 이익이 있나?
QnA 49, 스페셜리스트가 되기 위한 어느 학부생의 전공고민

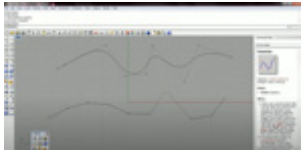
Rhino3d, Concept, Basic Workshop

Tistory index - https://computationaldesign.tistory.com/35
Video, Playlist - https://www.youtube.com/playlist?list=PLweNVwGoDKEYZVe4KRhecvCbNQivMK2uH

- 라이노 문법이해

1. 라이노(Rhino3d) 기초 워크숍 / 소개 영상
2. 라이노 개념 잡기
3. 시작하기 그리고 Curve / 커브
4 Curve Tool /커브 수정하기
5. Surface / 서피스 만들기
6. Surface tool / 서피스 수정하기
7. Curve from Object Tool 오브젝트에서의 커브
8. 그라스하퍼(GH) 시작하기 / 개념 이해

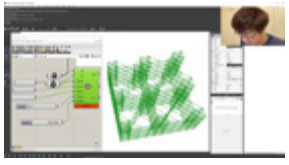




Rhino3d Python Workshop

Tistory - https://computationaldesign.tistory.com/21
Video, Playlist: https://www.youtube.com/playlist?list=PLweNVwGoDKEYVSobROuzG4zHLpnfd4sUU

1. 라이노 파이썬 워크숍 / Rhino Python, Rhinoscriptsyntax workshop
2. Point Grid Basic (rhinoscriptsyntax) -
3. Help File & Tutorials / 헬프 파일 & 온라인 튜토리얼
4. Function 1D / 라이노 파이썬 04 1차원 함수 2/2
5. Point Grid 2D / 2D포인트 그리드
6. Point Grid Pattern / 2D, 3D 포인트 그리드 패턴
7. Point Cloud - Random / 포인트 클라우드 - 랜덤
8. Point Cloud - Random Normal Distribution/ 포인트 클라우드- 정규분포
9. Point Cloud - Linear Regression / 포인트 클라우드- 선형 회기
10. Point, Line, Polyline / 포인트, 라인, 폴리라인
11. Line, Intersection, Length / 라인, 라인교차, 라인의 길이



Python For Designers

Tistory Search: https://computationaldesign.tistory.com/20
Video Playlist - https://www.youtube.com/playlist?list=PLweNVwGoDKEYw_lL0Roe04kPhsUT9sSQd

Python For Designers 미니콘다(Miniconda) 설치(2020)
디자이너를 위한 파이썬 가상환경 설치법 – link
01 Jupyter notebook / 디자이너를 위한 파이썬 01 주피터 노트북 – link
02 Python Basic / 디자이너를 위한 파이썬 02 파이썬 기초 1/2 – link
03 Python Basic / 디자이너를 위한 파이썬 03 파이썬 기초 2/2 – link
04 Class/ 디자이너를 위한 파이썬 04 파이썬 클래스 – link
05 Graph / 디자이너를 위한 파이썬 05 파이썬 그래프 – link
06 Graph Visualization / 디자이너를 위한 파이썬 06 파이썬 그래프 시각화 – link
07 Graph to JSON/ 디자이너를 위한 파이썬 07 파이썬 그래프 JSON – link
08 Graph to CSV / 디자이너를 위한 파이썬 08 파이썬 그래프 CSV – link
09 Graph HTML Canvas Vis / 09 파이썬 그래프 HTML Canvas 시각화 – link

Rhino C# Scripting

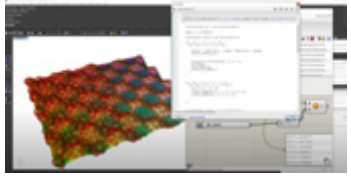
라이노(Rhino) 그라스하퍼(Grasshopper)와 c#코딩(coding) 동시에 공부하자

Tistory Search/
Video Playlist - http://bit.ly/2u4kH7d
Episode A - https://computationaldesign.tistory.com/14?category=937139
Episode B - https://computationaldesign.tistory.com/15?category=937139

01. 워크숍을 시작하면서
02. 라이노의 문법 그리고 그라스하퍼
03. 그라스하퍼 공부자료 & 레퍼런스
04. Point & Line 그리고 Data
05. Point 그리고 Data
06. Point List 그리고 Curve
07. Point Grid & Surface
08. Point, Curve 그리고 Brep(Closed Extrusion)
09. Point, Curve 그리고 Brep(Loft) - Optimization & Design Space
10. Point 그리고 Solid Brep - Primitive, Box, Cylinder, Cone
11. Point 그리고 Solid Brep - Primitive, Sphere, Indexing, Connectivity
12. Point, 그리고, Tri Mesh - Vertices, Faces, Colors, Barycentric coordinate
13. Point 그리고 Mesh Sphere
14. 에피소드 A 종료 - 요약 그리고 이런저런 생각

01. Episode B, 워크숍을 시작하면서, 그리고 몇 가지 생각
02. Surface, Paneling A - Normal Vector, Points, Lines
03. Surface, Paneling - Curvature, Project, Split
04. Tree Data 구조, 데이터 추출과 Tree data 만들기

구독자 질문 Q01 - *( )*는 뭐지? 또 new 는 뭐지?
구독자 질문 Q02 - C# 컴포넌트, 저 아이콘은 뭐지??
구독자 질문 Q03 - Brep Boolean(Union, Difference, Intersection...) 문제?
구독자 질문 Q04 If else 중괄호의 의미 그리고 double의 의미?
....



Rhino3d, Python, Mapping Workshop

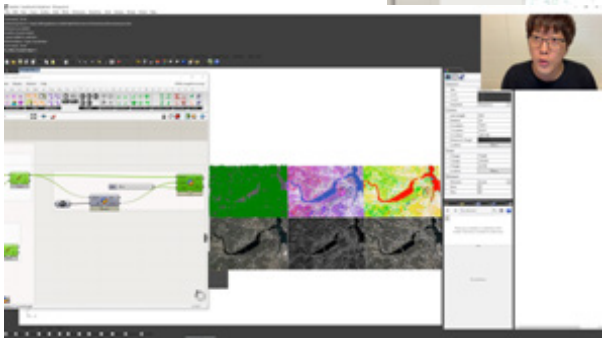
Tistory - https://computationaldesign.tistory.com/18?category=937139
Video Playlist - https://www.youtube.com/playlist?list=PLweNVwGgDKEYoRlA355KsGDS5x9nkzalF

Rhino Python Mapping 01 Basic Syntax / 라이노 파이썬 매핑 01 파이썬 기초

NYIT에서 진행했던 매핑 워크숍 입니다. 궁금하신 점은 질문 주세요. :)
Rhino Grasshopper Python, NJS Numerical Tool kit

01. **Basic Syntax** / 라이노 파이썬 매핑 01 파이썬 기초 – link
02. **Data Manipulation CSV** / 라이로 파이썬 매핑 02 CSV 데이터 – link
03. **Data Manipulation JSON, GeoJSON** / 라이노 파이썬 매핑 03 JSON, GeoJSON 데이터 – link
04. **Data Manipulation OSM, Shapefile** / 라이노 파이썬 매핑 04 OSM, Shapefile데이터 – link
05. **Data Manipulation DEM** / 라이노 파이썬 매핑 05 DEM데이터 – link
06. **Image Processing** / 라이노 파이썬 매핑 06 이미지 프로세싱 – link

[#컴퓨테이셔널디자인 18] 매핑 (건축, 도시) / Mapping for Urban and Architecture
건축 도시 디자인 프로세스에서 매핑을 많이 활용하죠. 매핑에 대한 생각을 공유합니다.
01:20 – 트레이싱
02:05 – 매핑
02:26 – 매핑 가능한 데이터
06:02 – 데이터의 타입 (top-down, bottom-up data)
09:11 – 매핑의 프로세스
12:35 – 매핑의 해석

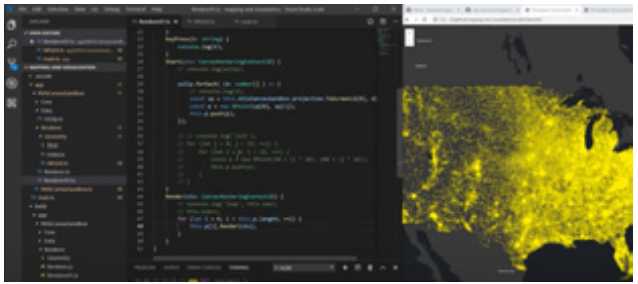


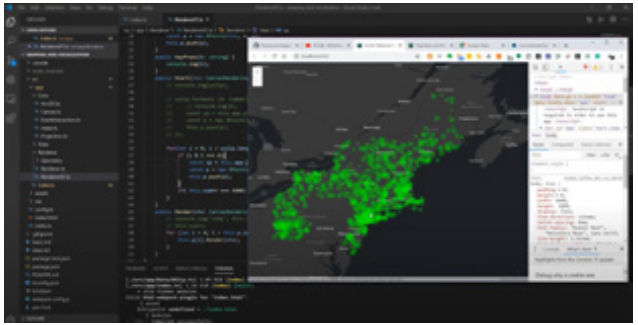
Digital Mapping Workshop, JSAPI

Tistory - https://computationaldesign.tistory.com/17?category=937139

Github :
https://github.com/NamjuLee/mapping-and-visualization
https://github.com/Esri/jsapi-resources

ArcGIS JS API reference: https://developers.arcgis.com/javascript/latest/api-reference





Stand-alone & GH Addon

Tistory - https://computationaldesign.tistory.com/36
Playlist: link

래빗(Revit) 다이나모(Dynamo) c# 디자인 스크립팅, 어떻게 플러그인을 만들까? - link
나만의 라이브러리 만들기 Zero Touch

어떻게 라이노의 기능을 유니티(Unity)에서 활용할 수 있을까? - link

라이노 플러그인 어떻게 만들까? - link
템플릿 파일 https://marketplace.visualstudio.com/items?itemName=McNeel.RhinoCommontemplatesforv6

라이노 그라스하퍼 애드온 어떻게 만들까? - link
템플릿 링크 https://marketplace.visualstudio.com/items?itemName=McNeel.GrasshopperAssemblyforv6

라이노 그라스하퍼 (Rhino Grasshopper) 플러그인을 소개해 드립니다.
특별히 어떤 데이터들이 디자인할 때 사용할 수 있을까요

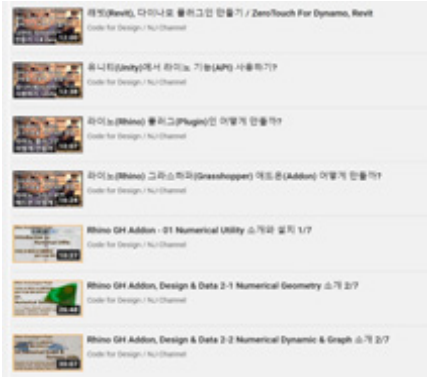
Rhino GH Addon - 01 Numerical Utility 소개와 설치 1/7 - link
Link https://www.food4rhino.com/app/numerical-geometry-utility

Rhino GH Addon, Design & Data 2-1 Numerical Geometry 2/7 - link
Link https://www.food4rhino.com/app/numerical-geometry-utility

Rhino GH Addon, Design & Data 2-2 Numerical Dynamic & Graph 2/7 - link
Link https://www.food4rhino.com/app/numerical-geometry-utility

Rhino GH Addon, Design & Data 3. Numerical Environment Utility 3/7 - link
Link: https://www.food4rhino.com/app/numerical-landscape-utility

Rhino GH Addon, Design & Data 4. Numerical Urban Utility 4/7 - link
Link: https://www.food4rhino.com/app/numerical-urban-utility



Numeric Network Analysis

SA 7.0 Unit 2

Daum Brunch : https://brunch.co.kr/@njnamju/91

Video Playlist - https://www.youtube.com/playlist?list=PLwsNVwGpDKEbGYBBPoKxHdMohJW245o38

Medium : https://nj-namju.medium.com/numeric-network-analysis-post-covid-19-urbanism-6-ft-rule-de267886b028

유튜브 한국어 전체강좌(수업, 워크숍, 미팅, 프레젠테이션) – 플레이 리스트
유튜브 영어 전체강좌(수업, 워크숍, 미팅, 프레젠테이션) – 플레이 리스트

원문 링크 Numeric Network Analysis: Post-COVID-19 Urbanism, 6 ft rule – link
선수 공부 자료 – link

이남주 / NJ Namju Lee / nj.namju@gmail.com
우정현 박사 / Junghyun Woo / axuplatform@gmail.com

SA 7.0 Unit 2 한국어 강좌

0. Introduction Unit 2 – Medium link
유닛 2수업 소개 – 전체 버전 (Eng)

1. Lecture, Data and Design – Medium link
데이터 그리고 디자인 – 전체버전 – 편집버전

2. Lecture, Computational Design Thinking for Designers – Medium link
디자이너를 위한 컴퓨테이셔널 사고 – 전체버전 – 편집버전

3. Lecture, Pipeline for Interaction, Data, and Geometry Visualization – Medium link
CAD 소프트웨어의 구조 그리고 데이터의 흐름과 시각화 – 전체버전 – 편집버전

4. Lecture, Urban Design Quality and Walkability – Medium link
도시디자인과 보행환경 – 전체버전

5. Lecture, Spatial Network Analysis in Transportation Geography – Medium link
교통계획 분야에서의 공간 네트워크 분석의 활용 – 전체버전

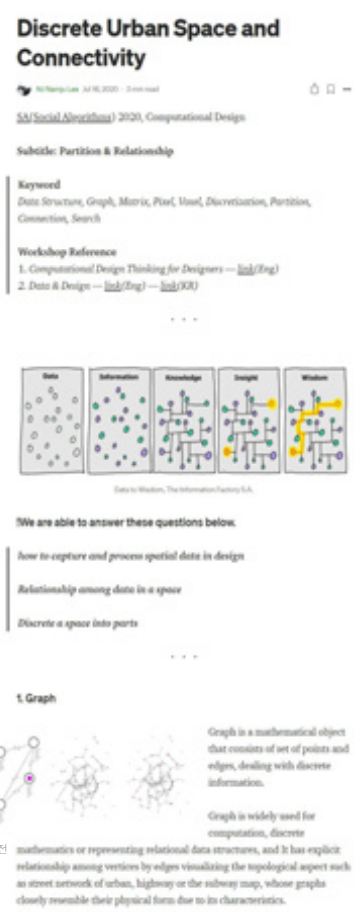
6. Lecture, Examples of Numeric Network Analysis using the NNA Toolbox – Medium link
NNA toolbox를 활용한 도시 공간정보 분석 예시 – 전체버전

7. Lecture, Discrete Urban Space and Connectivity – Medium link
이산 도시 공간과 연결성 – 전체버전 – 편집버전

8. Lecture, Geometry as Data Structure and Visualization – Medium link
데이터 구조로서의 지오메트리 그리고 시각화 – 전체버전 – 편집버전

9. Workshop, Pedestrian Volume Studies– Medium link / Post-COVID-19 Urbanism –Medium link
보행자 이동성 정보 수집 방법 / 포스트 COVID-19을 대비한 도시 환경 계획 및 아이디어 – 전체버전

10. Workshop, Data Visualization, Numerical Image Utility
데이터 시각화 / 이미지 툴 – 전체버전



Discrete Urban Space and Connectivity

SA/Social Algorithms) 2020, Computational Design

Subtitle: Partition & Relationship

Keyword
Data Structure, Graph, Matrix, Pixel, Voxel, Discretization, Partition, Connection, Search

Workshop Reference
1. *Computational Design Thinking for Designers* — link/(Eng)
2. *Data & Design* — link/(Eng) — link/(KR)

Data to Wisdom, The Information Factory S.A.

We are able to answer these questions below.

how to capture and process spatial data in design

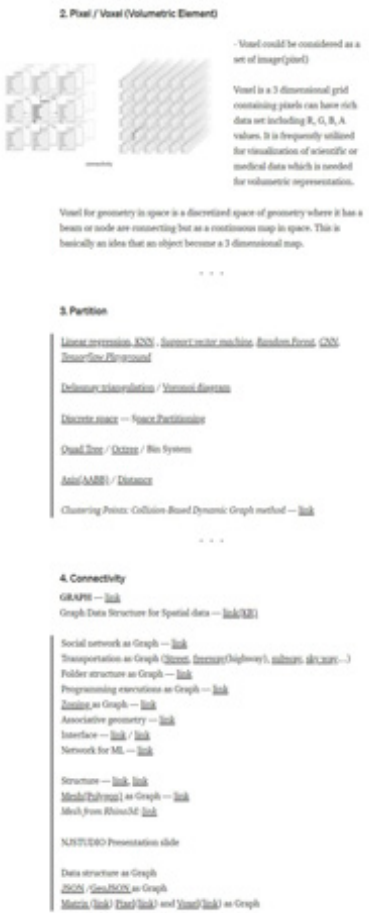
Relationship among data in a space

Discrete a space into parts

1. Graph

Graph is a mathematical object that consists of set of points and edges, dealing with discrete information.

Graph is widely used for computation, discrete mathematics or representing relational data structures, and It has explicit relationship among vertices by edges visualizing the topological aspect such as street network of urban, highway or the subway map, whose graphs closely resemble their physical form due to its characteristics.



2. Pixel / Voxel (Volumetric Element)

- Voxel could be considered as a set of image(pixel)

Voxel is a 3 dimensional grid containing pixels can have rich data set including R, G, B, A values. It is frequently utilized for visualization of scientific or medical data which is needed for volumetric representation.

Voxel for geometry in space is a discretized space of geometry where it has a beam or node are connecting but as a continuous map in space. This is basically an idea that an object become a 3 dimensional map.

3. Partition

Linear regression, KNN , Support vector machine, Random Forest, CNN, TensorFlow Playground

Delaunay triangulation / Voronoi diagram

Discrete space — Space Partitioning

Quad Tree / Octree / Bin System

Axis(AABB) / Distance

Clustering Points: Collision Based Dynamic Graph method — link

4. Connectivity

GRAPH — link
Graph Data Structure for Spatial data — link(KR)

Social network as Graph — link
Transportation as Graph (Street, freeway(highway), railway, sky way…)
Folder structure as Graph — link
Programming executions as Graph — link
Zoning as Graph — link
Associative geometry — link
Interface — link / link
Network for ML — link

Structure — link, link
Mesh/Polygon) as Graph — link
Mesh from Rhino3d: link

NJSTUDIO Presentation slide

Data structure as Graph
JSON /GeoJSON as Graph
Matrix (link) Pixel(link) and Voxel(link) as Graph

AI & Data for Design

Link: https://computationaldesign.tistory.com/29

AI and Data for design / 데이터 그리고 디자인 / 디자이너를 위한 인공지능

J-Term 2017, Harvard GSD :

Title: Introduction to Data Science for Building Simulation

1 Python Basic
2 Data process & Visualization
3 Train modes & Predict missing values

Data Process

Numpy, Pandas, CV

Workshop

Temperature Conversion
Multiplication Table 1. regression model 2. cnn model
Smart Drawing 1. Data process 2. Model A 3. Model B
Smart Commander
Semantic Segmentation
Third Place Prediction
Map Classifier
Super Resolution
Smart Map Tracer
Texture Prediction
Color Prediction
3D Volumetric Representation and Machine Learning in Design

Python Basic

Typescript Basic, Tensorflow JS

Project

Project, **Smart Map Tracer, ESRI Storymaps Hackathon** - video
Project, **Smart Drawing** - Writing / Video / Demo
Project, **Remixing & Resampling Three Dimensional Objects, Use of Volumetric Representation and Machine Learning in Design** - link / video
Project, **Politics of Space and Its Shadows** - link / video
Project, **Built Environment Assessment** - link / video
Analytical hosing prediction model with spatial observation in City of Boston
link 4-Smart Drawing
link Linear-regression , Polynomial Regression , Regression Model , XOR
Codepen - Tensorflow playground stater, Typescript

Introduction to Computational Design

Digital FUTURES World Workshop 2020

Tistory Search: https://computationaldesign.tistory.com/16?category=937139

Video Playlist - https://www.youtube.com/playlist?list=PLweNVwGqDKEZZyedJi632ULMJ6allmz2s

DigitalFUTURES Word link https://www.digitalfutures.world/workshops-asia-pacific-blog/nilee-kr

Medium link https://medium.com/@nj.namju/introduction-to-computational-design-data-geometry-and-visualization-using-digital-media-14161fdfd22f

1 Python Basic

2. Data Visualization, RhinoGH Python

3. Typescript & HTML Canvas Visualization

4. Computational Geometry & Geometry Class & Visualization

5. Pipeline for Interaction, Data, and Geometry Visualization

6. Digital Mapping using ArcGIS JSAPI

Introduction to Design Visualization

Harvard GSD, MIT SA+P

Link - https://namjulee.github.io/3d-visualization-harvard-gsd.github.com/
Video - https://youtu.be/3VeLfmt2N-0
Git - https://github.com/NamjuLee/Harvard-GSD-Workshop

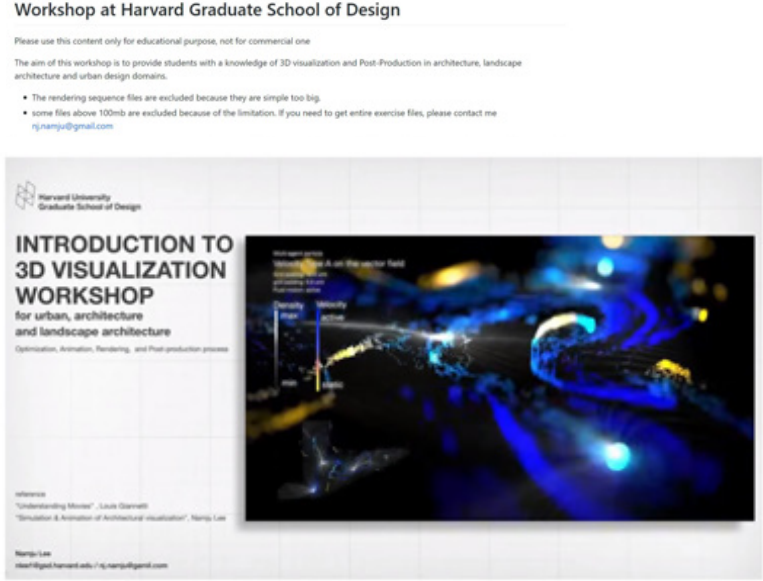
Download:

Content(pdf)

Example files

BasicAnimation.pdf

BasicParticleSystem.pdf



KEYWORD

Design Engineering

Numerical Design
Parametric Design
Data-Driven Design
Agent-based Design
Algorithmic Design
Design Space

Urban mapping
GIS
Data structure in design
Data Visualization
Compatibility

OpenGL
WebGL
OpenCV
Standalone
Addons
Plugins

Data processing
Data Mining
Data Visualization
Machine Learning
Data Science
Deep Learning
Computer Vision
Image processing

Geometry Computation
Differential geometry
Dynamics
3D Visualization
Animation
Fabrication
Robotics
Physical computing
Optimization
Automation

Immersive experience & design
Metaverse VR / AR / MR
Interactivity
Creative Coding
Design Scripting

DOMAIN & TECHNOLOGY

Software

- **Built Environment**
  - Architectural design
  - Spatial design
  - Urban design
  - Interaction
- **development**
  - Geometry
  - Interaction
  - Data driven design system
- **3D Visualization**
  - Modeling
  - Lighting
  - Rendering
  - Animation
- **Data Visualization**
  - Data pre processing
  - Train Network
  - AI, ML, DL
  - Visualization

- **Code**

  JAVA, C# for OpenGL, Unity3D, GLSL(Shader), and Rhino3D, Python for AI(TF, SKLearn...) Maya and Rhino3D, Rhino3D Script, 3ds maxscript, HTML, CSS, Typescript, Javascript(TFJS, THREE.js(WebGL), NodeJS)
- **2D, 3D**

  Illustrator, Photoshop, AutoCAD, 3ds Max, Maya, SketchUp, Rhino3D, Grasshopper, Particle systems, Simulation engines, and various plug-Ins
  Renderer : Vray, Mental ray, Brazil render, Final render, Maxwell render, Hyper Short, Key Short
- **VR, Motion**

  Unity, After Effect, Premiere, Combustion, Boujou, Quest3D, Turn Tool,

- **Computation** in Design
  - GIS / Urban scale
  - Environmental issue
  - Urban design / Smart City
  - Architectural design
  - Product scale
  - Interaction (human Computer Interaction)
  - Digital Fabrication / Robotics
  - Media
  - AI, ML, DL
  - VR /AR / MR / Metaverse

...

Thank you :)

NJ Namju Lee

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Resume - http://www.njstudio.co.kr/pdf/Resume_Namju_Lee.pdf

NJ Design Studio - http://www.njstudio.co.kr

NJS Lab - http://www.njslab.com/NJSLabCore/

NJS Data Lab - http://www.njslab.com/NJSLabDataEnv

NJS Sandbox env - http://www.njslab.com/NJSLabEnv/

github - https://github.com/NamjuLee

Linkedin - https://www.linkedin.com/in/nj-namju-lee-926b3252/

Medium(Eng) - https://nj-namju.medium.com/

Daum Brunch(Kr) - https://brunch.co.kr/@njnamju#articles