AI and Semantic Computing with "5-Dimensional World Map System"

Towards Environmental Artificial Intelligence For Global Knowledge-Sharing, Integration, Analysis and Visualization

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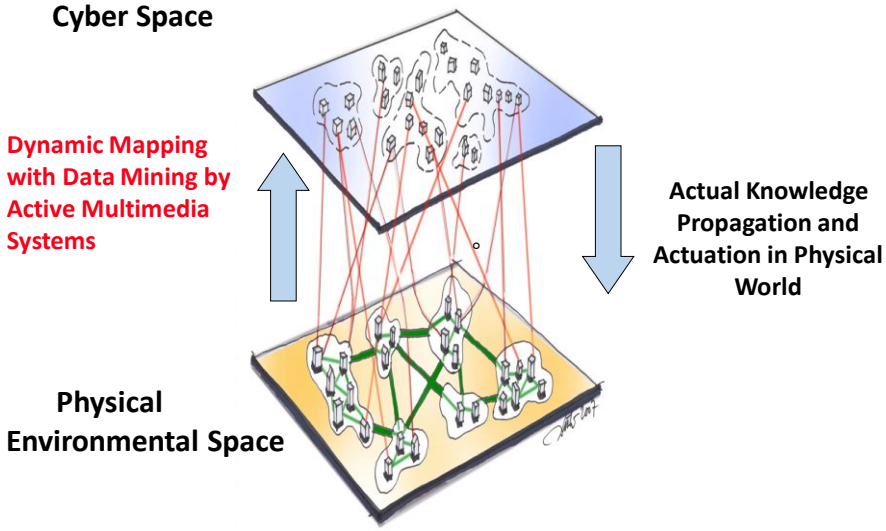
"Cyber & Physical Space System" for Global Issues



3

SPA-based Meta-level System for Global Knowledge Sharing, Integration and Visualization

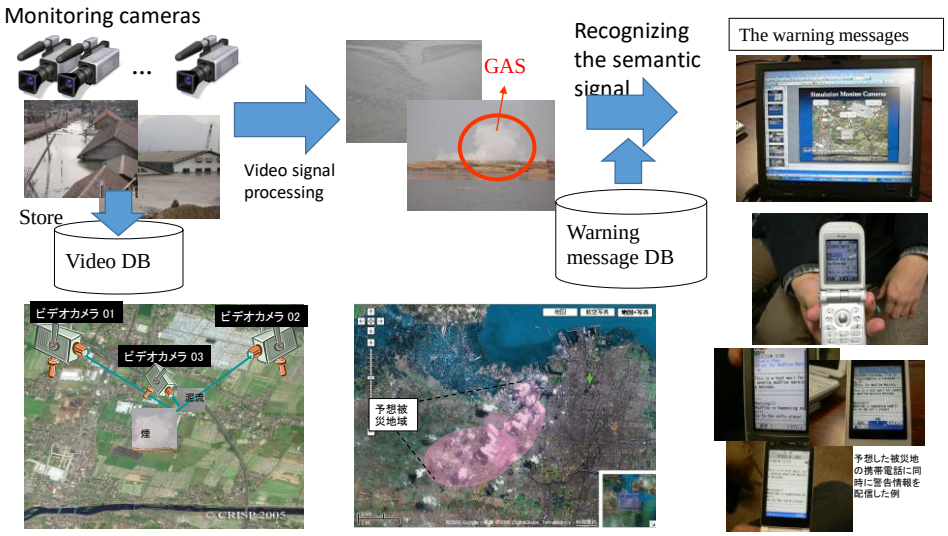
Essential System Implementations in Technology and Governance:
SPA Processes:

- *Sensing*
- *Processing*
- *Analysis and Actuation*

(1) A SPA-based Deep and Global Knowledge Sharing System Makes International Integration of Local Data resources into Global Knowledge

(2) Knowledge sharing for SDGs makes the start-up of the evolutional process for realizing sustainable development in societies and nature

SPA: Environmental Monitoring and Actuation to the Real World



Data mining, active database and Image processing systems are applied to environmental pictures to detect phenomena and disaster in nature. Real-time data analysis based on color-data classification in images is examined for environmental data related to phenomenon irregularity.

"Semantic Computing"

MMM(The Mathematical Model of Meaning)

Graduate School of Media and Governance

"Kansei (感性)" and Cross-cultural Computation Systems

- *In the design of multimedia **Cross-cultural Computation** Systems, one of the most important issues is:*

How to deal with "semantics" and "Kansei" of human beings.

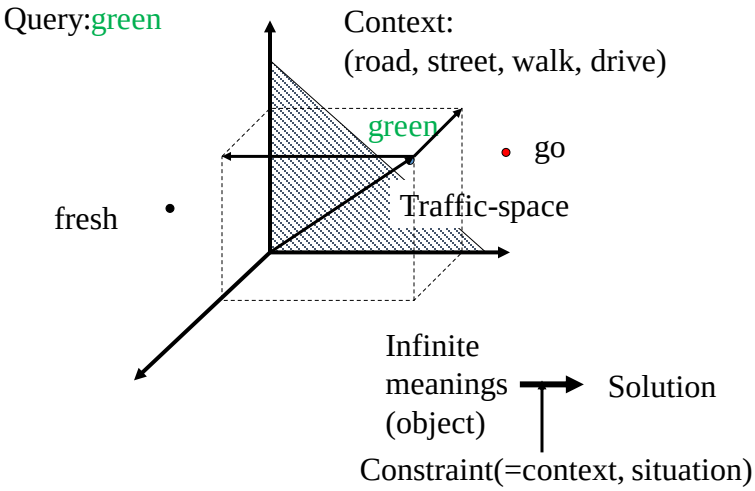
Cross-cultural Computation System for *"Kansei"* information

- *The concept of "Kansei'' includes several meanings on sensitive recognition, such as:*
- *(1)``impression,''*
- *(2)``emotion,''*
- *(3)``human senses,''*
- *(4)``feelings,''*
- *(5)``sensitivity,''*
- *(6)``psychological reaction'' and*
- *(7)``physiological reaction.''*

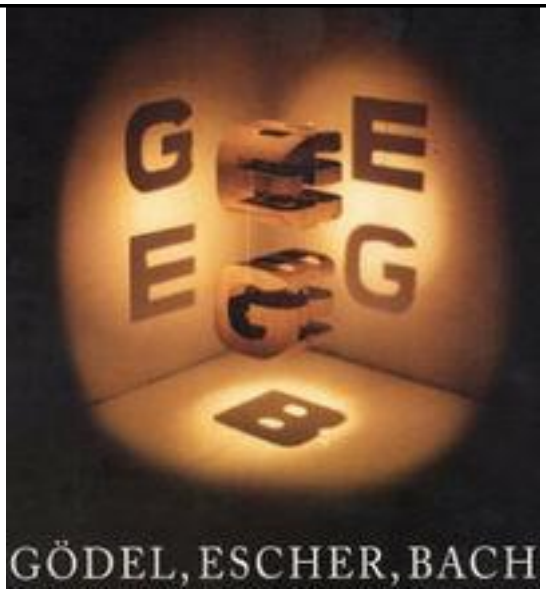
MMM(The Mathematical Model of Meaning)
as a Semantic Computing Model on CONTEXT :

(1) "Semantic Space Creation",
(2) "Dimensional Control"
(3) "Metric Setting"

Basic Idea of the Mathematical Model of Meaning(MMM) : (1993—)
(2000, 710, 619, 425, 417 dimensions in our current implementation):
"Semantic Space Creation",

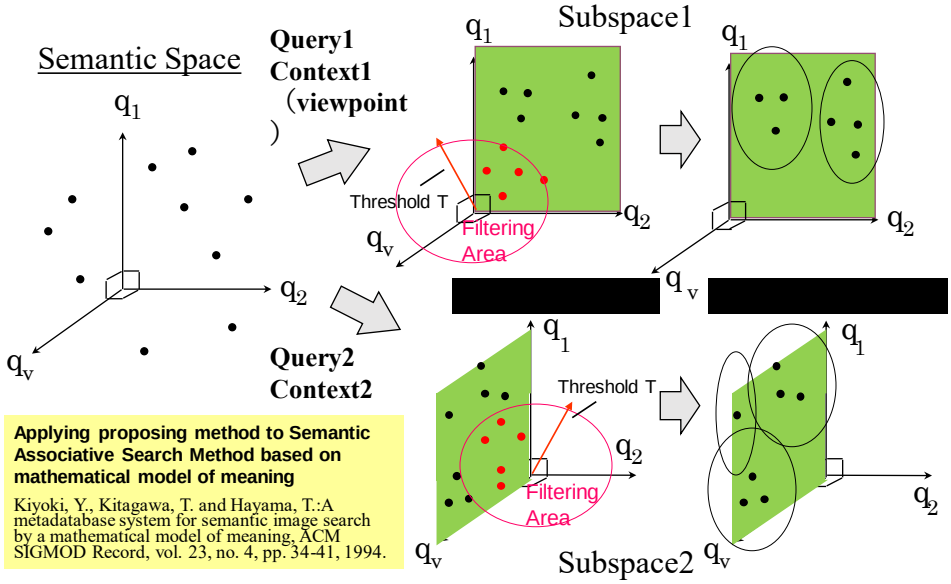


Mathematical Model of Meaning (MMM):
Kiyoki, Y. Kitagawa, T. and Hayama, T. : A metadatabase system for semantic image search by a mathematical model of meaning, ACM SIGMOD Record, vol. 23, no. 4, pp.34-41, 1994.



Gödel, Escher, Bach: An Eternal Golden Braid, 1979 book
by Douglas R Hofstadter

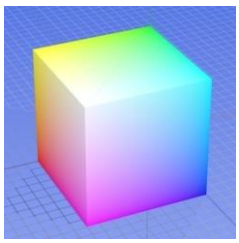
Overview of MMM (Mathematical Model of Meaning)



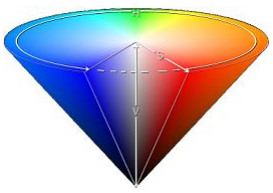
Applying proposing method to Semantic Associative Search Method based on mathematical model of meaning

Kiyoki, Y., Kitagawa, T. and Hayama, T.:A metadatabase system for semantic image search by a mathematical model of meaning, ACM SIGMOD Record, vol. 23, no. 4, pp. 34-41, 1994.

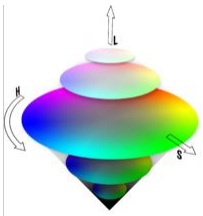
SEVERAL COLOR SYSTEMS FOR IMAGE RETRIEVAL



RGB

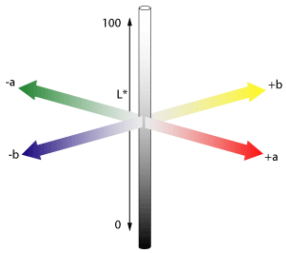


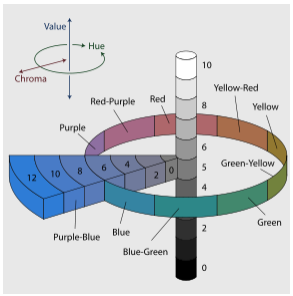
HSV



HSL

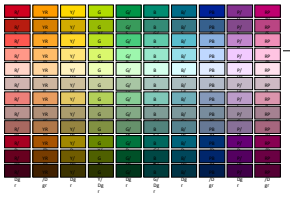
CIELAB





Munsell

Semantics of Colour on contemporary Colour Psychology (*1)



Colour	Images of colour
V	Vivid, Active...
S	Substantial, Practical ...
B	Bright, Sweet ...
P	Pretty, Sweet and dreamy ...
Vp	Light, Soft ...
Lgr	Gentle、Sober、静的、...
L	調和、Sober, Modest ...
Gr	Simple, Quiet and Elegant...
Dl	Light pale、Classic, Sober、...
Dp	Tasteful, Substantial...
Dk	Dignified, Steady...
Dgr	Heavy and Deep、Austere、...

Colour–Impression Matrix of present age

	R/V	R/S	…	YR/V	YR/S	…	N1.5	N2
warm	0.8	0.8	…	0.6	0.6	…	0	0
bright	0.8	0.8	…	0.6	0.6	…	0	0
:								
golden	0	0	…	0.8	0.8	…	0	0
sunshiny	0	0	…	0.8	0.8	…	0	0
:								
dark	0	0	…	0	0	…	0.8	1
gloomy	0	0	…	0	0	…	0.8	1

［*１］ based on 小林重順:『カラーイメージスケール改定版』,講談社,2001(130 colors183 impression words)

Semantics of Colour on Japanese Edo era (*2)

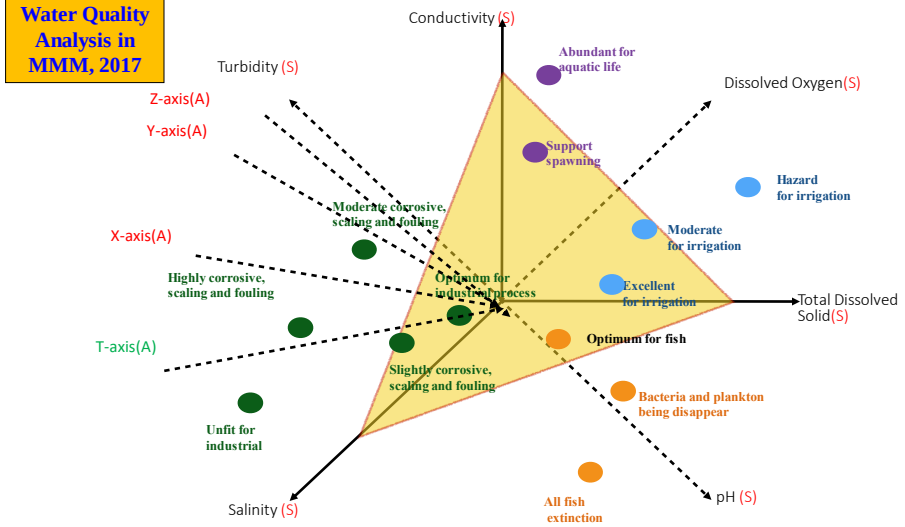
- : energy, powerful, celebration, life, …
- : harvested, prosperous, royal, glory, …
- : eternity, life, nature, tree, garden…
- : sea, maternal, people, earth, ancestry…
- : noble, elegant, sexy, dignified, …
- : pure, innocence, virginity…
- : night, death, mourning, cheerless…

Colour–Impression Matrix of Japanese Edo era

	R/V	R/S	…	YR/V	YR/S	…	N1.5	N2
energy	1	0.8	…	0.4	0.4	…	0	0
powerful	1	0.8	…	0.4	0.4	…	0	0
:								
harvested	0	0	…	0.4	0.4	…	0	0
prosperous	0	0	…	0.4	0.4	…	0	0
:								
night	0	0	…	0	0	…	1	1
mourning	0	0	…	0	0	…	1	1

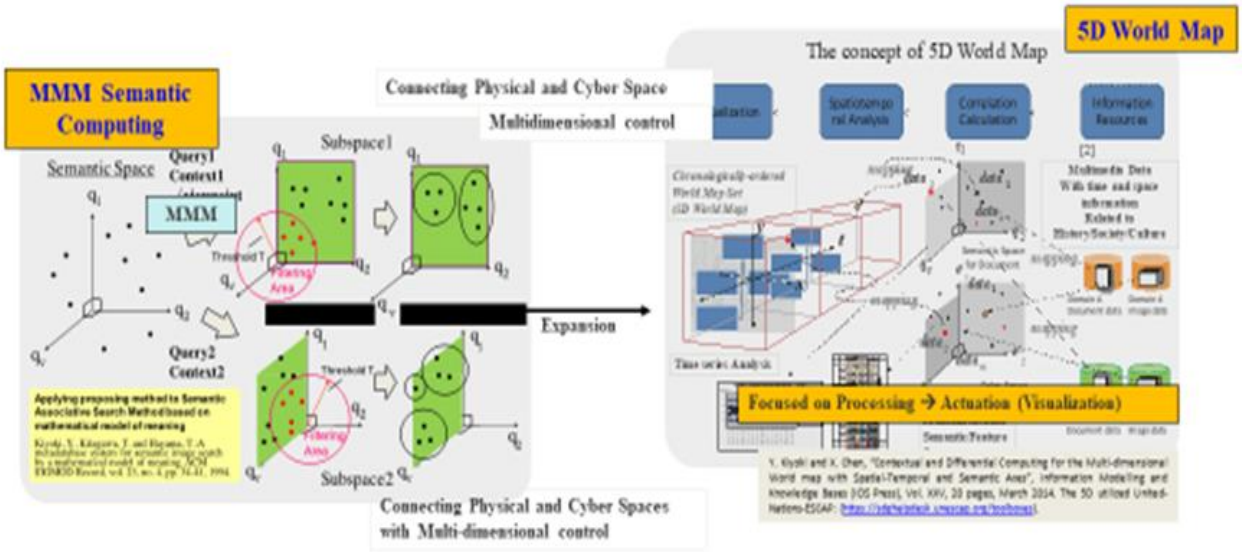
［*2］ Ikko Tanaka & Kazuko Koike, Japan Color, Chronicle Books: San Francisco, 1982.（江戸徳川時代の元禄文化（歌舞伎・浄瑠璃・浮世絵）を対象とした色のセマンティクスについて、英語で記述した文献）を基に作成。

Chalisa's PhD Study for Water Quality Analysis in MMM, 2017



The semantic space for water-quality

The system structure of MMM Semantic-Computing and 5D World Map System



5D-WMS is currently used in United Nations: ESCAP: SDGs 9, 11 & 14 as Global Knowledge Base System for Disasters and Ocean Environment

https://www.5dwm.mydns.jp

https://sdghelpdesk.unescap.org/toolboxes
http://sdghelpdesk.unescap.org/toolboxes?field_sdgs_target_id=All&title=&page=4

5D World Map System
towards ***"Global Environmental Knowledge Creation, Memorization and Integration"***

5-dimensional World-Map System:

4-Dimensions for Physical Space: spatial(3D)-time(1D) dimensions

1-Dimension for Semantic Space: the degenerated dimension of semantics and color combination (multi-dimensional semantic space (ex: 2000 or 130 dimensions)

慶應義塾
Keio University

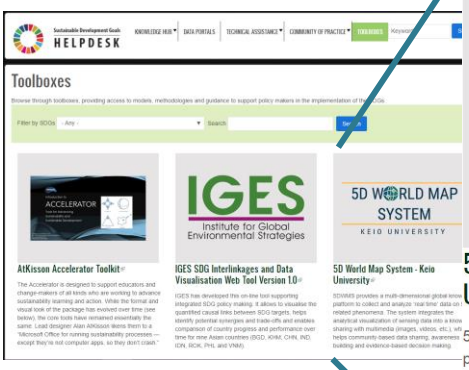
UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

5D-World Map System:
Global & Collaborative Knowledge Sharing & Visualization as Environmental Artificial Intelligence

Yasushi Kiyoki, Shiori Sasaki, Asako Uraki, Chalisa Veesommai
Jinmika Wijitdechakul, Irene Rachmawan, Yasuhiro Hayashi

Global Environmental System Leaders (GESL) Program
Graduate School of Media and Governance, Keio University, SFC

The first meeting of the Drafting Committee on Asia-Pacific Plan of Action on Space Applications for Sustainable Development 2018-2030, June 1st, 2018, UNCC, Bangkok, Thailand



5D-WMS is currently used in United Nations: ESCAP: SDGs 9, 11 & 14 as
Global Knowledge Base System for Disasters and Ocean Environment

5D WORLD MAP SYSTEM
KEIO UNIVERSITY

5D World Map System - Keio University

5DWMS provides a multi-dimensional global knowledge platform to collect and analyze 'real time' data on SDGs-related phenomena. The system integrates the analytical visualization of sensing data into a knowledge sharing with multimedia (images, videos, etc.), which helps community-based data sharing, awareness building and evidence-based decision making.

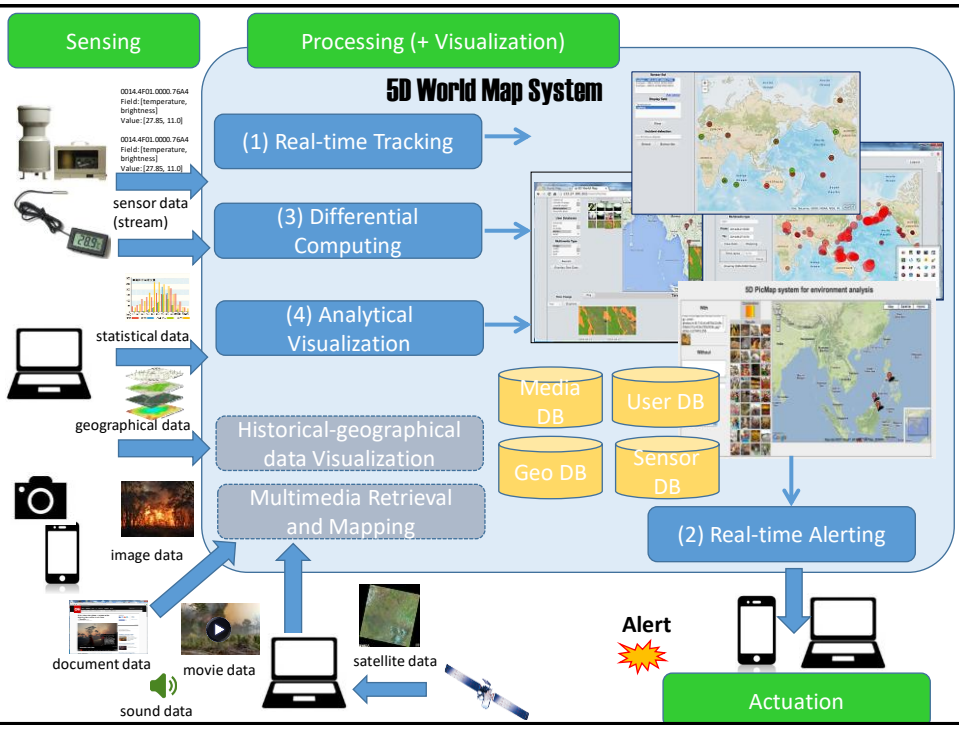
United Nations ESCAP（UN ESCAP) & KEIO SFC Joint Project

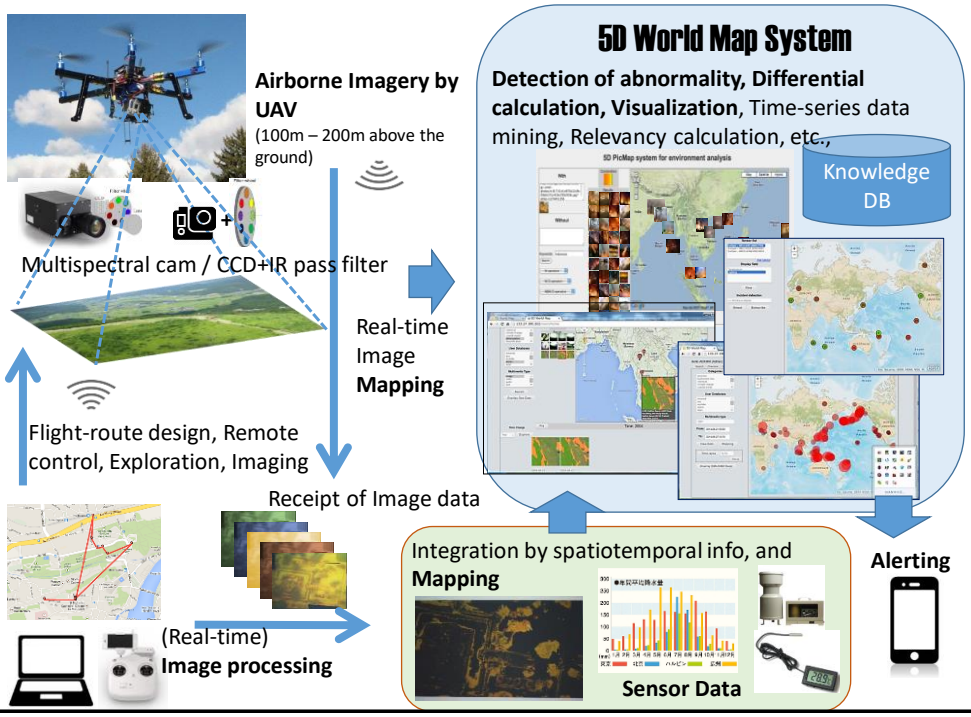
“5D World Map as an Environmental Artificial Intelligence”

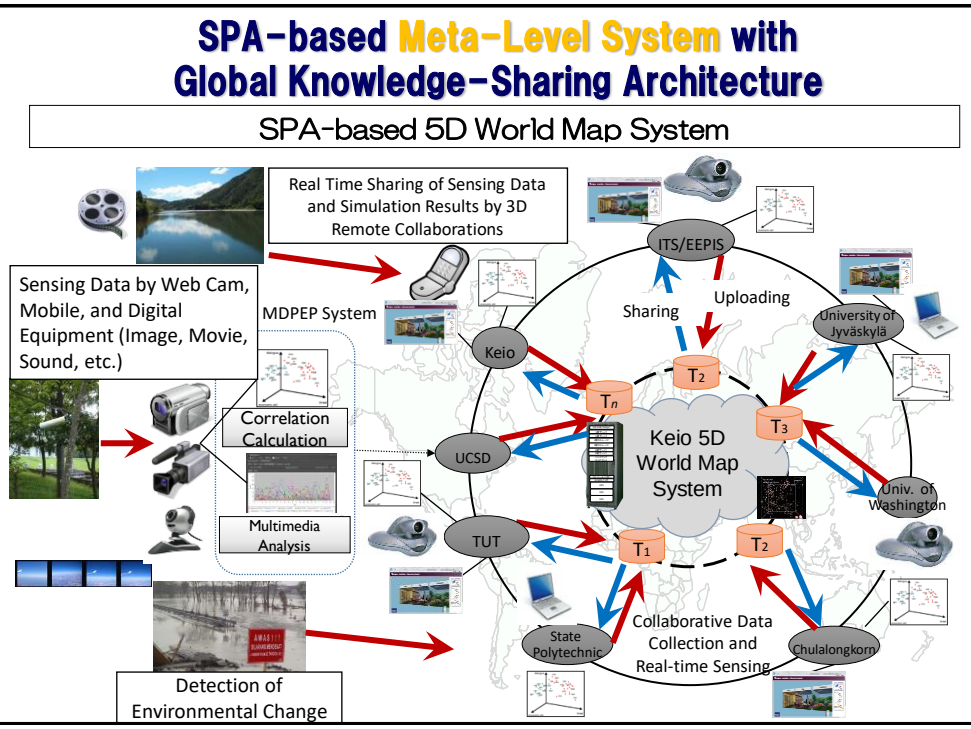
5D-WMS is currently used in United Nations: ＥＳＣＡＰ：ＳＤＧ１４ as ＧＬＯＢＡＬ　ＤＢ　ＳＹＳＴＥＭ for Ocean Environment

https://sdghelpdesk.unescap.org/toolboxes

http://sdghelpdesk.unescap.org/toolboxes?field_sdgs_target_id=All&title=&page=6

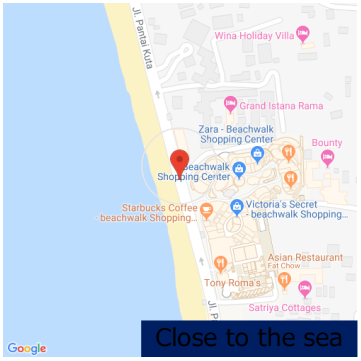



Airborne Imagery by UAV
(100m – 200m above the ground)
Multispectral cam / CCD+IR pass filter
Real-time Image Mapping
Flight-route design, Remote control, Exploration, Imaging
Receipt of Image data
(Real-time) Image processing
5D World Map System
Detection of abnormality, Differential calculation, Visualization, Time-series data mining, Relevancy calculation, etc.,
Knowledge DB
Integration by spatiotemporal info, and Mapping
Sensor Data
Alerting


SPA-based Meta-Level System with Global Knowledge-Sharing Architecture
SPA-based 5D World Map System
Real Time Sharing of Sensing Data and Simulation Results by 3D Remote Collaborations
Sensing Data by Web Cam, Mobile, and Digital Equipment (Image, Movie, Sound, etc.)
MDPEP System
Correlation Calculation
Multimedia Analysis
Detection of Environmental Change
ITS/EEPIS
Sharing
Uploading
University of Jyväskylä
Keio
UCSD
TUT
State Polytechnic
Chulalongkorn
Univ. of Washington
Keio 5D World Map System
Collaborative Data Collection and Real-time Sensing
Graduate School of Media and Governance

Function 3: Coast-area Location-Checking for Selected Images 23

Determine whether the photographing spot is the coastal area or not
by the distance from the photographing spot to the ocean
in the mapped map image

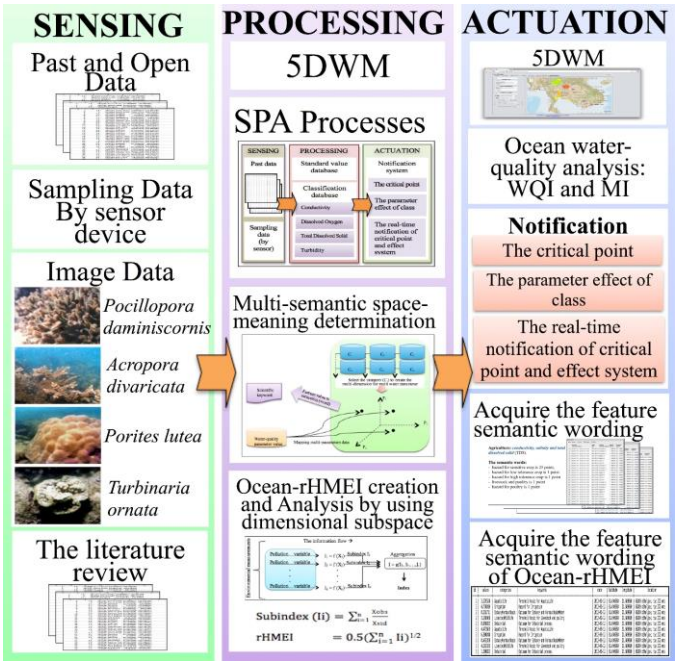


- Include the color of the sea in a circle of radius *r* centered on the photographing spot:
  Close to the sea
- Not include it:
  Far from the sea

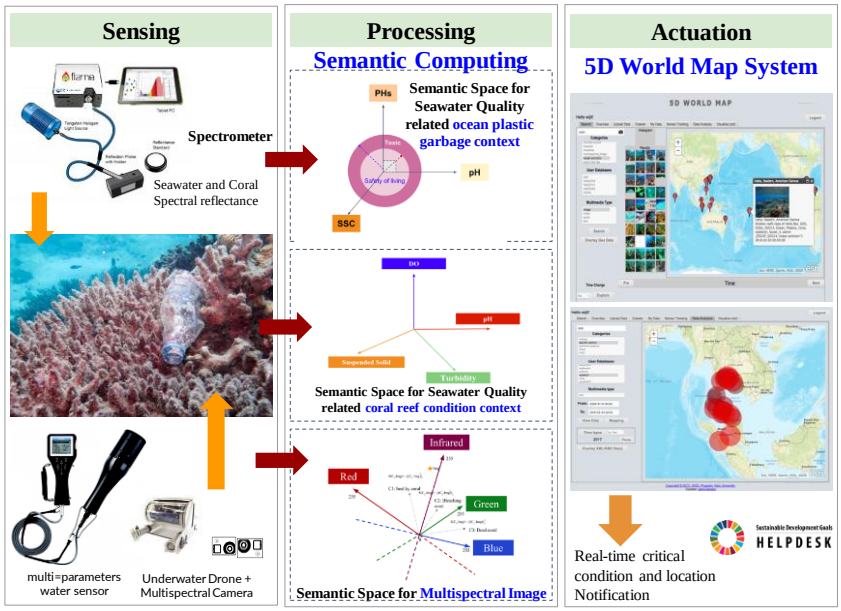
→ Select only images that are judged to be “Close to the sea”

Knowledge Integration on

Ocean Plastic-Garbage with 5DWM



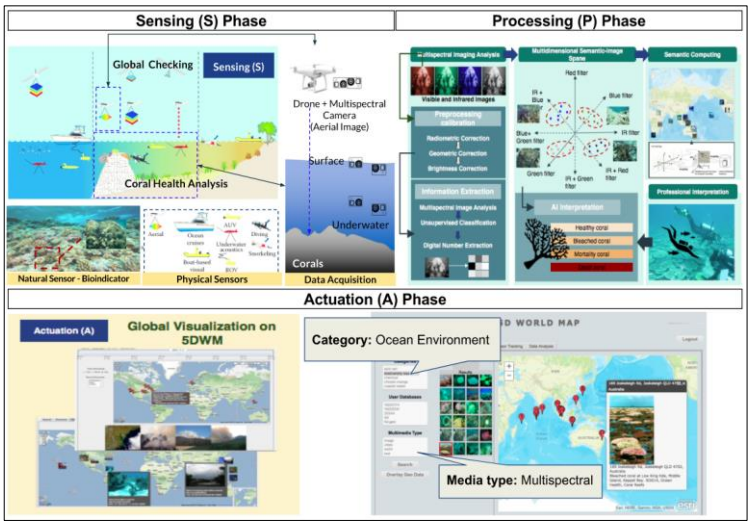
Semantic computing in 5D World Map System for Ocean-Environment Analysis



Natural Environment Changes

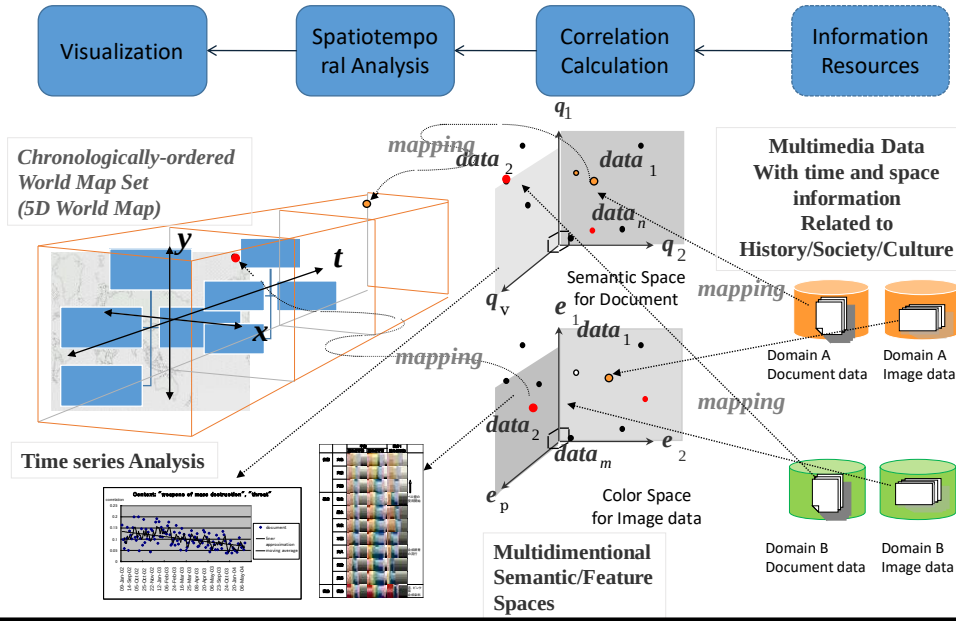
Ocean Environment Research with Chalisa's PhD Study

Semantic computing in 5D World Map System for Ocean-Environment Analysis: Coral Reefs Analysis (1/3)



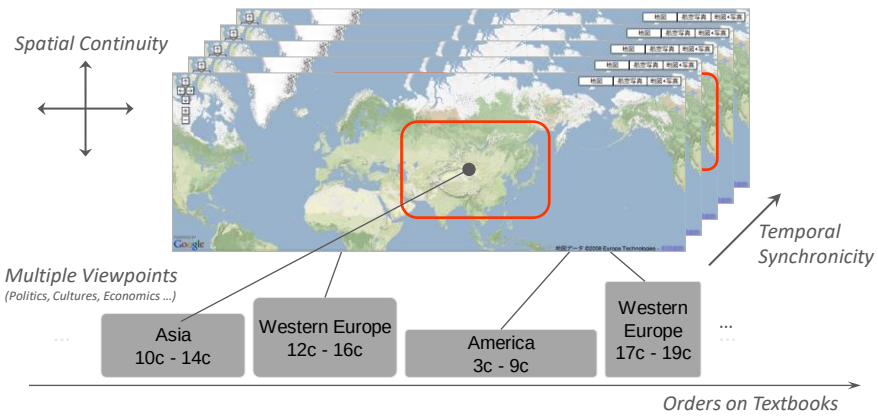
SPA system for Global Coral Knowledge Sharing with Multispectral Imaging and Semantic Computing: Sensing, Processing and Analytical Actuation Functions (SPA) on Multispectral Underwater Environment-Images in 5D World Map

The concept of 5D World Map



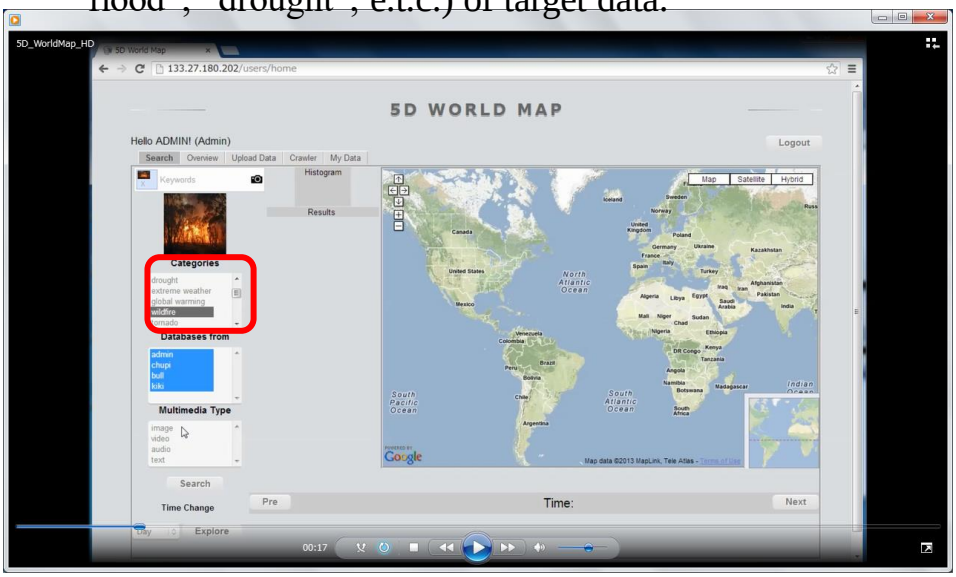
Basic Idea

- It is important to evaluate and visualize numerous kinds of historical/cultural documents in appropriate ways according to users requirements (user's viewpoints) as "**contexts**".

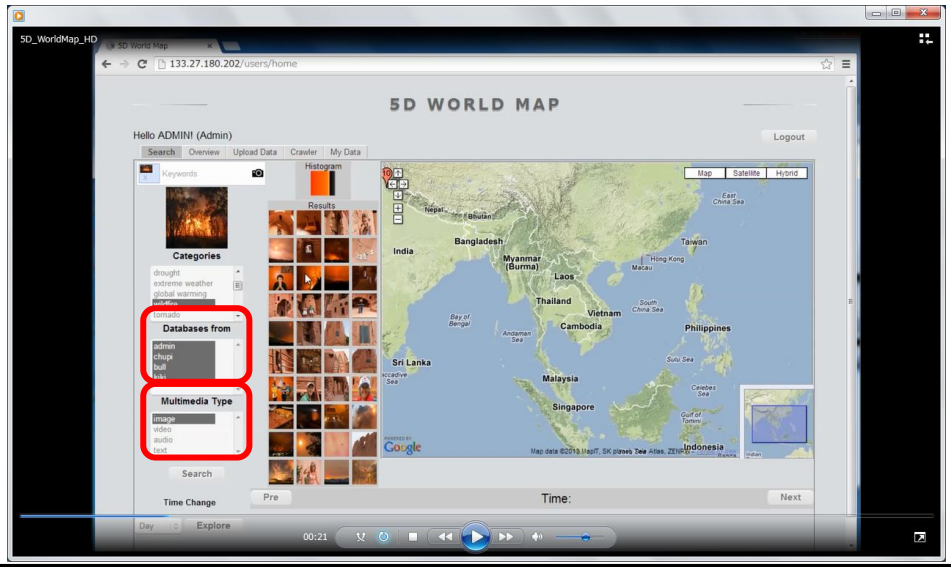


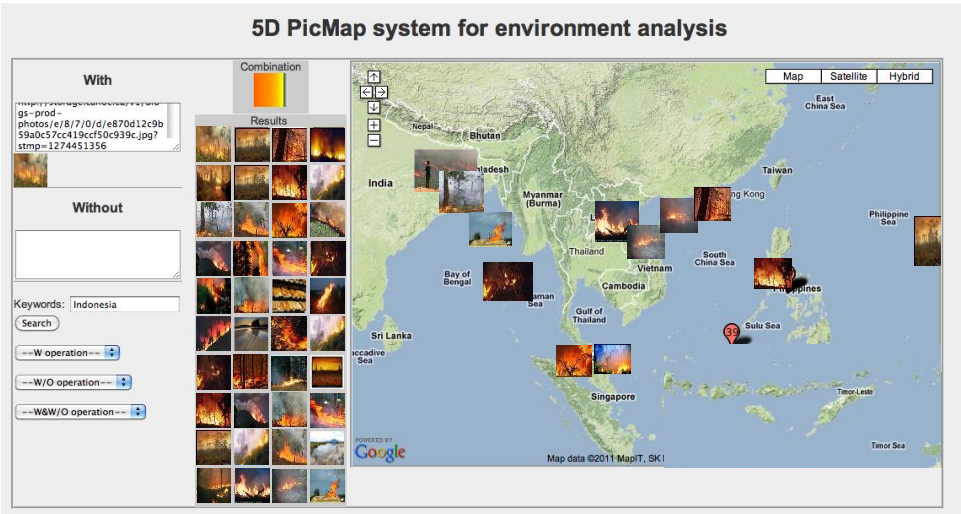
Search by Image:

Select one or more categories (e.g. “wild fire”, “flood”, “drought”, e.t.c.) of target data.



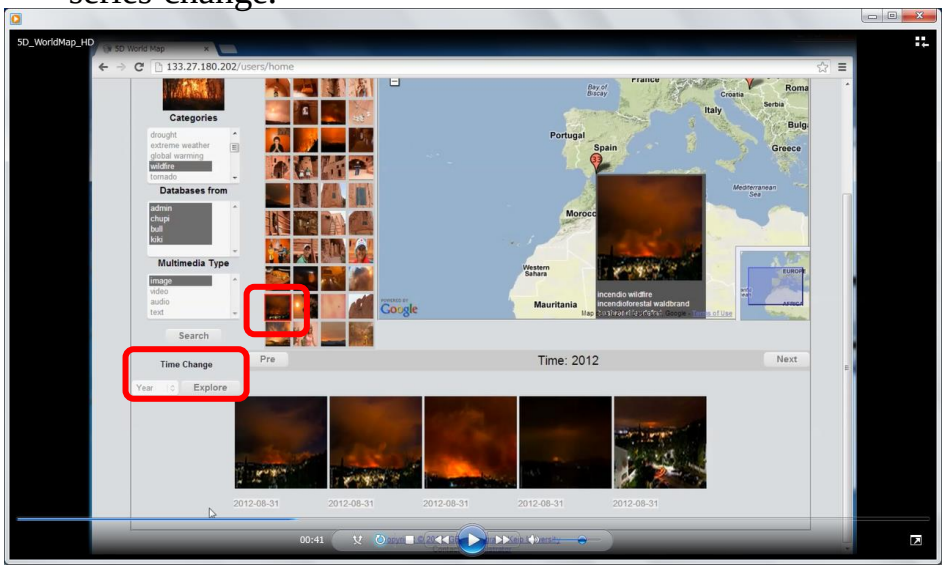
Select one or more target database made by each user, and target multimedia type (image, text, audio, video…) of target data.



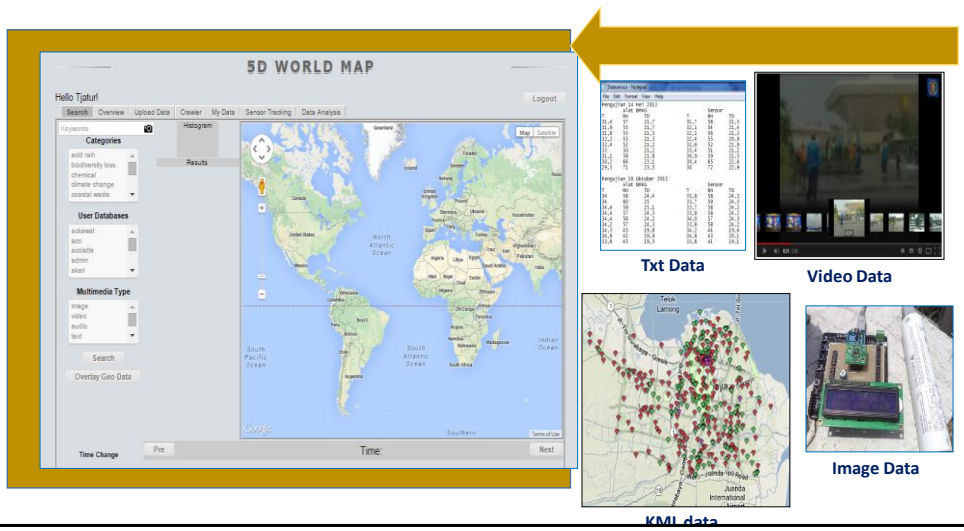


If an analyzer selects one image in the result of top 40 ranking, the system shows the location information of the image on the world map.

The analyzer observes the temporal information of the images on the same location, and analysis of the time-series change.



Building Awareness for Dengue on 5D World Map

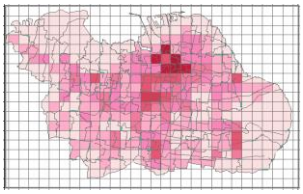


The Vector-Control Strategy Interoperability in Dengue Fever:
Case Study Surabaya, Kuala Lumpur, Bangkok

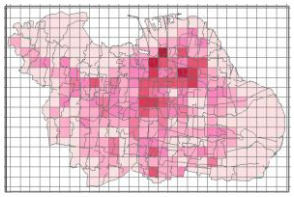
Wahjoe Tjatur Sesulihatien[1,2], Shiori Sasaki[1], Yasushi Kiyoki[1], Azis Safie[3], Subagyo Yotopranoto[4], Petchporn Chawakitchareon [5], Virach Sornlertlamvanich[6]

Result and Discussion:

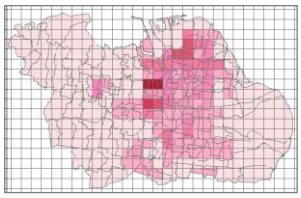
Risk map indicate Index of vulnerability



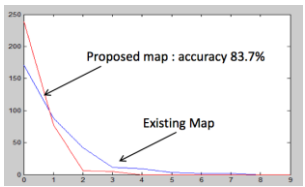
Proposed Map



Real Map



Existing Map



Place	Governance	Implementation (in Research)
Indonesia	Empowering the people to prevent dengue	Spatial-transmission of vector-borne Impulse-event analysis Social-ecological Awareness Spatio-temporal dengue-event history Weather prediction Event-based monitoring
Malaysia	Vector-borne surveillance	Community-Wealth based forecasting Spatial Vector-borne Dimension Community-based surveillance Urban risk factor Vector-breeding site classification
Thailand	Case-based Risk assessment	Community-based assessment Event-history risk prediction Demographic transition Analysis Environmental-fluctuation pattern Case-sustainable factor

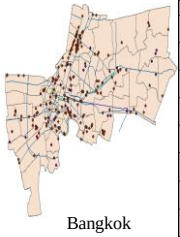
RESOURCES

Surabaya

Attribute
Residential
Commerce Area
Bussiness Area
Rainfall
Population Density
Temperature
Solid Waste
Primary Scool
House Index
Secondary school
High school
University
Apartment
Ruko
Humidity
Industrial area

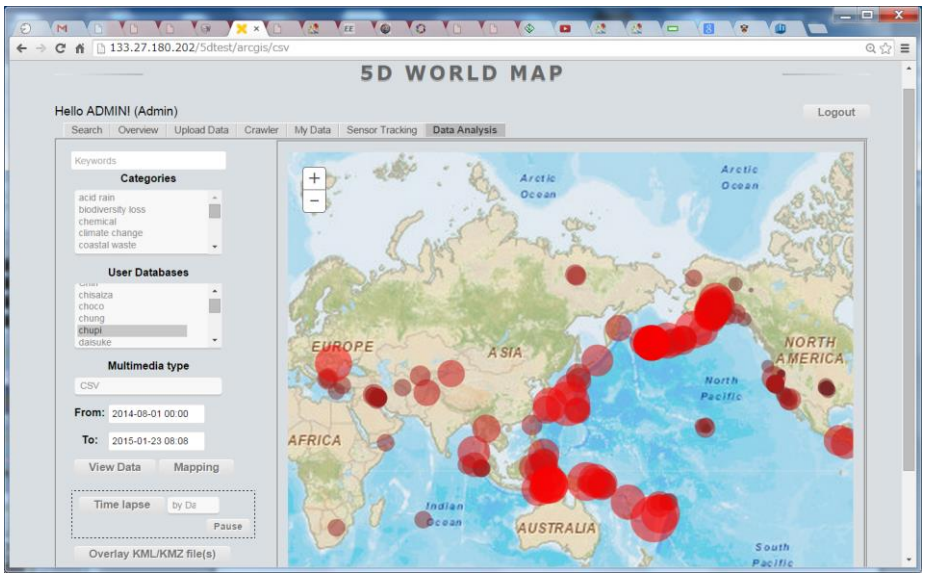
Kuala Lumpur

Attribute
Cemetery
Residential
Population Density
Rainfall
Temperature
Commerce Area
Bussiness Area
Primary Scool
Solid Waste
Mall
Garden
Apartment
Secondary school
High school
University



Bangkok

Attribute
Residential
Commerce Area
Bussiness Area
Population Density
Temperature
Mall
Rainfall
Solid Waste
Primary Scool
House Index
High school
Youth Facility
River
Traditional market
Supermarket

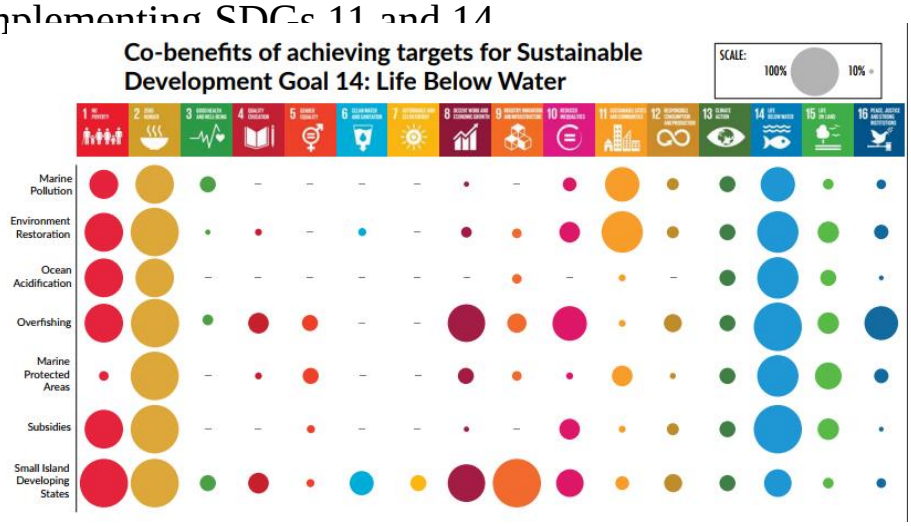


=> VIDEO

ESCAP

5D-World Map for Global Knowledge-Sharing-Platform Creation,

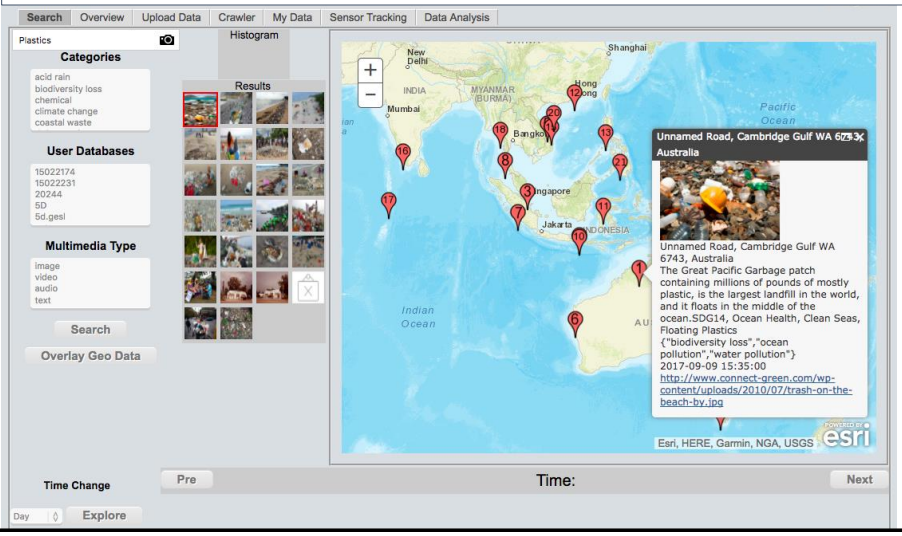
Implementing SDGs 11 and 14



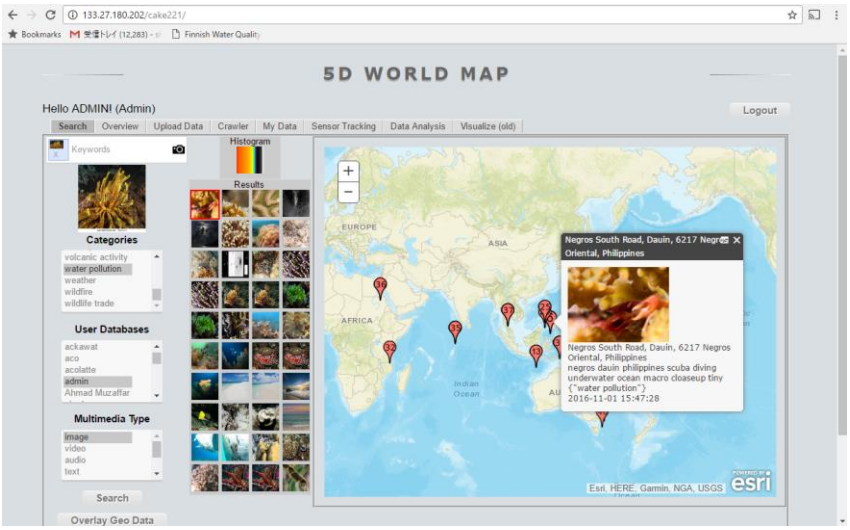
出典: http://www.nereusprogram.org/sdg-report/

"Knowledge Platform" Demo for **"SDG 14"** in "5D World Map System: (a) Example of image data collection in Pacific Ocean and the Indian Ocean

"Knowledge Platform" Demo for **"SDG 14"** in 5D World Map System: (b) Example of **"Floating Plastics"** image data collection in Pacific Ocean and the Indian Ocean



Semantic computing in 5D World Map System for Ocean-Environment Analysis: Coral Reefs Analysis (2/3)



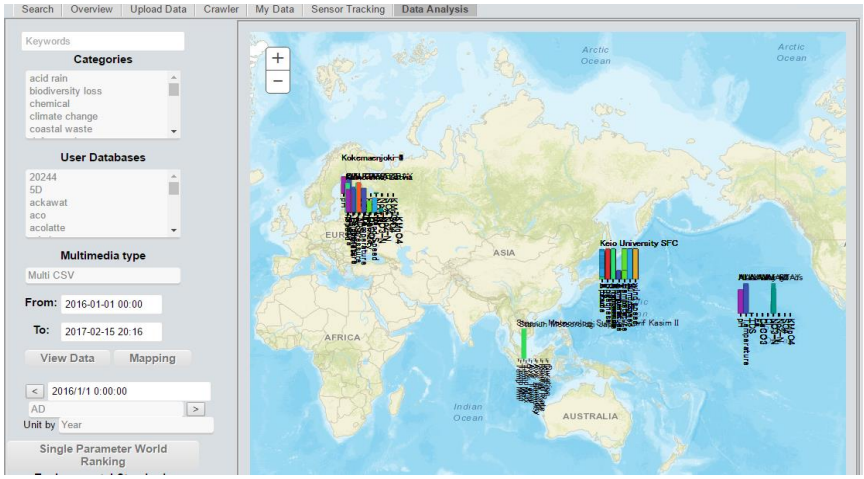
Users able to retrieve the coral reefs condition data by using color-based multispectral analysis on 5D World Map System

Global Environmental Analysis and Visualization of "Coral" in "5D World Map System

Input image = purple coral, Categories = coastal waste, SDG14, ocean pollution

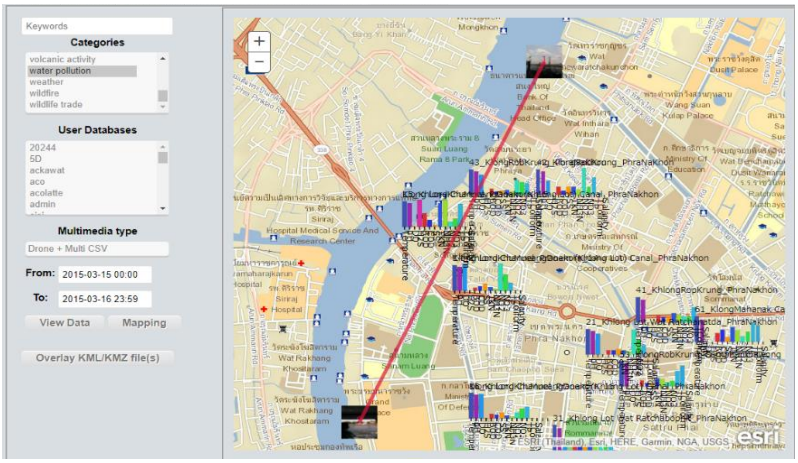
5D World Map System : as a SDGs Knowledge Sharing Platform

Global Environmental Analysis of "SDG 14" : (e)Example of Ocean Acidification (water-quality values: pH, DO, TDS, etc.) in the world



5D World Map System : as a SDGs Knowledge Sharing Platform

Global Environmental Analysis of "SDG 14" : (f) Zooming-up example of water-quality analysis in Chao Phraya River basin in Bangkok



Real-time Drone Image Mapping (Tracking) + Multi-parameter Sensor Data Mapping

Summary of 5D-World Map System

- A new environmental-semantic computing system for Ocean Environment-analysis with "5-Dimensional World Map."
- The main feature of our system
  - Realize semantic-computing in the environmental-semantic spaces for Ocean-water-quality analysis with image databases.
- The concept of our system
  - Based on "environmental-semantic spaces" for realizing global environmental analysis.
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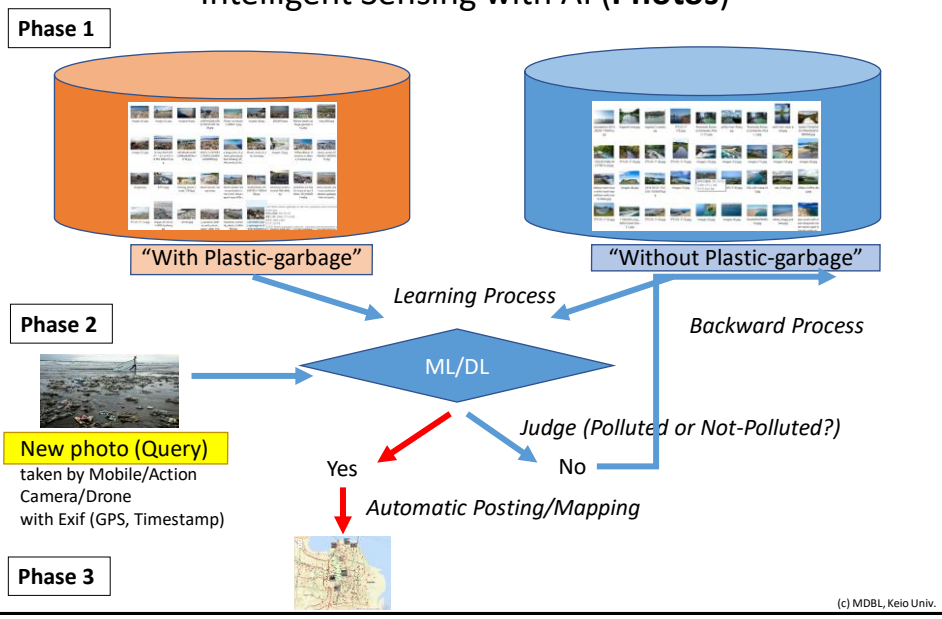
  - An Ocean research exchanging platform in world-wide area.
    - An Environmental Multimedia Computing system and the 5D World Map System, as an international knowledge sharing platform with Spatio-temporal and semantic analysers."

慶應義塾 Keio University

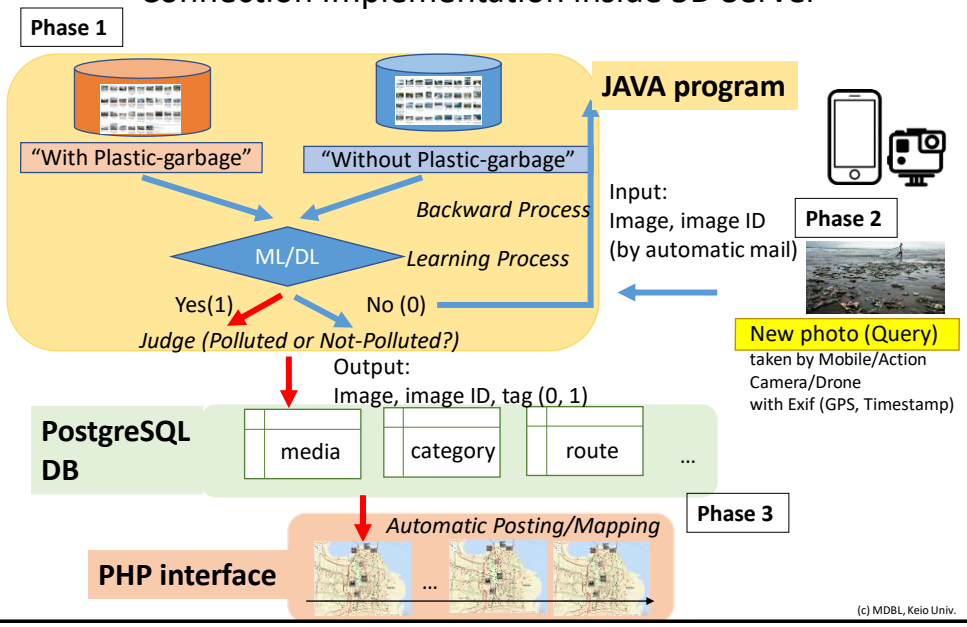
Project plan by Keio University - 5D Team

Intelligent Sensing with AI (**Photos**)



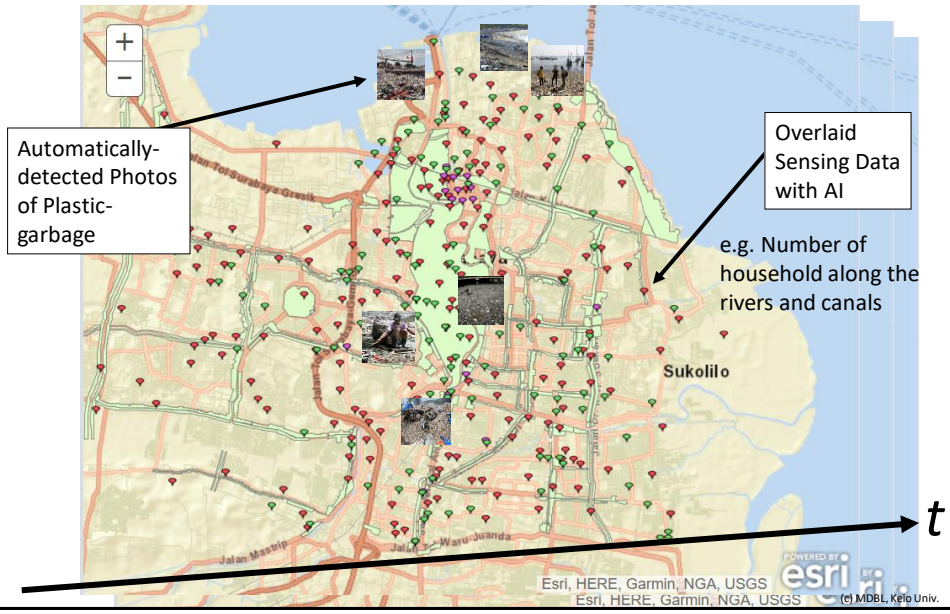
Project plan by Keio University - 5D Team

Connection Implementation inside 5D Server

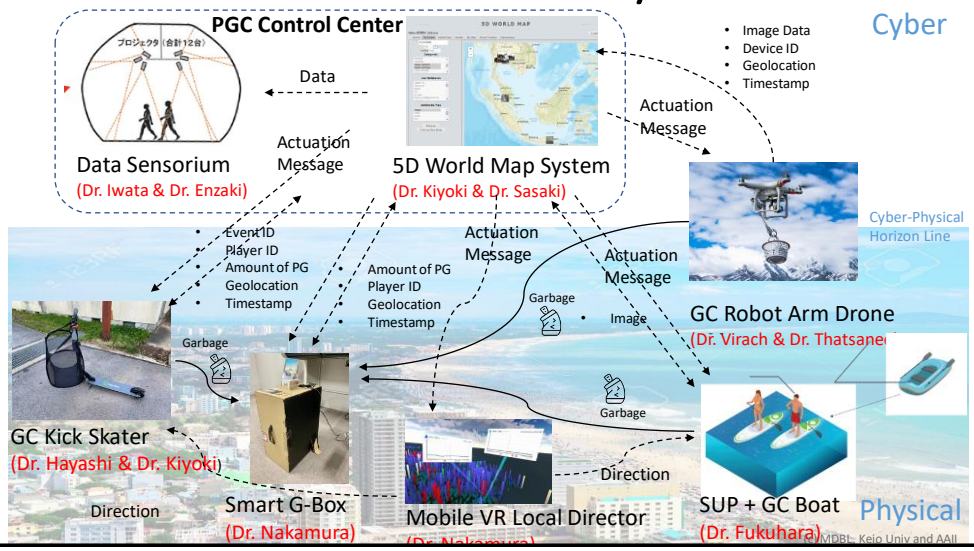


Project plan by Keio University - 5D Team

Output Image of Surabaya Case (**Photos + Data**)



Future Direction of PGC Control Center on SPA-based 5DWMS in MU-DS AAII with Thammasat University

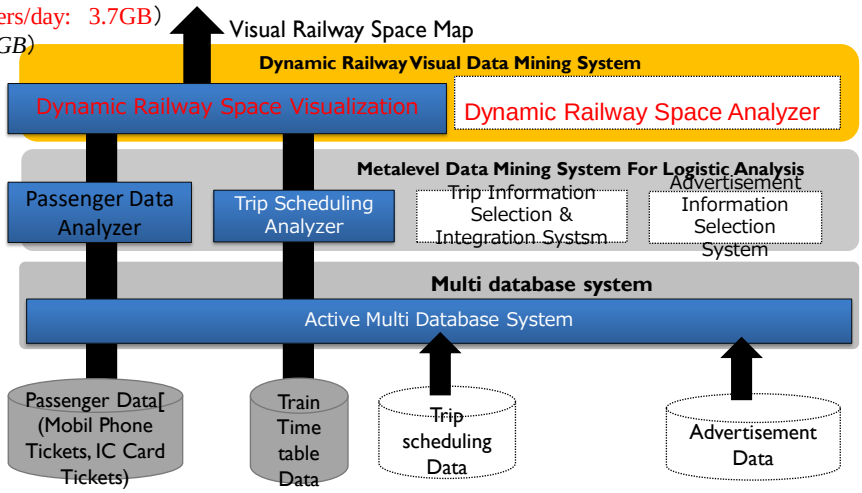


Tokyo-Cyber Station Project: 2015-now

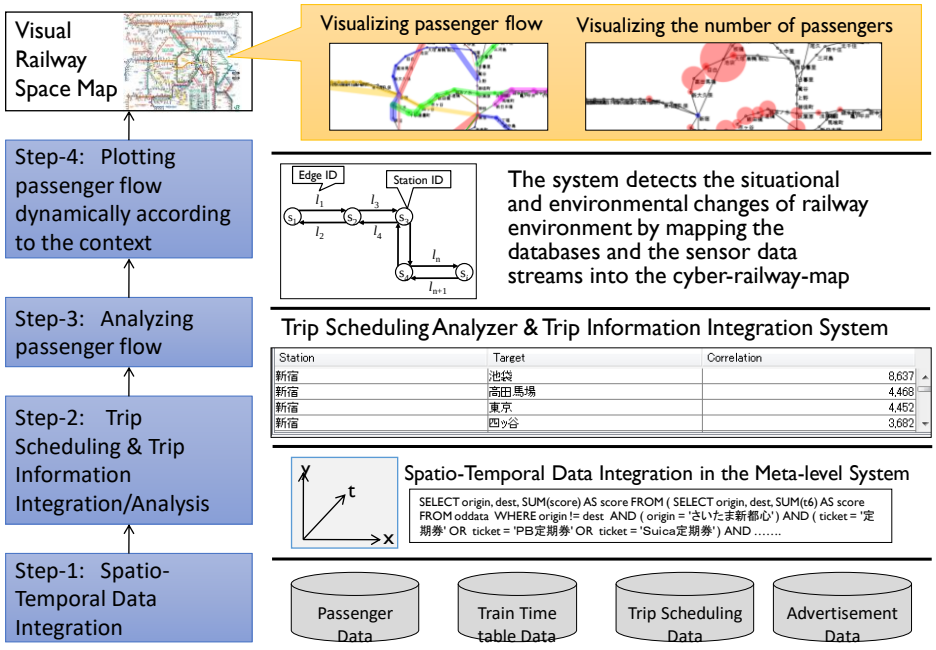
Visual Data Mining
400 stations
(6.7million passengers/day: 3.7GB)
3,815,706 paths(*1.2GB*)

JR-East(Japan-Railway East) Joint Project

Railway-Cyber-Space Creation by Active Multi-Database System



54



55

400 Stations:

STATIONS

いわき, さいたま新都心, ひたち野うしく, 阿佐ヶ谷, 旭, 綾瀬, 安食, 安善, 安中, 安房鴨川, 安房勝山, 安房小湊, 安房天津, 伊勢崎, 伊東, 伊豆多賀, 衣笠, 井野, 磯原, 磯子, 磯部, 稲城長沼, 稲田, 稲田堤, 稲毛, 稲毛海岸, 宇佐美, 宇都宮, 羽黒, 羽村, 羽鳥, 鵜原, 浦和, 永田, 越生, 越谷レイクタウン, 越中島, 榎戸, 猿橋, 猿田, 塩崎, 塩山, 奥多摩, 横芝, 横須賀, 横川, 横浜, 王子, 岡部, 岡本, 荻窪, 桶川, 下館, 下溝, 下総橘, 下総松崎, 下総神崎, 下総中山, 下総豊里, 下野花岡, 河辺, 我孫子, 海芝浦, 海浜幕張, 海老名, 笠間, 笠幡, 滑河, 葛西臨海公園, 浦須坂, 蒲田, 鎌取, 鎌倉, 鴨宮, 鴨居, 茅ヶ崎, 寒川, 干潟, 間々田, 関内, 館山, 厳根, 岩井, 岩間, 岩舟, 岩宿, 岩瀬, 寄居, 亀戸, 亀有, 祇園, 菊名, 吉祥寺, 吉川, 久喜, 久住, 久地, 久里浜, 宮ノ平, 宮原, 宮山, 求名, 牛久, 牛浜, 橋本, 玉戸, 桐生, 錦糸町, 金子, 金町, 九重, 駒形, 駒込, 空港第2ビル, 熊川, 熊谷, 栗橋, 君津, 群馬総社, 群馬藤岡, 群馬八幡, 軍畑, 恵比寿, 結城, 検見川浜, 原宿, 原当麻, 古河, 古淵, 古里, 戸塚, 戸田, 戸田公園, 湖北, 五井, 五反田, 御宿, 御茶ノ水, 御徒町, 御嶽, 厚木, 向河原, 江見, 港南台, 甲斐大和, 甲府, 荒川沖, 行田, 香取, 香川, 高円寺, 高久, 高崎, 高崎問屋町, 高田馬場, 高萩, 高尾, 高浜, 高麗川, 鴻巣, 国定, 国道, 国府津, 国分寺, 国立, 黒磯, 根岸, 越府川, 佐貫, 佐貫町, 佐原, 佐倉, 佐野, 佐和, 桜木町, 笹子, 笹川, 三河島, 三郷, 三鷹, 三門, 山手, 山前, 山梨市, 四ッ谷, 四街道, 四方津, 姉ヶ崎, 市ケ谷, 市川, 市川塩浜, 市川大野, 思川, 指扇, 氏家, 児玉, 自治医大, 鹿島神宮, 鹿島田, 宍戸, 社家, 取手, 酒々井, 酒折, 秋川, 秋葉原, 十王, 十条, 十日市場, 渋川, 渋谷, 宿河原, 春日居町, 初狩, 勝浦, 勝沼ぶどう郷, 勝田, 小岩, 小机, 小宮, 小金井, 小見川, 小作, 小山, 小川町, 小田原, 小田林, 小倉, 小木津, 小林, 昭島, 昭和, 松井田, 松岸, 松久, 松戸, 松尾, 沼田, 上溝, 上総一ノ宮, 上総興津, 上総湊, 上中里, 上尾, 上野, 上野原, 常陸青柳, 常陸多賀, 植田, 尻手, 信濃町, 新浦安, 新横浜, 新橋, 新検見川, 新座, 新三郷, 新子安, 新治, 新芝浦, 新秋津, 新習志野, 新宿, 新小岩, 新小平, 新松戸, 新杉田, 新川崎, 新前橋, 新大久保, 新町, 新日本橋, 新白岡, 新八柱, 新府, 新茂原, 新木, 新木場, 深谷, 真鶴, 神田, 神保原, 神立, 逗子, 吹上, 水郷, 水戸, 水上, 水道橋, 雀宮, 成瀬, 成田, 成田空港, 成東, 西浦和, 西荻窪, 西国分寺, 西国立, 西松井田, 西千葉, 西川越, 西川口, 西船橋, 西大井, 西大宮, 西那須野, 西日暮里, 西八王子, 西府, 西立川, 青梅, 青堀, 石岡, 石橋, 石神前, 石川町, 石和温泉, 赤羽, 赤塚, 千歳, 千倉, 千駄ヶ谷, 千葉, 千葉みなと, 川井, 川越, 川口, 川崎, 川崎新町, 川島, 扇町, 泉, 浅草橋, 浅野, 船橋, 船橋法典, 前橋, 前橋大島, 蘇我, 倉賀野, 倉橋, 倉見, 早川, 巣鴨, 相原, 相武台下, 相模原, 相模湖, 足利, 袖ヶ浦, 太海, 太東, 代々木, 大井町, 大磯, 大貫, 大久保, 大宮, 大月, 大原, 大戸, 大口, 大崎, 大森, 大川, 大船, 大塚, 大平下, 大網, 大和, 大甕, 沢井, 谷保, 丹荘, 池袋, 竹岡, 中浦和, 中山, 中神, 中野, 中野島, 潮見, 町田, 銚子, 長浦, 長者町, 長津田, 鳥沢, 津田山, 津田沼, 椎柴, 辻堂, 鶴見, 鶴見小野, 鶴田, 的場, 天王台, 田浦, 田端, 田町, 登戸, 都賀, 土浦, 土気, 土呂, 東浦和, 東我孫子, 東海, 東京, 東金, 東結城, 東戸塚, 東山梨, 東秋留, 東十条, 東所沢, 東小金井, 東松戸, 東神奈川, 東逗子, 東青梅, 東千葉, 東川口, 東船橋, 東大宮, 東中神, 東中野, 東飯能, 東福生, 東浪見, 東鷲宮, 湯河原, 湯本, 藤代, 藤沢, 藤野, 栃木, 那古船形, 那須塩原, 内原, 南浦和, 南越谷, 南橋本, 南古谷, 南三原, 南酒々井, 南千住, 南船橋, 南多摩, 南中郷, 南柏, 南与野, 南流山, 二宮, 二俣新町, 二俣尾, 日光, 日向, 日向和田, 日進, 日暮里, 日野, 日立, 入谷, 韮崎, 熱海, 馬橋, 馬喰町, 拝島, 柏, 白岡, 箱根ヶ崎, 箱根ケ崎, 箱根ヶ崎, 八王子, 八王子みなみ野, 八街, 八積, 八丁畷, 八日市場, 八幡宿, 八木原, 鳩ノ巣, 板橋, 飯岡, 飯倉, 飯田橋, 番田, 尾久, 品川, 浜金谷, 浜松町, 浜川崎, 浜野, 富浦, 富田, 布佐, 府中本町, 敷島, 浮間舟渡, 武蔵引田, 武蔵浦和, 武蔵境, 武蔵五日市, 武蔵溝ノ口, 武蔵高萩, 武蔵小金井, 武蔵小杉, 武蔵新城, 武蔵増戸, 武蔵中原, 武蔵白石, 舞浜, 福原, 福生, 福徳, 溯野辺, 物井, 分倍河原, 平井, 平間, 平塚, 片岡, 片倉, 弁天橋, 保田, 保土ヶ谷, 宝積寺, 豊田, 北浦和, 北鎌倉, 北茅ヶ崎, 北戸田, 北高崎, 北鴻巣, 北小金, 北松戸, 北上尾, 北赤羽, 北千住, 北朝霞, 北藤岡, 北柏, 北八王子, 北府中, 北本, 北与野, 本郷台, 本庄, 本千葉, 本納, 本八幡, 幕張, 幕張本郷, 明覚, 茂原, 毛呂, 網代, 木下, 木更津, 目黒, 目白, 勿来, 門沢橋, 野崎, 野木, 矢向, 矢川, 矢板, 矢部, 矢野口, 友部, 有楽町, 与野, 与野本町, 誉田, 洋光台, 用土, 来宮, 立川, 竜王, 両国, 梁川, 蓮田, 浪花, 和田浦, 藪, 籠原, 鷲谷

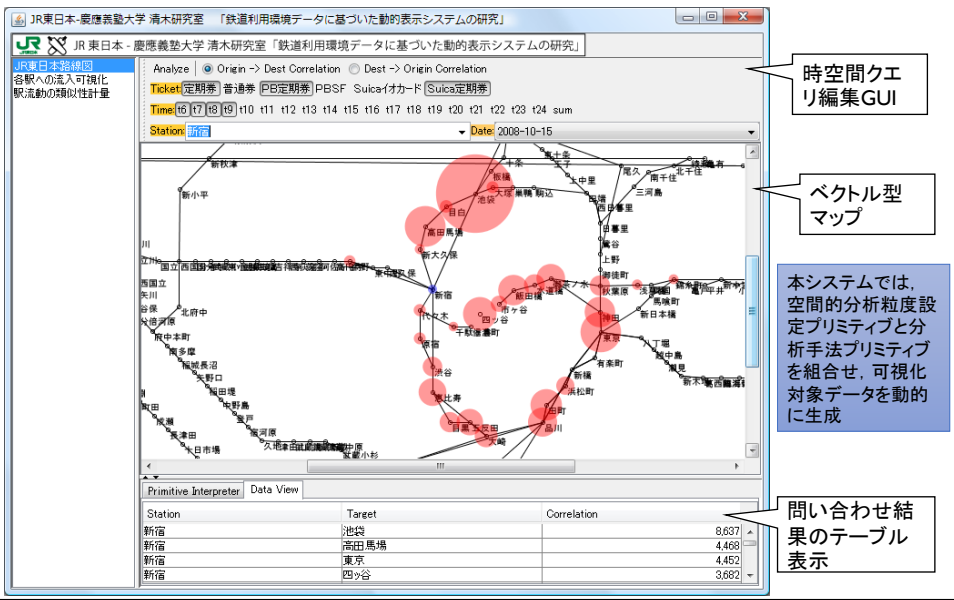
Railway Big Database：

（1）400 Stations（destinations）
（2）2008/10/15 ～2008/10/27 12 days
（3）6,008,310 data items
（4）348,019 data items/day

System Size：
（1）PostgreSQL → 26.00M tuples

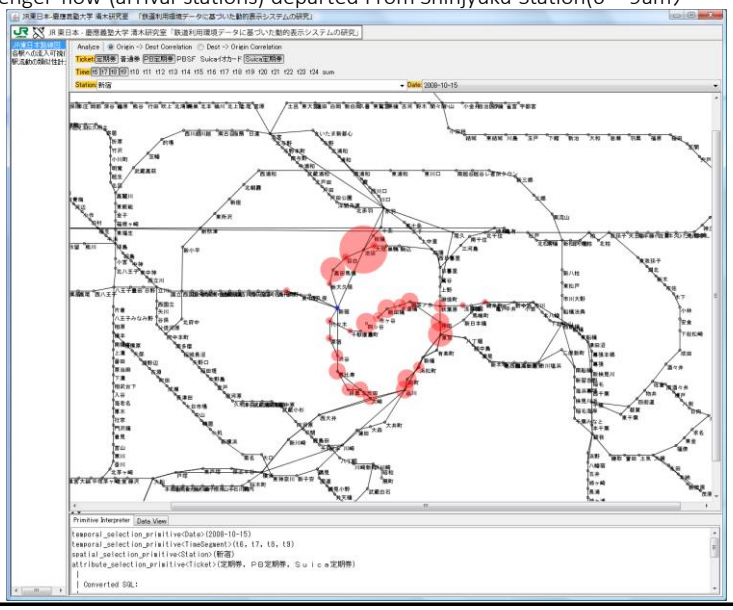
Path-selections
（1）total paths： 197,590,976
（2）400 ×400: path selection, 1 minute during 4:00am～25:00
（3）3,844 trains
（4）Average number of change: 3 times

Railway-Cyber-Space Visualization



Railway-Cyber-Space Visualization

Passenger-flow (arrival-stations) departed From Shinjyuku Station(6〜9am)



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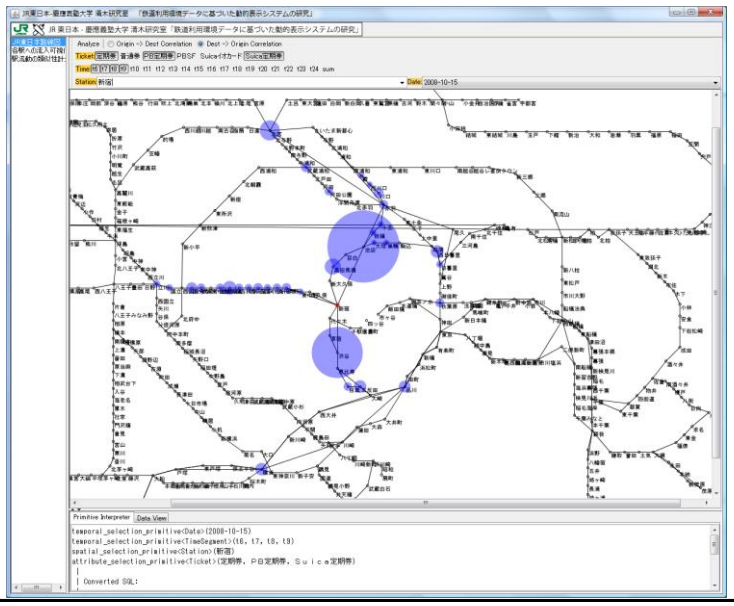
Railway-Information-Space Visualization

Passenger-flow (departure-stations) Arrived at Shinjyuku(6〜9am)



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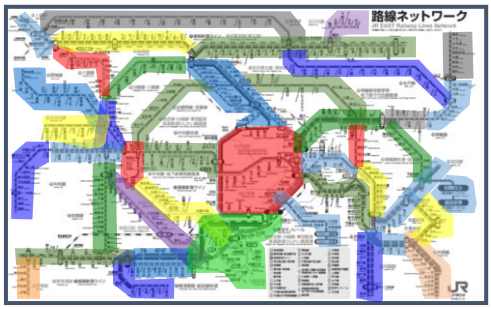
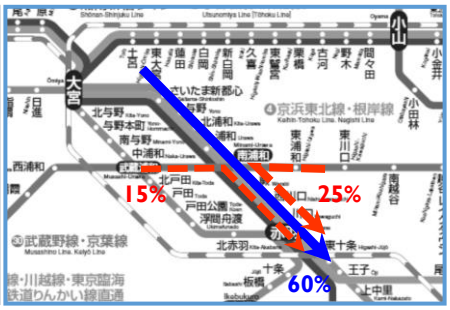
Visualization-1



Grouping for stations

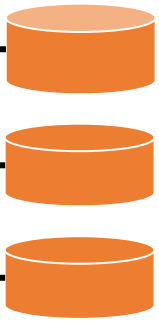


Ex: changing trains at Minami-Urawa sation

Digital Signage-1: Visualization in Stations

Digital Signage
Automatic Provision

MULTI DATABSES



Digital Signage in Express Train for Tourism

63

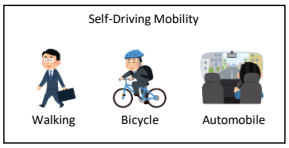
Tokyo-Cyber-Station

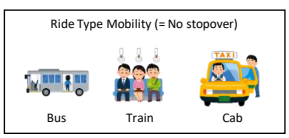
64

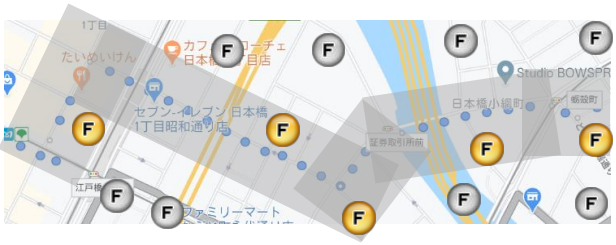
図 45:【検索条件4】利用者の現在位置:駅構内1階、改札内中央、検索対象:改札内外両方、検索オプション:目的「休憩したい」、感性「優雅」「魅惑」(Dynamic / Situation / Personal)キューブ、(Dynamic / Intention / Personal)キューブに対応
(感性オプションを追加。)

STEP 5: Symbolic Filtering for Visualization

- This symbolic filter **extracts only results that can be reasonably proposed** from the results of the semantic distance calculation.
- **Business hours of facilities, sightseeing spots and weather information** are interpreted on the filtering.
- **An recommended(promising) navigation route** is shown on a map.







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    - Semantic associative search is realized in the multiple dimensional orthogonal semantic space with semantic projection functions.
    - Semantic Computing applied to water-quality data resources. We have applied this system to Si-chang and Hawaii-water quality data resources as actual experiments in Pacific Ocean.
- This system creates
  - A remote, interactive and real-time environment-analysis and visualization.
  - An Ocean research exchanging platform in world-wide area.
    - An Environmental Multimedia Computing system and the 5D World Map System, as an international knowledge sharing platform with Spatio-temporal and semantic analysers."

慶應義塾 Keio University

THE AAII

SUSTAINABLE DEVELOPMENT GOALS

https://ejcsummerschool2021.wordpress.com/

AI Academic & Enterprise Modeling

AI Consortium and 5D World Map System Summer School

- Global Knowledge-Sharing, Integration, Analysis and Visualization Towards Global Artificial Intelligence -

KEIO University, Kiel University, Tampere University, University of Maribor, University of Hamburg, Politeknik Elektronika Negeli Surabaya (PENS), Thammasat University, RUN, Chulalongkorn University, Musashino University, United Nations ESCAP

with International Conferences: EJC & KCIC-IES

2021.09.09 Updated
(Original: 2020.03.06)

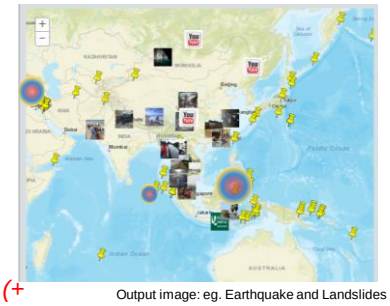
Realization of Capacity Building with 5D

- Encouraging policy makers to incorporate risk analysis in policy formulation -

5D system development ← by Keio University

Outputs:

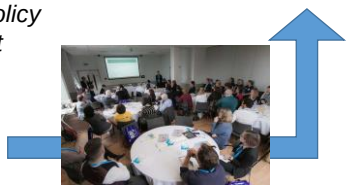
1) *Long-term Warning (Map):*
   - *Indication of risk hotspots and related risk visualization*
2) *Short-term Warning (Push):*
   - *Alert on risk hotspots for local governments and residents*



Output image: eg. Earthquake and Landslides

Workshop ← by AI&5D+ ESCAP

Capacity building workshops *for policy makers (+ experts & students) to incorporate risk analysis in policy formulation, particularly for infrastructure investment*



Target Countries:

- *South Asia*

  Nepal, Bangladesh, Maldives, …

- *South-east Asia*

  Cambodia, Myanmar, Laos, Thailand, Indonesia, Philippines, …

- *Central Asia*

Target Disasters:

Earthquake, Flood, Landslide, Typhoon/Cyclone/Storm, Tsunami, Meteorological disaster, Epidemic desease…

Project Overview

"5-Dimensional World Map System"
For Global Knowledge-Sharing, Integration, Analysis and Visualization
Towards Global Artificial Intelligence

Yasushi Kiyoki

- Humankind, the dominant species on Earth, faces the most essential and indispensable mission; we must endeavor on a global scale to perpetually restore and improve our natural and social environments. One of the essential computations in AI is context-dependent semantic-computing to analyze the changes of various situations in a context dependent way with a large amount of information & knowledge resources.
- It is also significant to memorize those situations and compute social and environment change in various aspects and contexts, in order to discover what are happening in our planet. We have proposed a multi-dimensional computing model, the Mathematical Model of Meaning (MMM) in 1994. As a global knowledge processing system based on MMM, we have realized "5-Dimensional World Map System" for integrating and analyzing environmental and social phenomena in ocean and land. We introduce the concept of "SPA (Sensing, Processing and Analytical Actuation Functions)" for realizing a global knowledge processing system, to apply it to 5-Dimensional World Map System. This concept is effective and advantageous to design knowledge processing and environmental systems with Physical-Cyber integration to detect environmental and social phenomena as real data resources in a physical-space (real space), map them to cyber-space to make analytical and semantic computing, and actuate the analytically computed results to the real space with visualization for expressing environmental and social phenomena, causalities and influences. Currently, the 5D World Map System is globally utilized as a Global Environmental Semantic Computing System, in SDGs 9, 11 and 14, United-Nations-ESCAP: (https://sdghelpdesk.unescap.org/toolboxes)

1st AI-5D Workshop in Tokyo, Keio University (Online) : Feb 27, 2021

https://ysato07247.wixsite.com/profkiyokilecture21

1st AI-5D Summer School in EJC2021, Hamburg, Germany (Online), Sep. 6, 2021

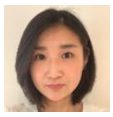
https://ejc2021.entavis.com/

1st AI-5D Summer School in EJC2021, Hamburg, Germany (Online), Sep. 6, 2021

https://ejcsummerschool2021.wordpress.com/

Organizers:






2nd AI-5D Workshop in IES-KCIC2021 in Surabaya, Indonesia: Sep. 29, 2021

https://ies.pens.ac.id/

Organizer:
Dr. Ali Ridho Barakbah

Designing Summer School in PENS

- Date/Period of Summer School in PENS
- Talk on AI & 5D research topics
- What kind of AI lecture material/topic and practice can be provided from lecturers/speakers of this WS.
  - 5 speakers from Japan, Thailand, Europe
  - 5 speakers from PENS

3rd AI-5D Workshop in 3rd AAII Training & Symposium in Thammasat University, Thailand, Nov. 17-18, 2021

Cf.

2018.11.23-27
1st AAII Workshop
(Training +Symposium)

Organizer:
Prof. Virach Sornlertlamvanich

AMEICC Endowed Course for Thammasat University

Proposed Schedule

- 1st AI-5D Workshop in Tokyo, Keio University (Online) : Feb 27, 2021 https://ysato07247.wixsite.com/profkiyokilecture21
- 1st AI-5D Summer School in EJC2021, Hamburg, Germany, Sep. 6-10, 2021 https://ejc2021.entavis.com/ https://ejcsummerschool2021.wordpress.com/
- 2nd Workshop in IES-KCIC2021 in Surabaya, Indonesia: Sep. 29-30, 2021 https://ies.pens.ac.id/
- 3rd Workshop in the 3rd AAII Training Workshop and Symposium at Thammasat University, Thailand, Nov. 17-18, 2021
- 4th Workshop in Musashino University, Japan, Spring 2022.
- 5th or 6th AI-5D Summer School in EJC2022, Hamburg, Germany June, 2022
  Any opportunity at ESCAP-related events.

4th AI-5D Workshop and/or 2nd Summer School in Musashino University, Japan, Spring 2022

Musashino University,
Ariake Campus, Tokyo

2nd or 3rd AI-5D Summer School in EJC2022, Hamburg, Germany
June, 2022
(Accepted by EJC Organizers)