

# *Smart Campus and Society 5.0*

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# Society 5.0

iLDi



大阪大学

OPEN 2021



# Institute for Datability Science (FY2016)



Datability means “the ability to use large volumes of data sustainably and responsibly.”  
[CeBIT 2014, held in Hannover, Germany]



*Orchestration*

*Co-Creation*



## Creation of New Fields of Study

Health  
Science

Bioscience

Cognitive  
Neuroscience

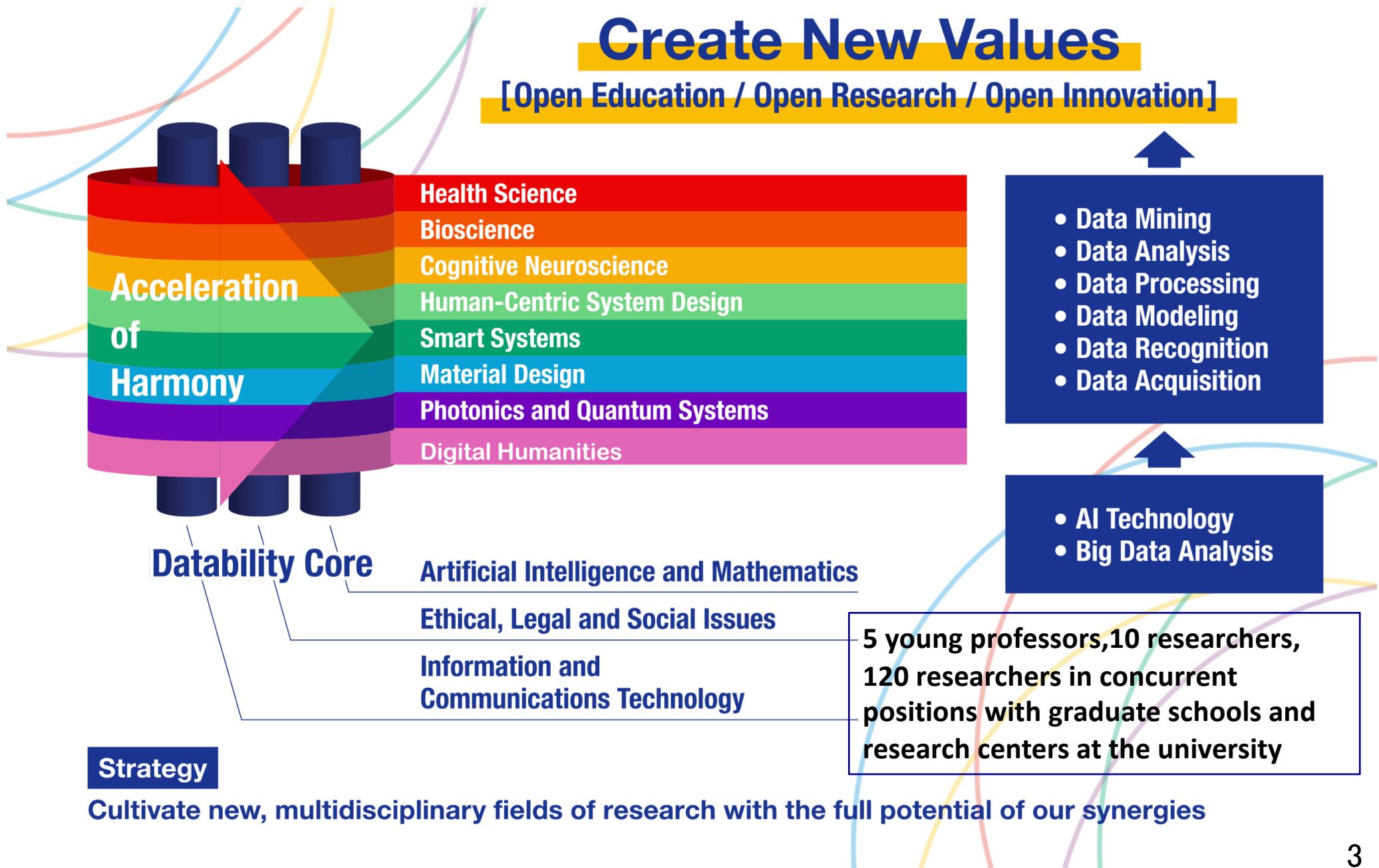
Human-Centric  
System Design

Smart  
Systems

Material  
Design

Photonics and  
Quantum Systems

Digital  
Humanities



1

## Data-driven research

- Matchmaking among researchers in different fields for collaboration
- Designing research plans with research field-specific know-hows

2

## Databases ready for secondary uses and standardization

- Collecting data by opt-in anonymization in the circumstance of university's publicness

- ◆ Databases of behavioral data of more than 1000 people from logs within specific areas on campus
- ◆ Liked databases of biological/medical data and clinical data



3

## Practical training/education in AI

- Task-oriented education program in OJT
- Wide coverage from basics to advanced (lectures and OJT)
- "Pick-as-you-want" style education program

# Initiative for Life Design Innovation

■Osaka University

■RIKEN

■Osaka prefecture office

■Osaka city office

■Kansai Economic Federation

■Chamber of Commerce  
meeting of the Osaka

■OSTEC (Osaka Science &  
Technology Center)

- NEC Corporation
- DAIKIN INDUSTRIES, LTD.,
- Nippon Telegraph and Telephone West Corporation
- Panasonic Corporation
- Mitsubishi Electric Corporation
- TOSHIBA Corporation
- Hitachi, Ltd.
- IBM Japan, Ltd.
- West Japan Railway Techsia Co.,Ltd.

- Mizuno Corporation
- Osaka Gas Co., Ltd.
- Sekisui House, Ltd.
- Mitsui Fudosan Co., Ltd.
- KDDI CORPORATION
- OG SPORTS CO.,LTD
- SHIONOGI & CO., LTD.
- Miraca Research Institute LLC.
- FUJIFILM Corporation
- Fuji Xerox Co., Ltd.
- Dentsu Inc.

To solve problems that cannot be judged by individuals and/or to seek individuals' happiness using personal social data through supports from universities and society

## Edutainment

Events and programs that encourage fun and learning

## Life Style

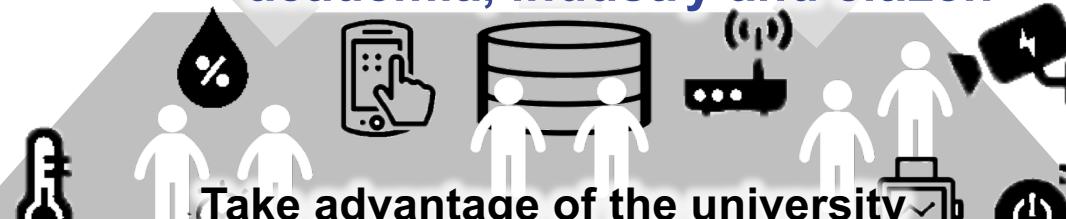
Products and services supporting individual QoL

## Wellness

Product and services which promote wellness in body and soul

## Creation of Innovation

Collaboration among government, academia, industry and citizen



Take advantage of the university as a demonstration field of pre-Society5.0

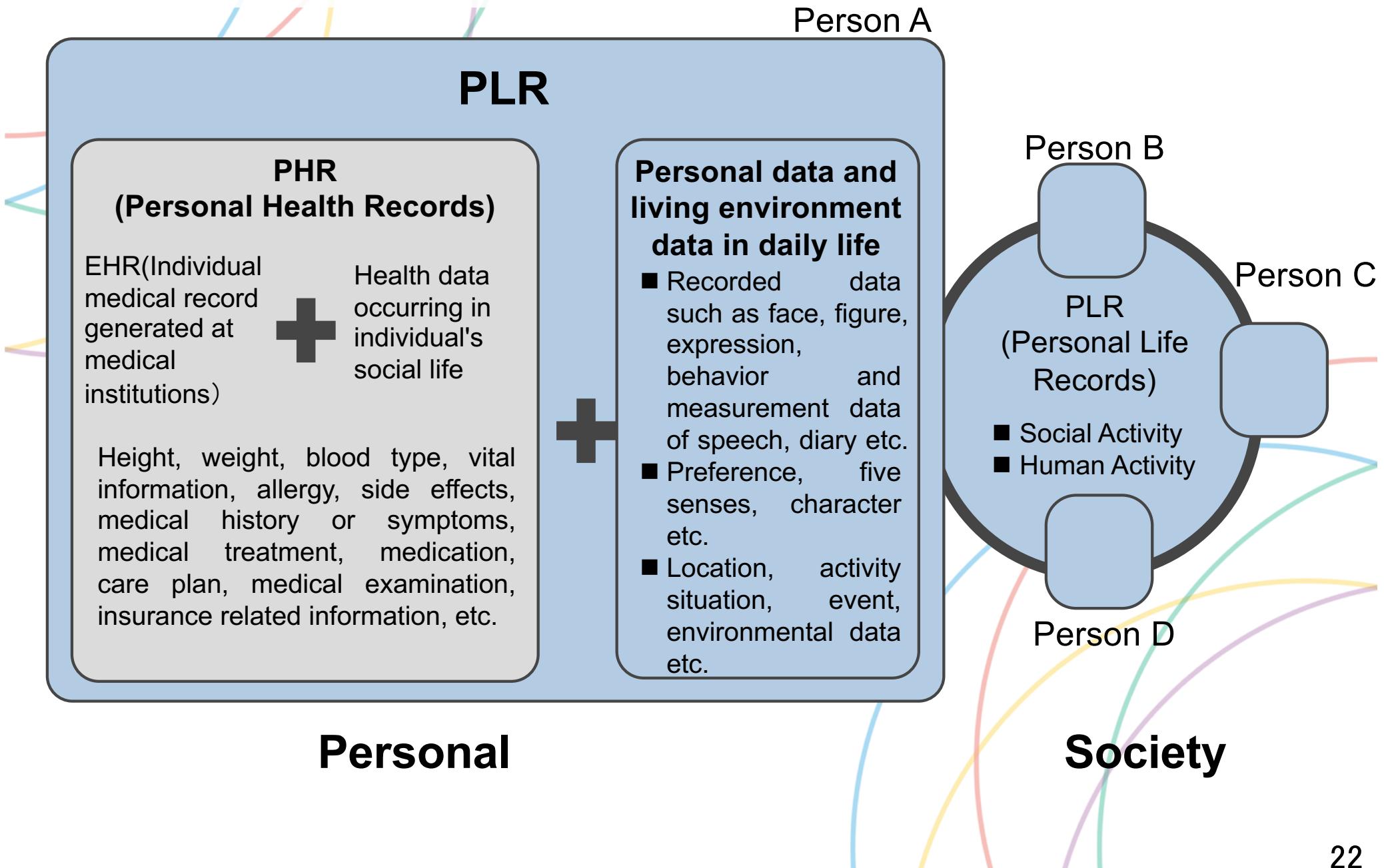
Universities & Research Institutes

Entrepreneurs & Industry

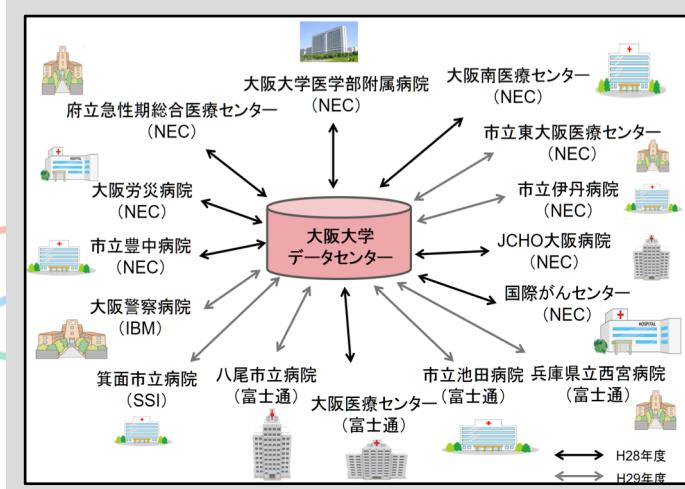
Our Goal is to utilize information technology for people to live healthily and abundantly, make life innovation in society, solve social problems and show signs of economic development

Our aim is to disseminate drastic technological innovation and changes in socio-economic environment from the university, while responding flexibly to the needs of the times and designing people's great QoL based on their physical health, mental health, social health (communication), environmental health from the relationship between human health and life.

# Personal Life Records (PLR)



# ⑦ Establishment of Demonstration Fields



**Hospital Network**  
 - Health Care  
 - Insurance  
 - In-home Care

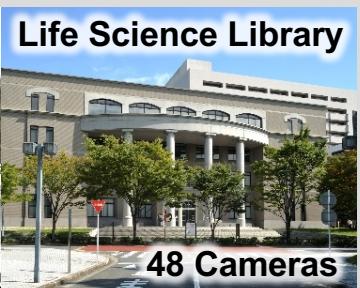
Open in April 2021



**MINOH New Campus**  
 - Human-Robot Symbiosis  
 - Lecture rooms  
 - Cafeteria



TOYONAKA Campus (Health / Sports)



SUITA campus (Daily Life)



# ⑦ Establishment of Demonstration Fields iLDi



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## Demonstration Fields in Osaka University



40 Cameras

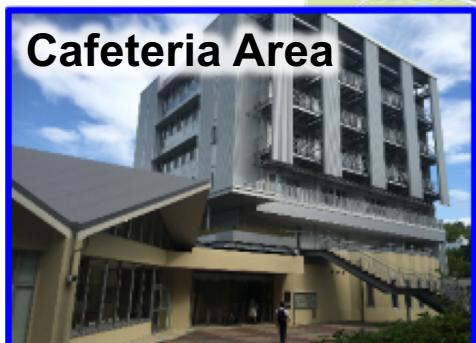
SUITA  
Campus



Video Cameras



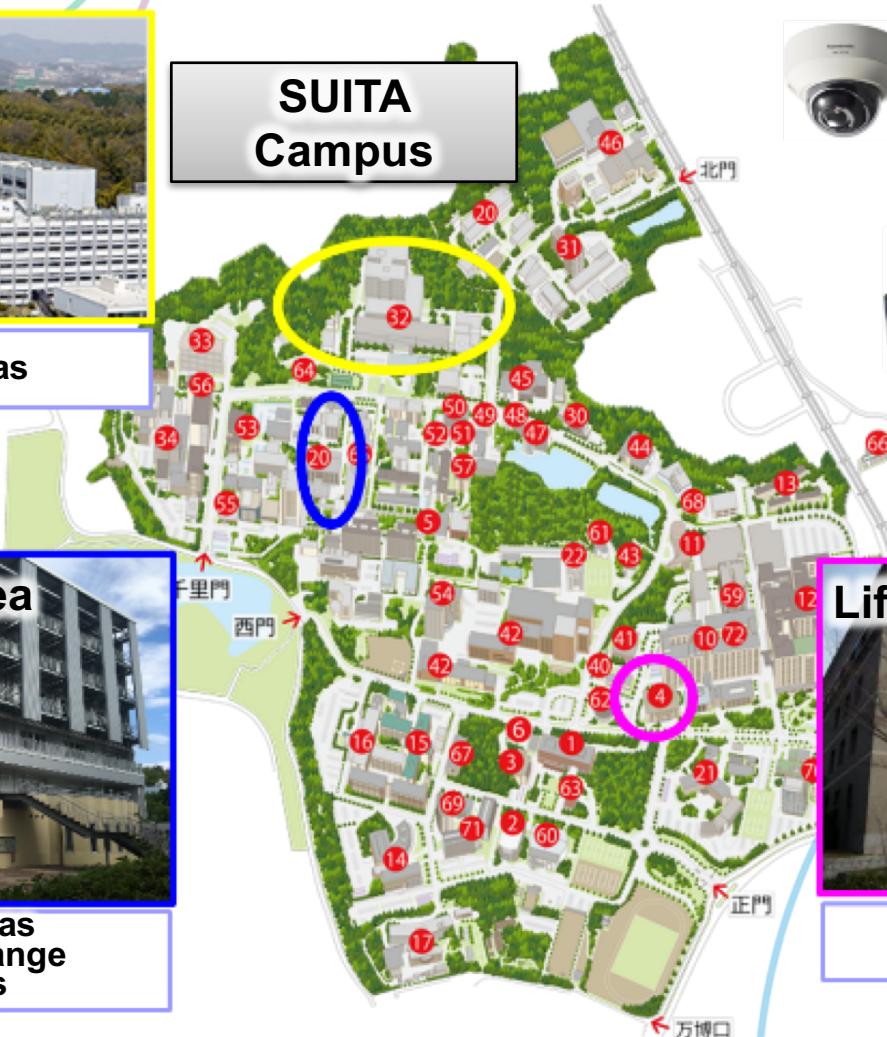
Laser Range  
Sensors



16 Cameras  
15 Laser Range  
Sensors



48 Cameras

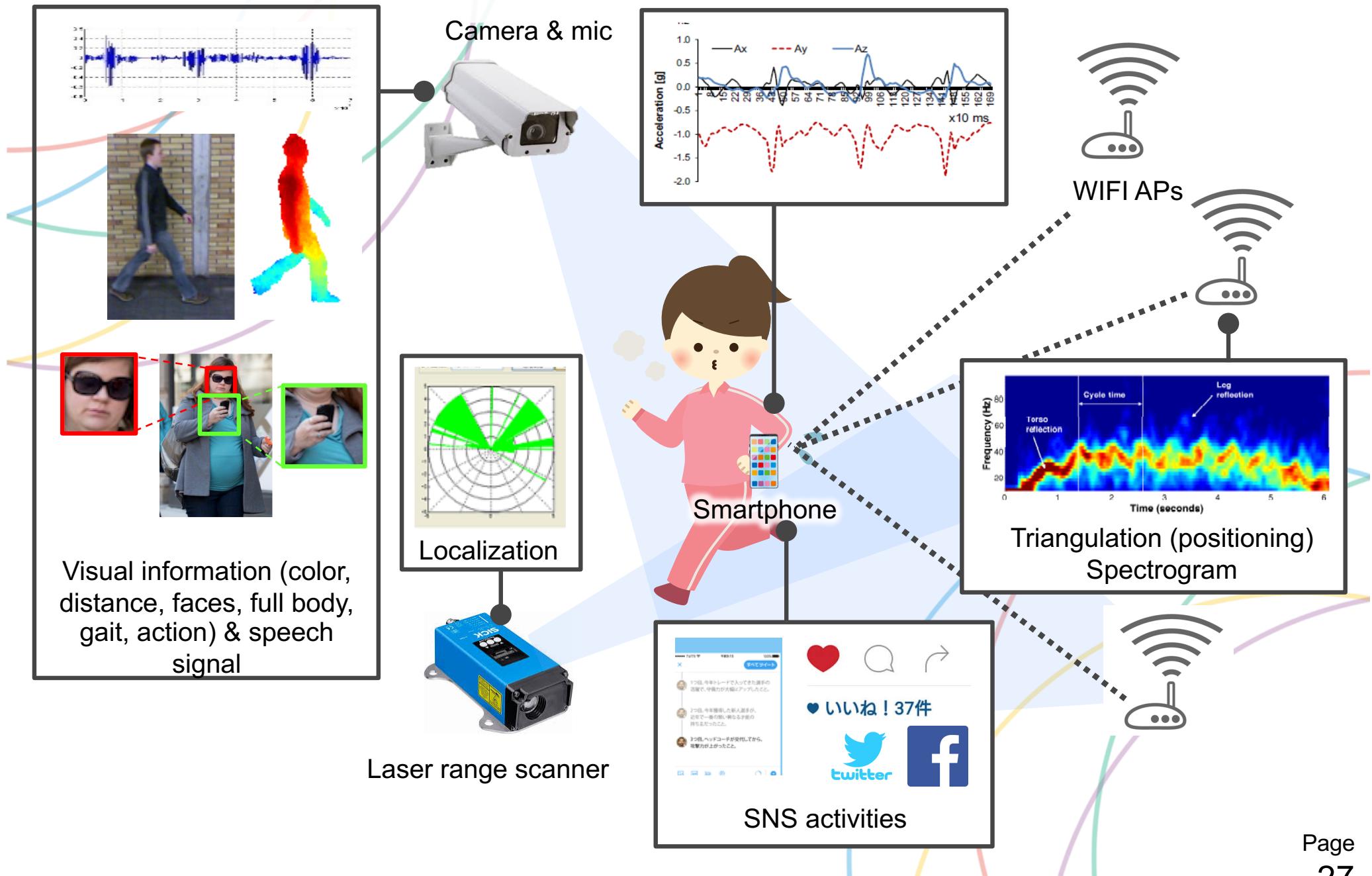


# ⑥ Activity sensing platform project iLDi



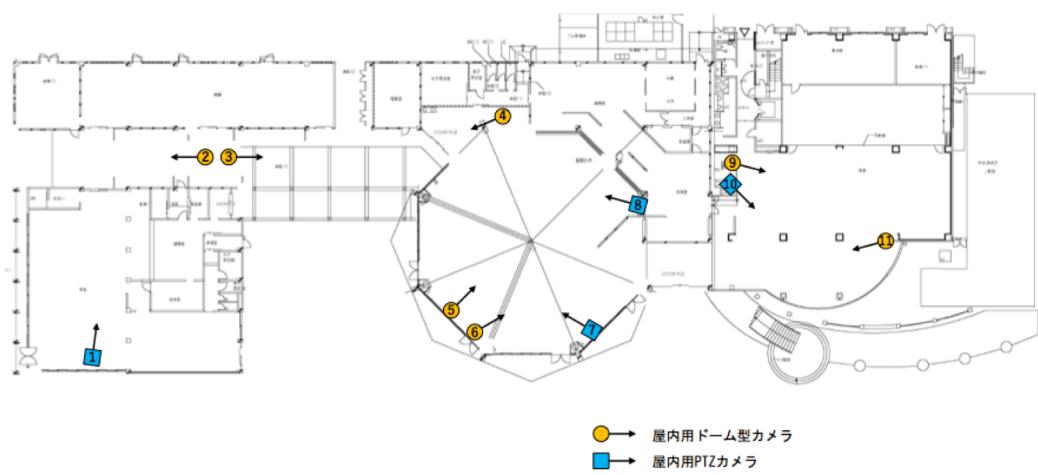
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OSAKA UNIVERSITY

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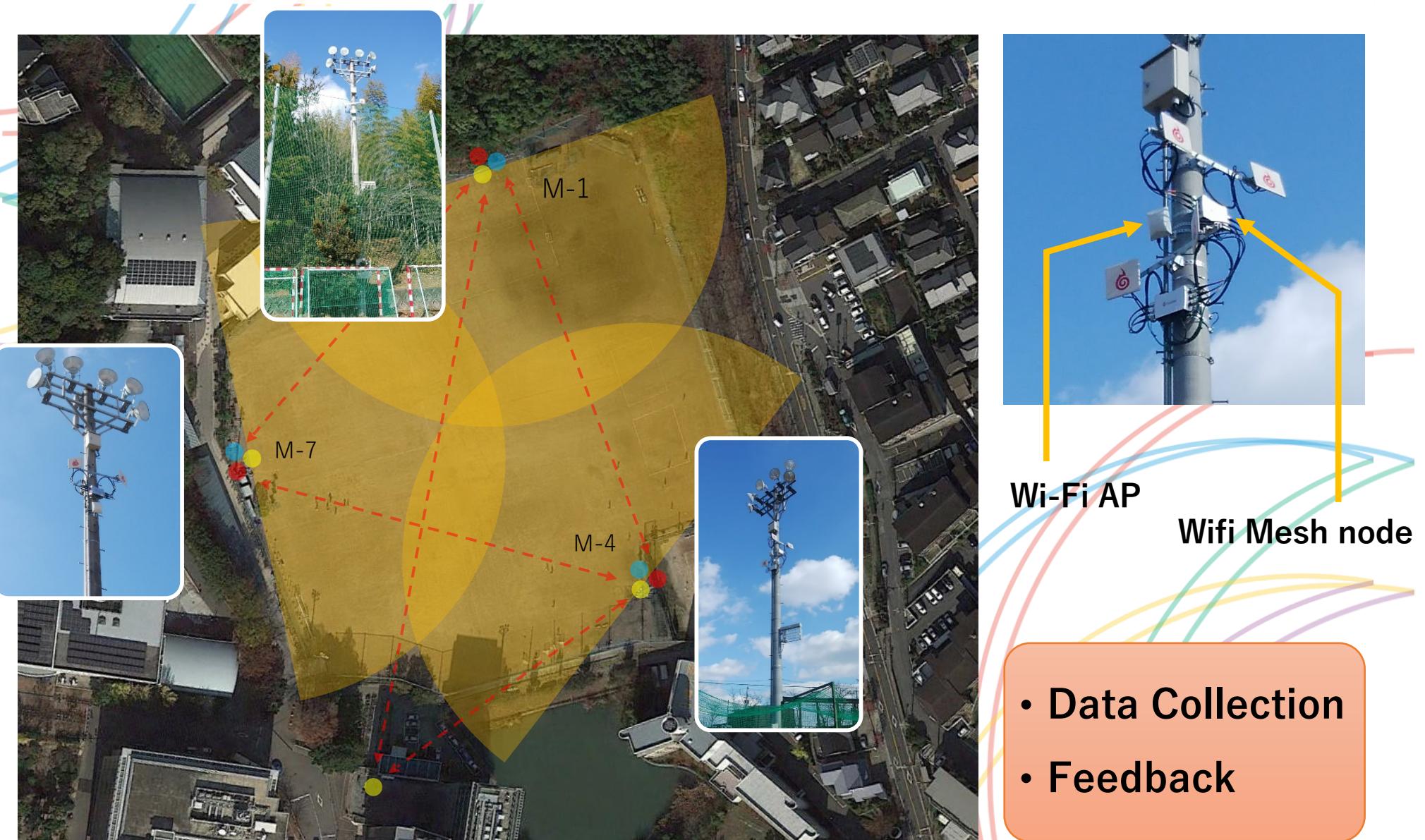


屋内用カメラ



# Sensing Data Infrastructure

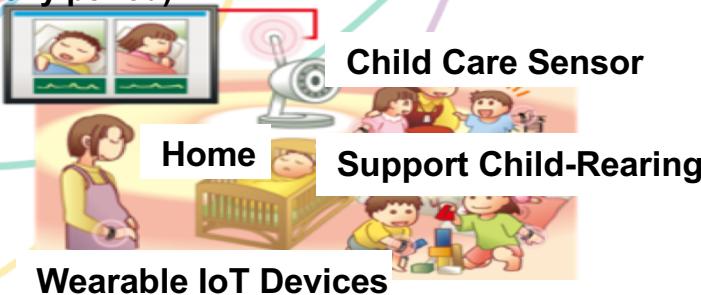
(Wifi enabled Ground at Toyonaka)





## ① Health/Preventive Medical Care Projects

Realizing medical care by health recording (medical checkup data, medical treatments, nursing and personal records) throughout lifetime (perinatal period, Infancy, childhood, adult age and elderly period)



## ② Health & Sports Projects

Prediction of traumatic injuries & performance improvement by performance analysis|



## ③ Future School Support Projects

Supporting students' learning and school life

Detecting & preventing social withdrawal and bullying

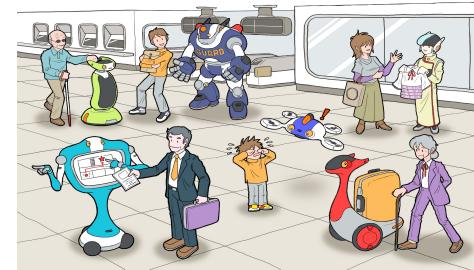


## ④ Symbiotic Intelligent System Projects

Long term working life for elderly people supported by the use of IT and robotics technology

Guarantee of QoL by utilizing information media and robots

Functional and compact society through collaborating with local communities



## ⑤ Info. System Infrastructure PJ

- Distributed management by Blockchain
- Protection of personal information of DB
- Secure computation among multiple data

## ⑥ Action Sensing Infrastructure PJ

- Action Sensing by adopting smart phones, wristwatch type sensors & IOT



## ⑧ Data governance PJ

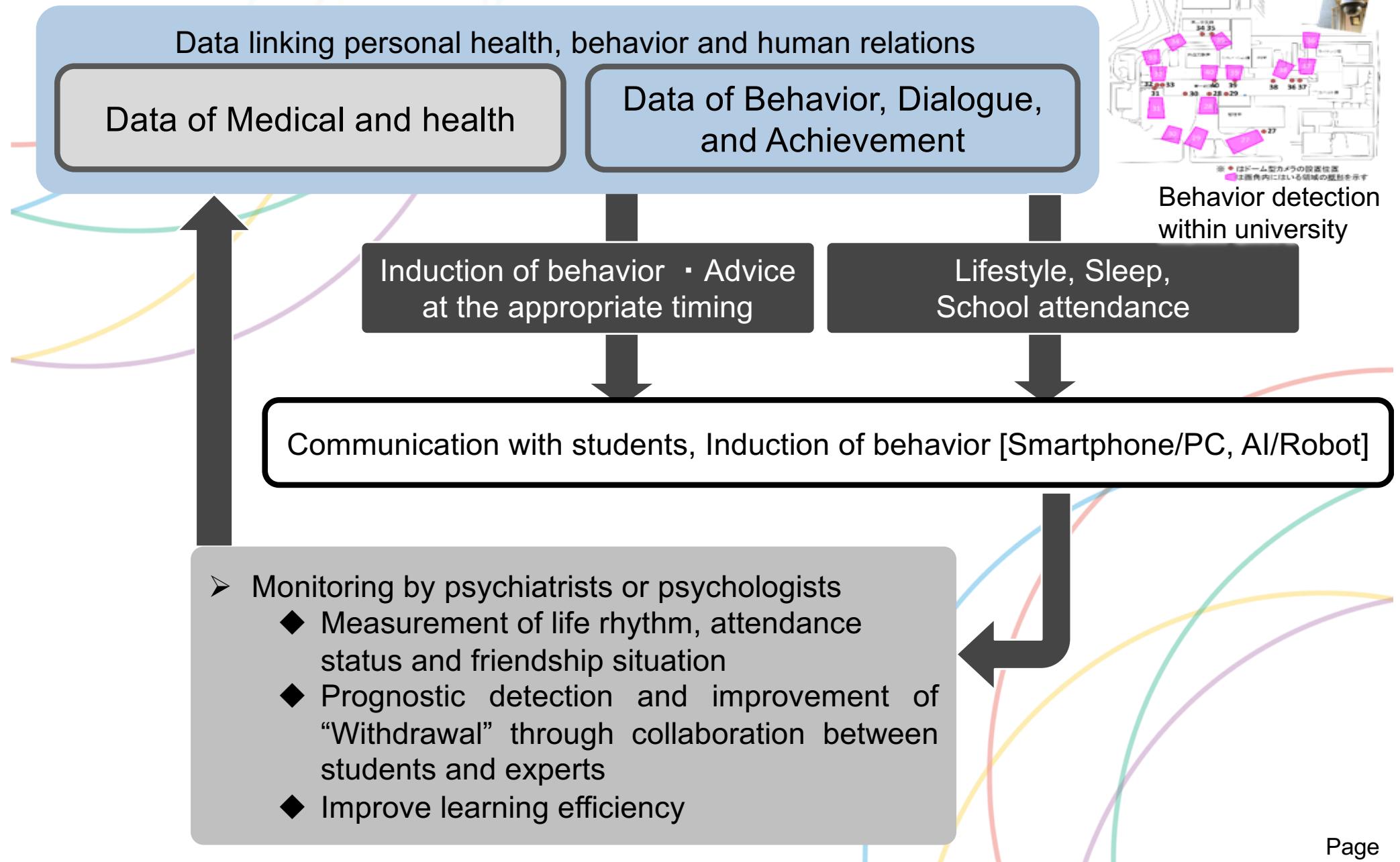
- Personal information, privacy protection
- ELSI (Ethical, Legal, Social Issue)
- Privacy effect evaluation

## ⑦ Empirical Field Maintenance PJ

## ⑨ Datability Experts Training PJ

## ⑩ Ground Challenge Research PJ

### ③ - 1) Project of Prognostic Detection and Improvement of “Withdrawal”

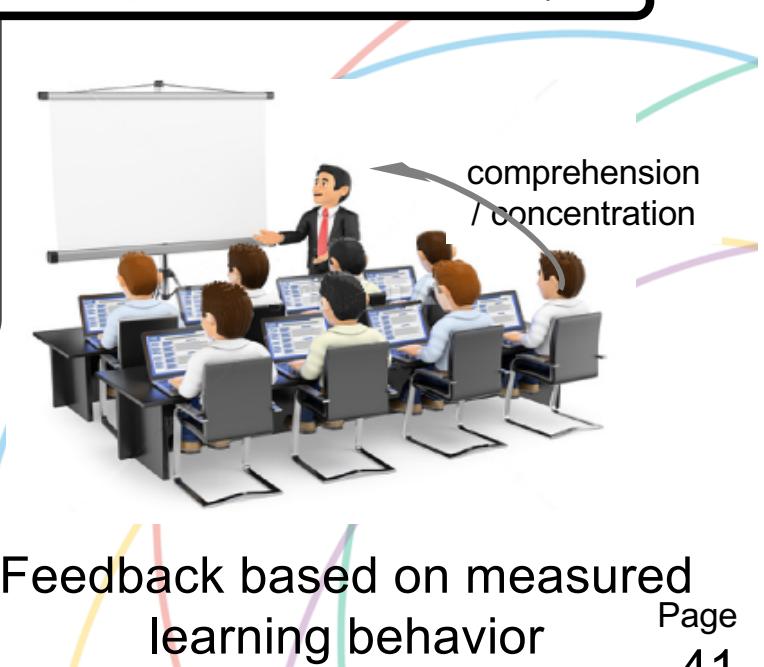
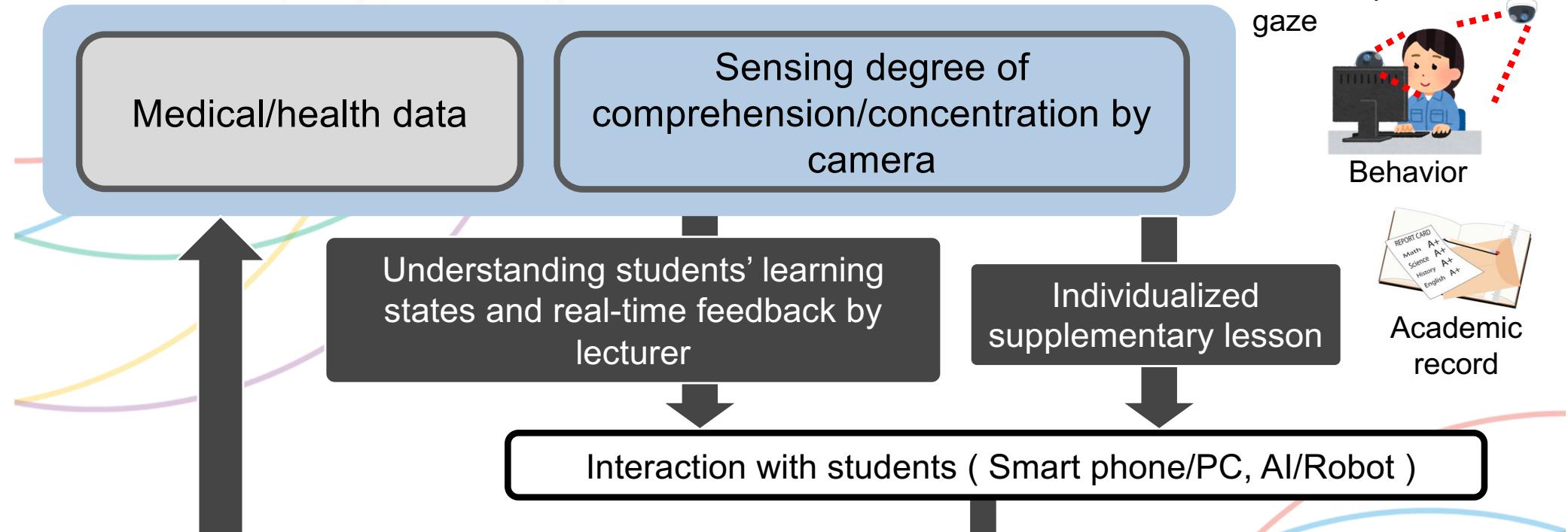
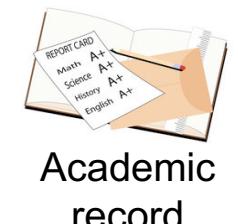


### ③ - 1) Project of Prognostic Detection and Improvement of “Withdrawal”

PJ	Subjects	Types of data	Examples of specific data	Sensor	Significance of PJ [Effect caused by PJ]
③-1	Students	Location information, School attendance data, Usage data of SNS, Health check-up data	Behavior · Dialogue · School record, Lifestyle · Sleep · Rhythm, Attendance status, Friendship situation	Wearable sensor, Smartphone	Prognostic detection and improvement of “Withdrawal”, Support of satisfying school life [Prevention of leave of absence and leaving school]

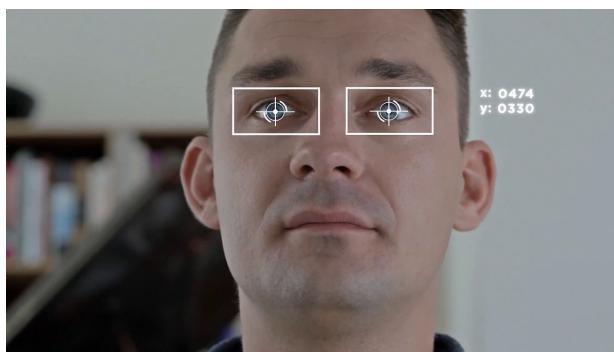


### ③ - 2) Learning and Life Support for Students



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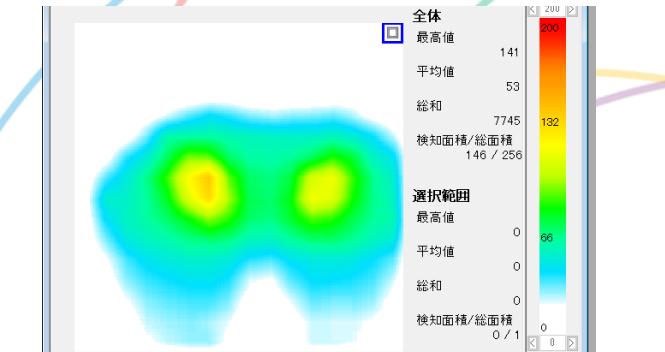
PJ	Target	Data type	Data to be used	Sensors	Expected results
③-2	Student	<ul style="list-style-type: none"> <li>- Health/physical strength examination</li> <li>- Academic record</li> <li>- Movement history</li> </ul>	<ul style="list-style-type: none"> <li>- Camera image (degree of comprehension /concentration)</li> <li>- Face authentication</li> <li>- Gaze</li> <li>- Seat pressure</li> <li>- Lifestyle</li> <li>- Learning cycle</li> <li>- Human relations personality</li> </ul>	<ul style="list-style-type: none"> <li>- Eye tracker</li> <li>- Sensor of facial expression</li> <li>- Seat pressure sensor</li> <li>- etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Activating lectures</li> <li>- Making learning efficient</li> </ul>



Gazing



Facial expression



Seat pressure

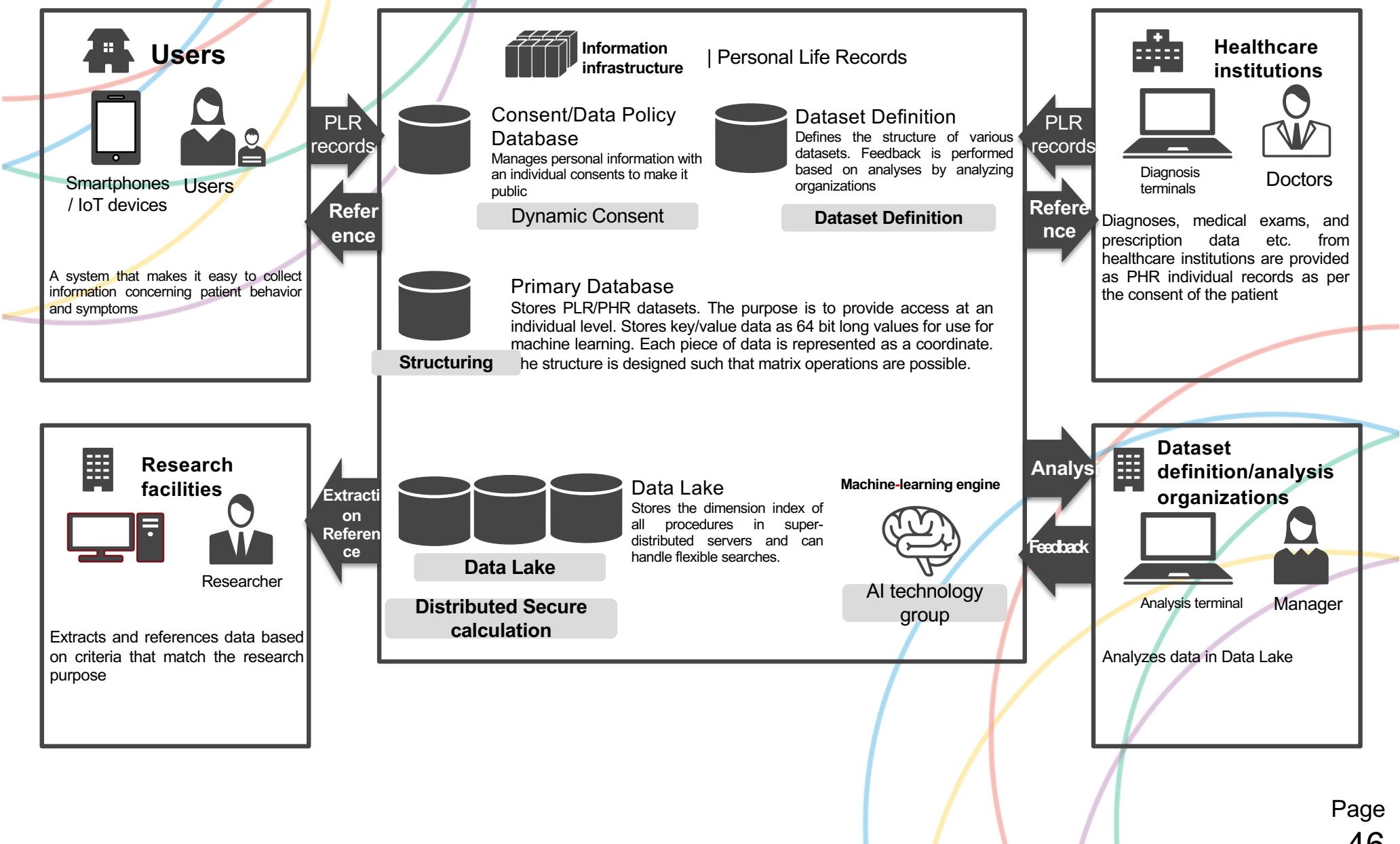
# ⑤ Information system infrastructure project

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PLR/HER  
connection

## Connecting apps via consent control API groups



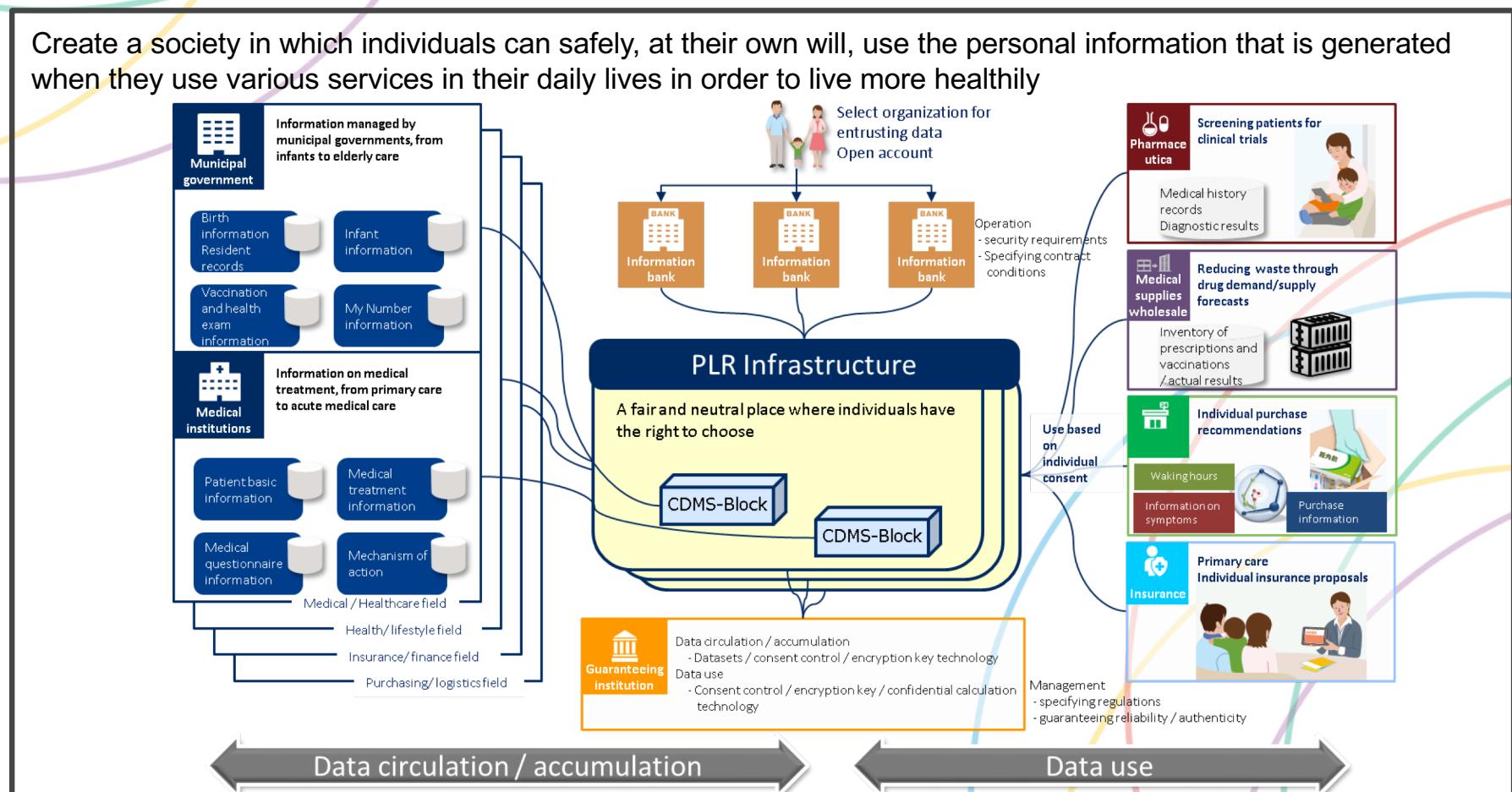
# ⑤ Information system infrastructure project

## Research and development for personal data handling infrastructure for Society 5.0

- Structuring and integrating data: Unified management and integration of various types of data in order to understand situations
- Individual consent control: Appropriate access control based on individual consent
- Security and privacy handling: Consistent handling of security and privacy

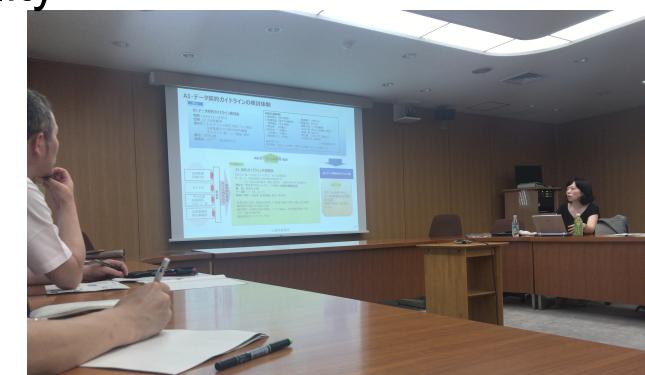
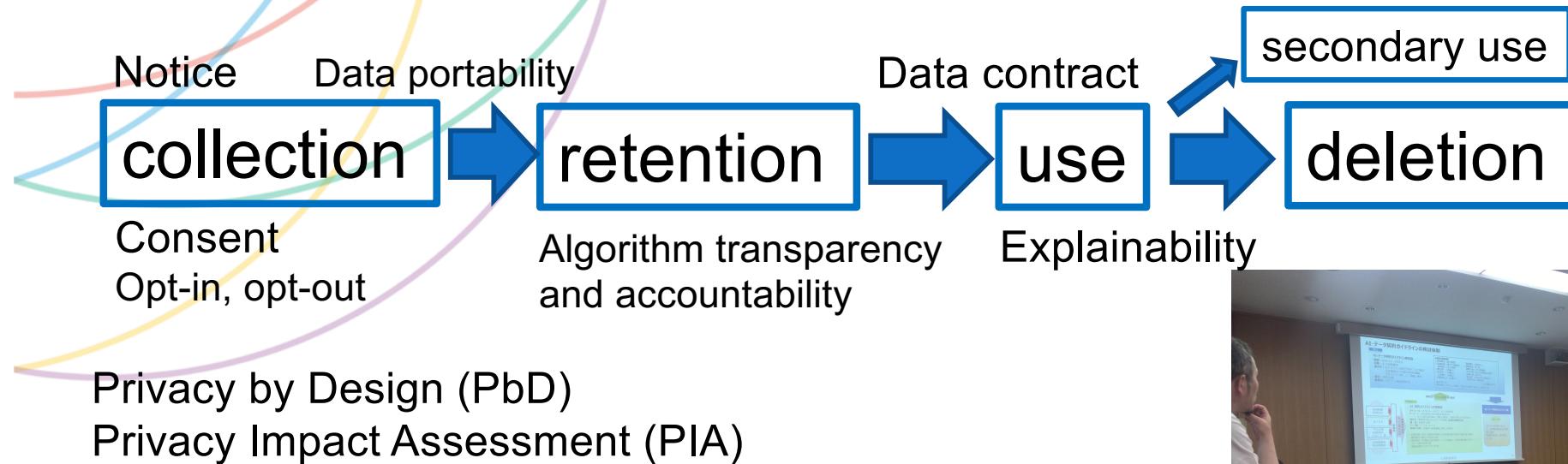
Secure calculations for the purpose of statistical processing that does not disclose original data

Create a society in which individuals can safely, at their own will, use the personal information that is generated when they use various services in their daily lives in order to live more healthily



# ⑧ Data governance project

The goal of this initiative is to make common rules and prepare guidelines for responsible data lifecycle management in the society 5.0.

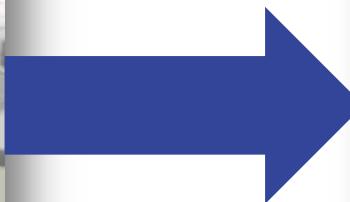


## Activities since November

A regular meeting of the study group on protections of privacy and personal data

- Discussion on principles and guidelines for responsible data handling
- Discussion on the way to obtain the participant's consent
- Investigation of the methodologies for privacy impact assessment
- Literature review on data governance for PHR (personal health record) and smart city in various countries
- Group formation for discussion on legal aspects of responsible data handling for society 5.0 (We have recruited seven professors and lawyers)

## Osaka University Campus



PLR to *de facto standard*



Osaka City Downtown

OSAKA-KANSAI  
JAPAN  
**EXPO 2025**



World Expo 2025  
Candidate