D3 CENTER
Digital design, Datability, Decision intelligence

Cybermedia Center
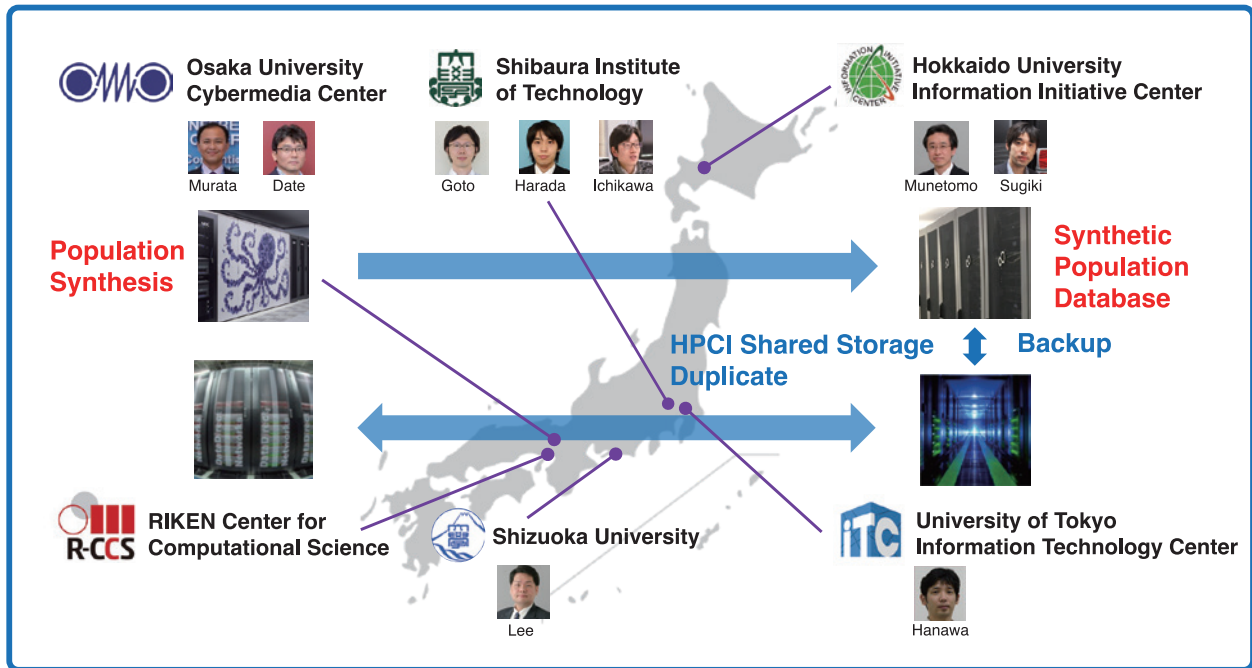**Osaka University, Japan**

BOOTH 4049

Synthetic Population for Real-Scale Social Simulations

HPCI High Performance Computing Infrastructure

Tadahiko Murata[1], Susumu Date[1], Yusuke Goto[2], Toshihiro Hanawa[3] ,
Takuya Harada[2], Manabu Ichikawa[2], Hao Lee[4], Masaharu Munetomo[5], Akiyoshi Sugiki[5]

1) Osaka Univ, 2) Shibaura Inst of Tech, 3) Univ of Tokyo, 4) Shizuoka Univ, 5) Hokkaido Univ

JHPCN

- **Osaka University Cybermedia Center** — Murata, Date
- **Shibaura Institute of Technology** — Goto, Harada, Ichikawa
- **Hokkaido University Information Initiative Center** — Munetomo, Sugiki
- **Population Synthesis**
- **Synthetic Population Database**
- **HPCI Shared Storage Duplicate**
- **Backup**
- **RIKEN Center for Computational Science**
- **Shizuoka University** — Lee
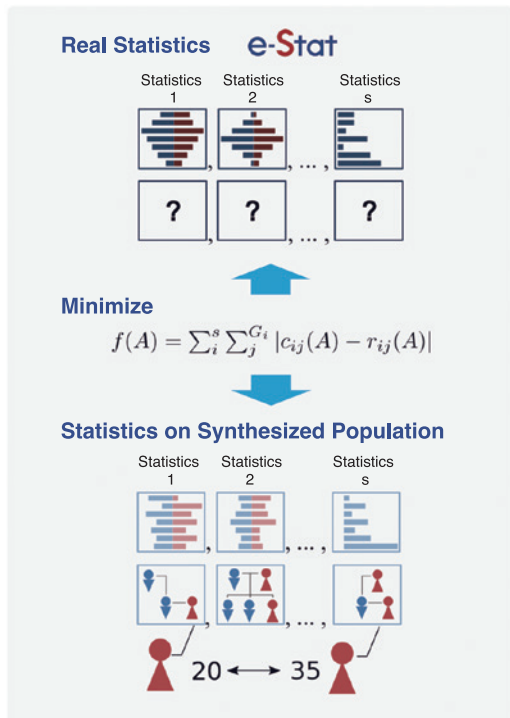- **University of Tokyo Information Technology Center** — Hanawa

---

Synthetic Populations (SPs)

Synthesize Japanese populations using Census for 2000, 2005, 2010, and 2015. Working on 2020 now [A,B]

Real Statistics e-Stat

Statistics 1, Statistics 2, ..., Statistics s

Minimize

$$f(A) = \sum_i^s \sum_j^{G_i} |c_{ij}(A) - r_{ij}(A)|$$

Statistics on Synthesized Population

Statistics 1, Statistics 2, ..., Statistics s

20 ⟷ 35

Real-Scale Social Simulations Using SPs

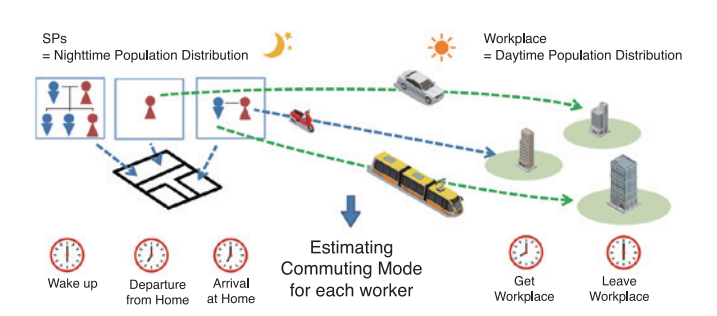Conduct simulations using attributes of Synthetic Populations X survey data collected by researchers.

Voting Simulation in Takatsuki, Osaka with 350,000 population [C,D]
Age, Distance to polling station
X Interest to election by age

COVID-19 Infection Simulation in Myoko, Niigata with 30,000 population[E]
Age, Industries X Infection Rate by Age

Cabinet Secretariat COVID-19 Simulation Project

SPs With Short Time Movement Using Working Place

SPs = Nighttime Population Distribution

Workplace = Daytime Population Distribution

Estimating Commuting Mode for each worker

Wake up | Departure from Home | Arrival at Home | Get Workplace | Leave Workplace

---

A) Murata, Masui, Harada (2017), B) Harada, Murata (2017), C) Konishi, Murata (2010), D) Murata, Hamaguchi (2017), E）Kurahashi (2020), F）Murata, Iwase, Harada (2023), G) Horigami, Murata (2024)

Contact: sc24@ais.cmc.osaka-u.ac.jp   https://www.sde.cmc.osaka-u.ac.jp/home