JST: SCC-PG: Bridging the digital gap and identifying cross-cultural pathways for adoption of IoT technologies to support super-aging societies in the U.S. and Japan

Progress Report

UMBC
KYUSHU UNIVERSITY
Northeastern University
Keio University

NSF Award #1952032
A Collaboration among four INCS-CoE Charter Members
Supported by NSF and JST

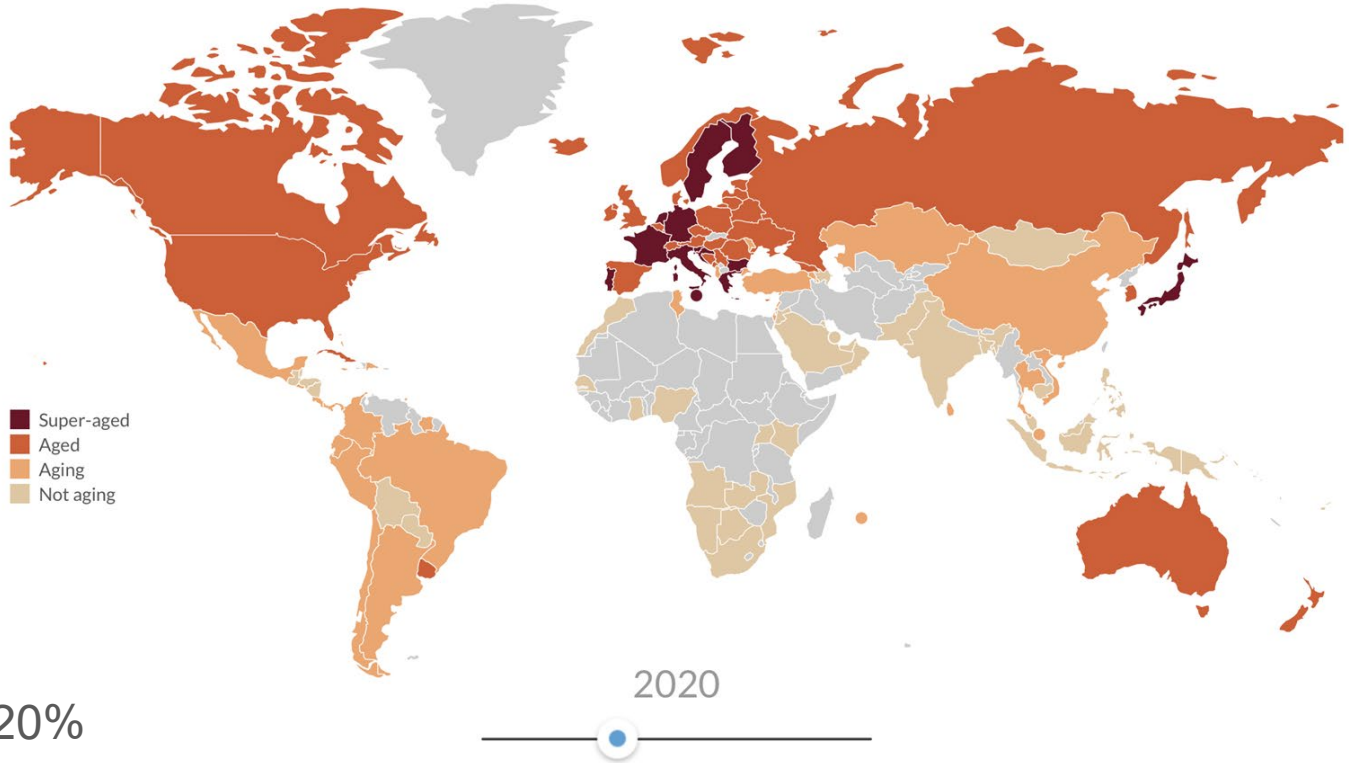
Super-Aging Societies

Percentage of population above 65 Years old

2020

Japan: 28.6%

U.S.: 16.6%



Super-Aged Threshold: 20%

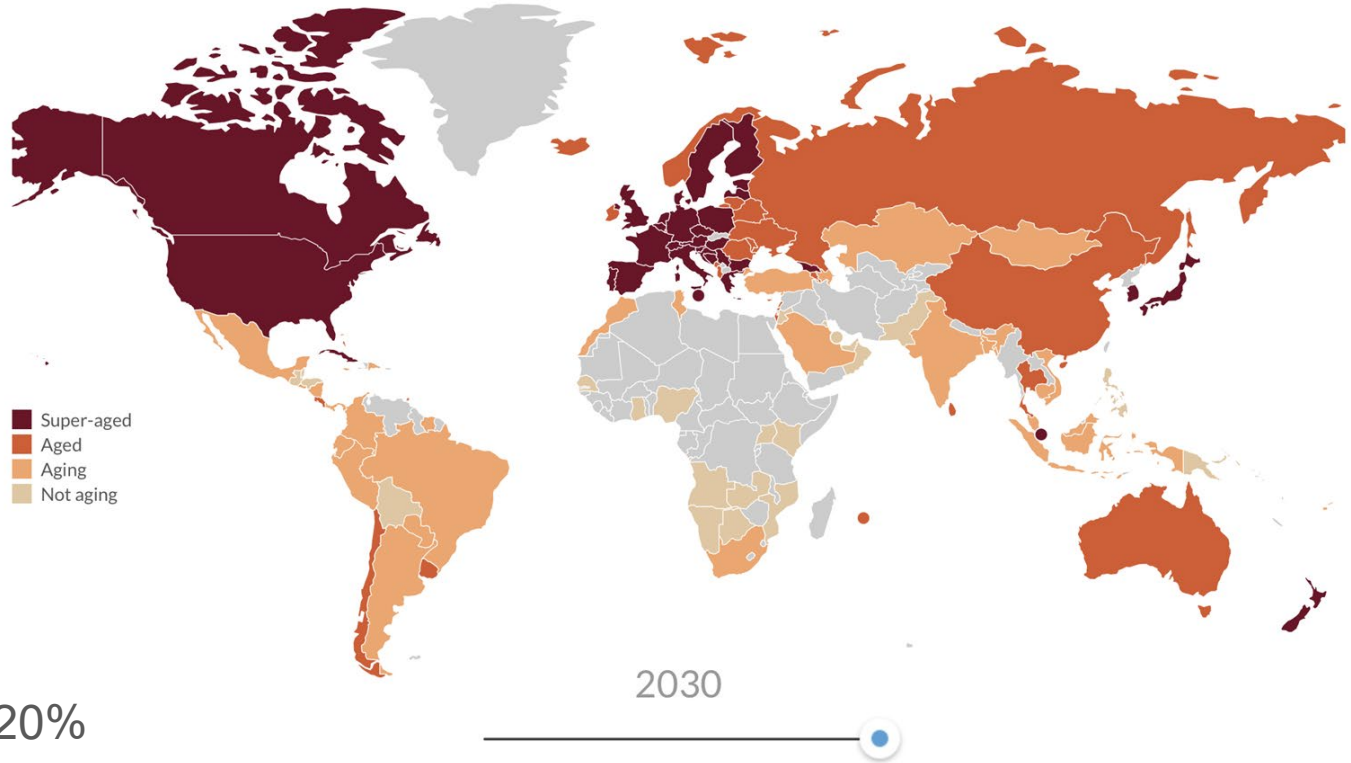
Super-Aging Societies

Percentage of population above 65 Years old

2030

Japan: 30.7%

U.S.: 20.1%



Super-Aged Threshold: 20%

What is the Problem?

- As our societies grow older, they are being fundamentally transformed. Work and work-related relationships have provided a key social anchor to many people. As we “age out” of work and the community it creates, isolation increases, which in turn can lead to sequelae (mortality, all-cause hospitalization, comorbidities - including mental issues such as depression).

- Our team brings together social scientists, gerontologists, and computer scientists to create new technologically grounded systems that can sustain and facilitate (superaging) individuals’ connection with the society and community around them.

What is the Prior Art?

- Not much has been done to address the overall problem in a way that tackles *multiple underlying issues simultaneously*, and in a *proactive* rather than reactive mode.
- Individuals directly use ICT to try and stay connected (e.g. Facebook). Some experimental ICT systems try to assist in tasks at home. Gerontologist and Sociologists study these transitions from workforce, and try to understand their effects on individuals and society. Individual technologists have worked on subproblems -- detecting actions, detecting emotions, assistive technologies, etc.
- To the best of our knowledge, there is no effort to create *connected communities* for the super aged using smart technologies.

What is new about our Approach?

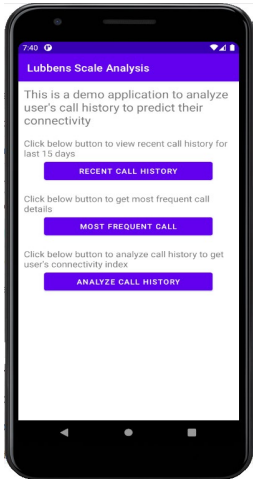
- We propose to develop evidence based, adaptive environments to address isolation by creating connected communities that use AI and IoT (Sensing, Smart Systems, Predictive Modeling, Machine Learning, Robotics).
- We bring together disparate, transdisciplinary expertise and bridge two cultural gaps – between the U.S. and Japan, and between technologists and gerontologists/sociologists.
- Our approach is culturally competent, technologically forward looking (2030), interdisciplinary and grounded in community.

Progress on our Planning Grant

- Met at Kyushu University in February 2020 – post-submission, but prior to planning grant award, to discuss key concepts.
- Originally planned in-person workshops were replaced by international virtual meetings on a regular cadence – often biweekly.
- Integrated our experiences and learnings from the current personal effects of the pandemic.
- Broke into cross-disciplinary multi-institutional workgroups to explore four themes:
  - Human Behavior and Modeling
  - Human Cyber Systems
  - Sensors and Analytics
  - Socio-Culturally Informed Transition to Practice

Preliminary Work

- Extensive literature review.
- Discussing with Community stakeholders, such as Itoshima City, to build *smart and connected* systems responsive to their needs, and helping to identify stakeholder pain points which lead to research challenges.
- Focusing the scope of research to the most critical cross disciplinary areas.
- Exploring feasibility of smart and connected approaches:
  - Surveys of senior citizens to identify issues (IRB in approval process)
  - App to detect isolation by automating Lubben Social Network Scale[1].
  - Publications in pipeline/planned.



Research Challenge – Thesis

New technologies can be used to create ***smart systems*** that help understand and incorporate models of an individual's states and contexts on a continuous basis, relate it to known issues around isolation identified in literature and state-of-the-art psychological knowledge, and take action to keep the individual ***connected with the community*** around them, while preserving the individual's privacy and security.

Bridging the digital gap and identifying cross-cultural pathways for adoption of IoT technologies to support super-aging societies in the U.S. and Japan

Thank You

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