Smart Homes to Support Independent Aging

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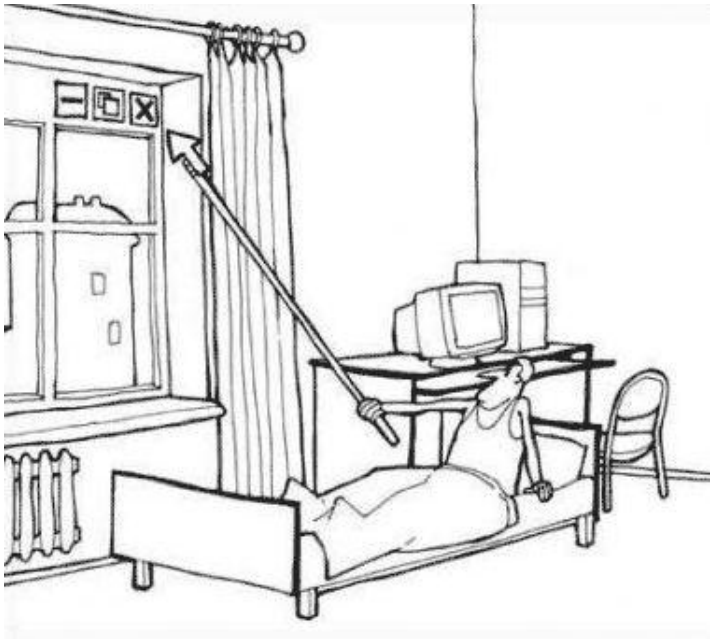
home-based environmental assisted living technologies for healthy elders

Smart home

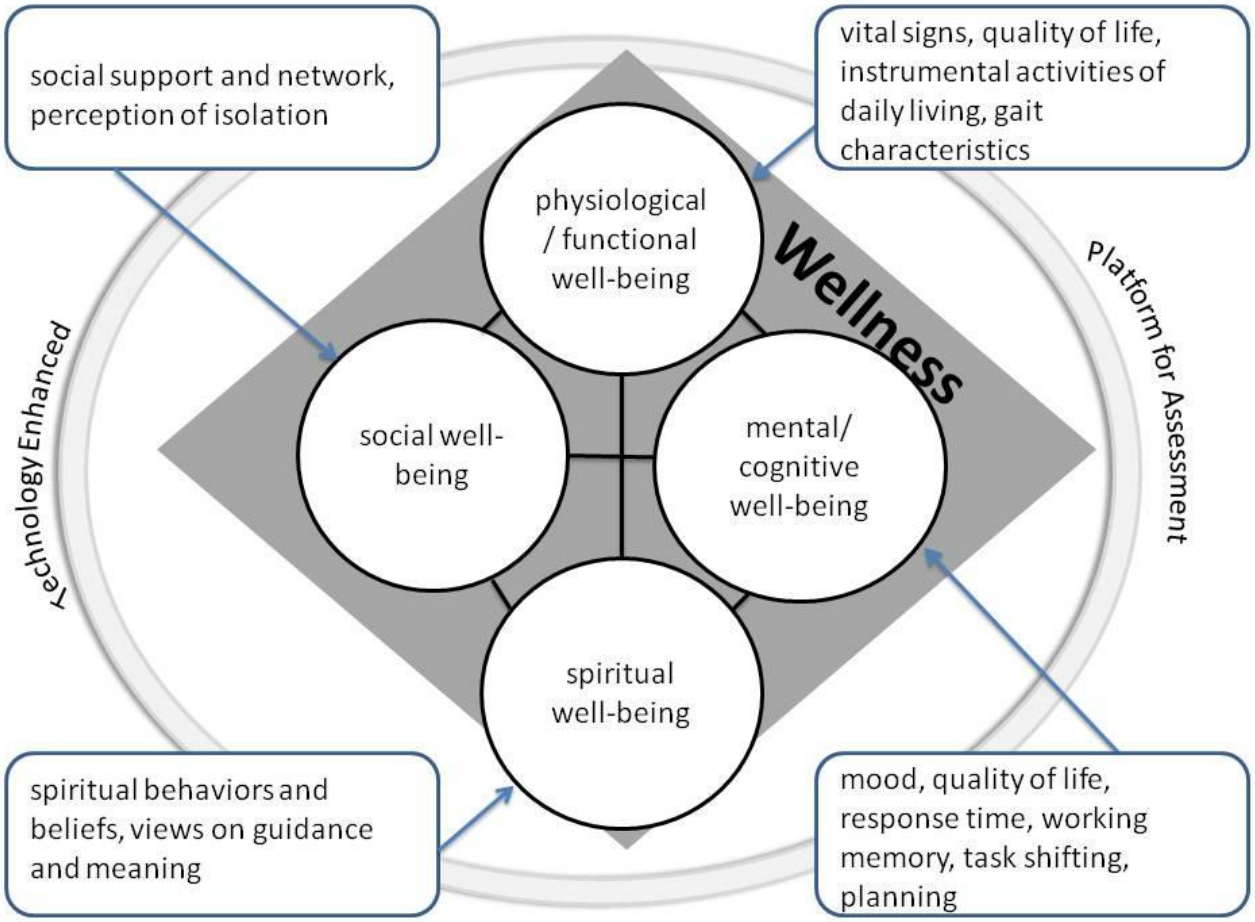
- a residence equipped with technology that enhances safety and well-being of patients at home and monitors their health condition.



Background

- Older adults vary in the development and progression of chronic disease and decline at varying rates in areas of well-being.
- Efforts to date have addressed a single aspect of older adults' wellness.
- Holistic approach to wellness is needed.
- Smart homes have the potential to introduce tools that enable non-obtrusive monitoring and assessment wellness.

Theoretical Framework: Wellness

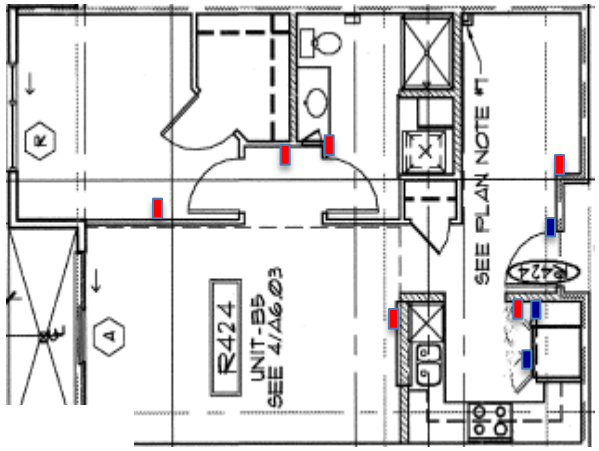


Demonstration project

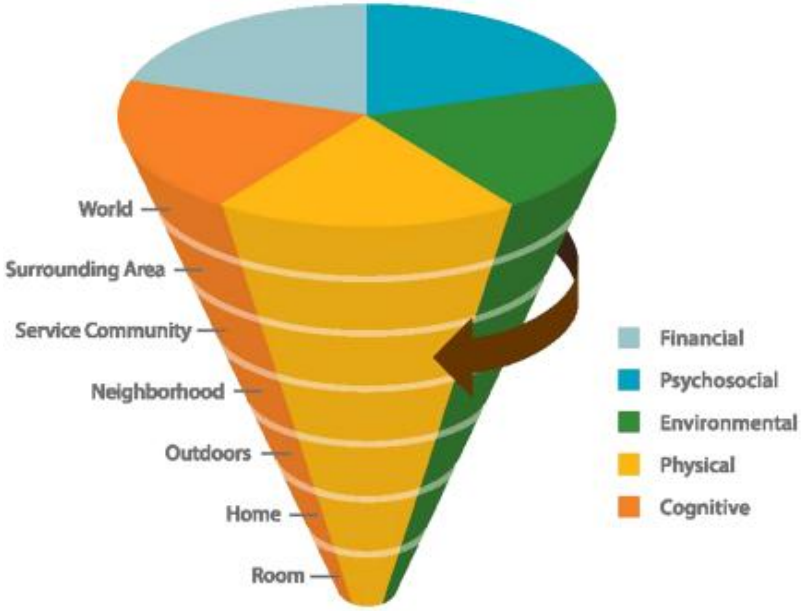
- Independent retirement community in Seattle
- Eligibility criteria included:
  - age of 62 years or older
  - residents of an independent retirement community
  - independent in activities of daily living (ADL)
  - able to provide written informed consent

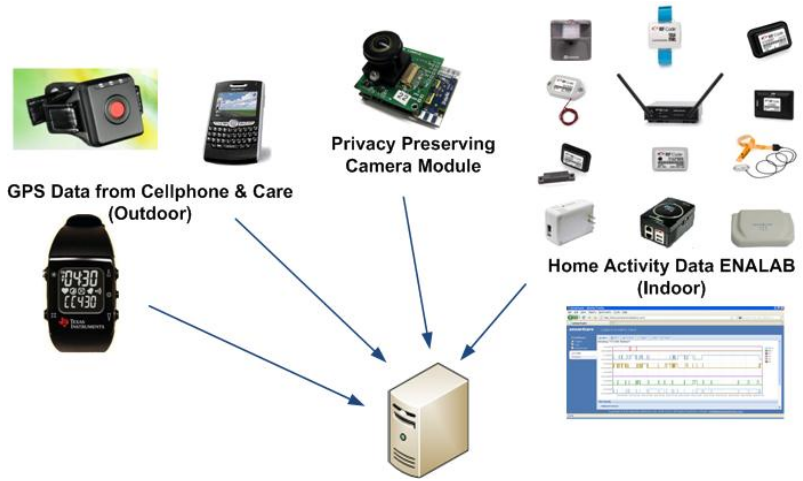
Sensors

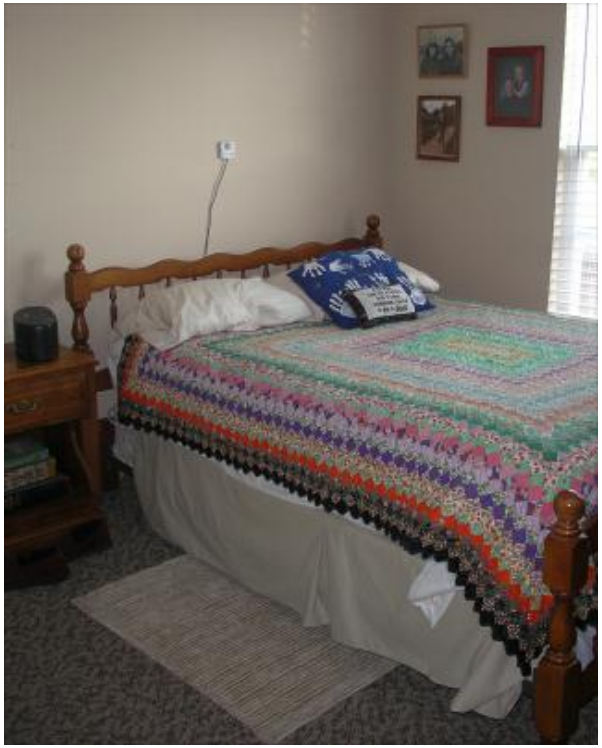
- Stove sensor
- Sensor mat
- Motion sensors

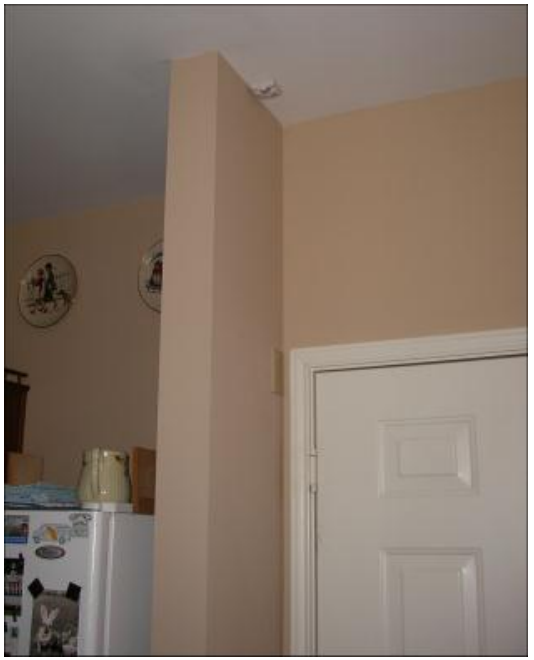


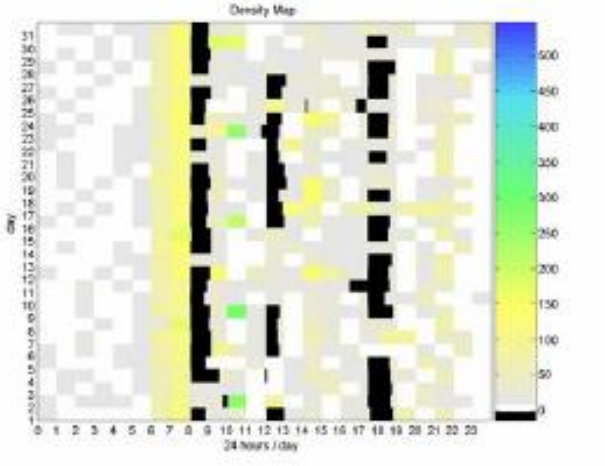
Door sensor
Motion sensor

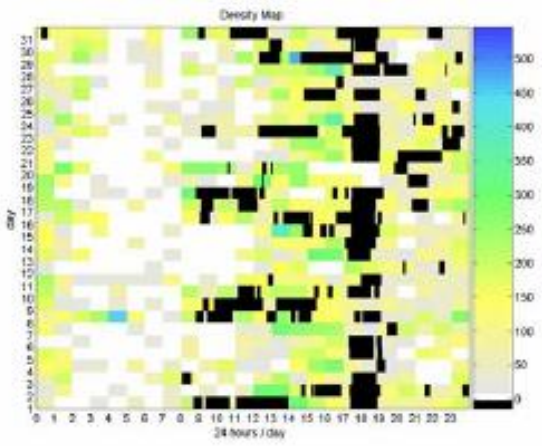









Density Map
day
24 hours / day


Density Map
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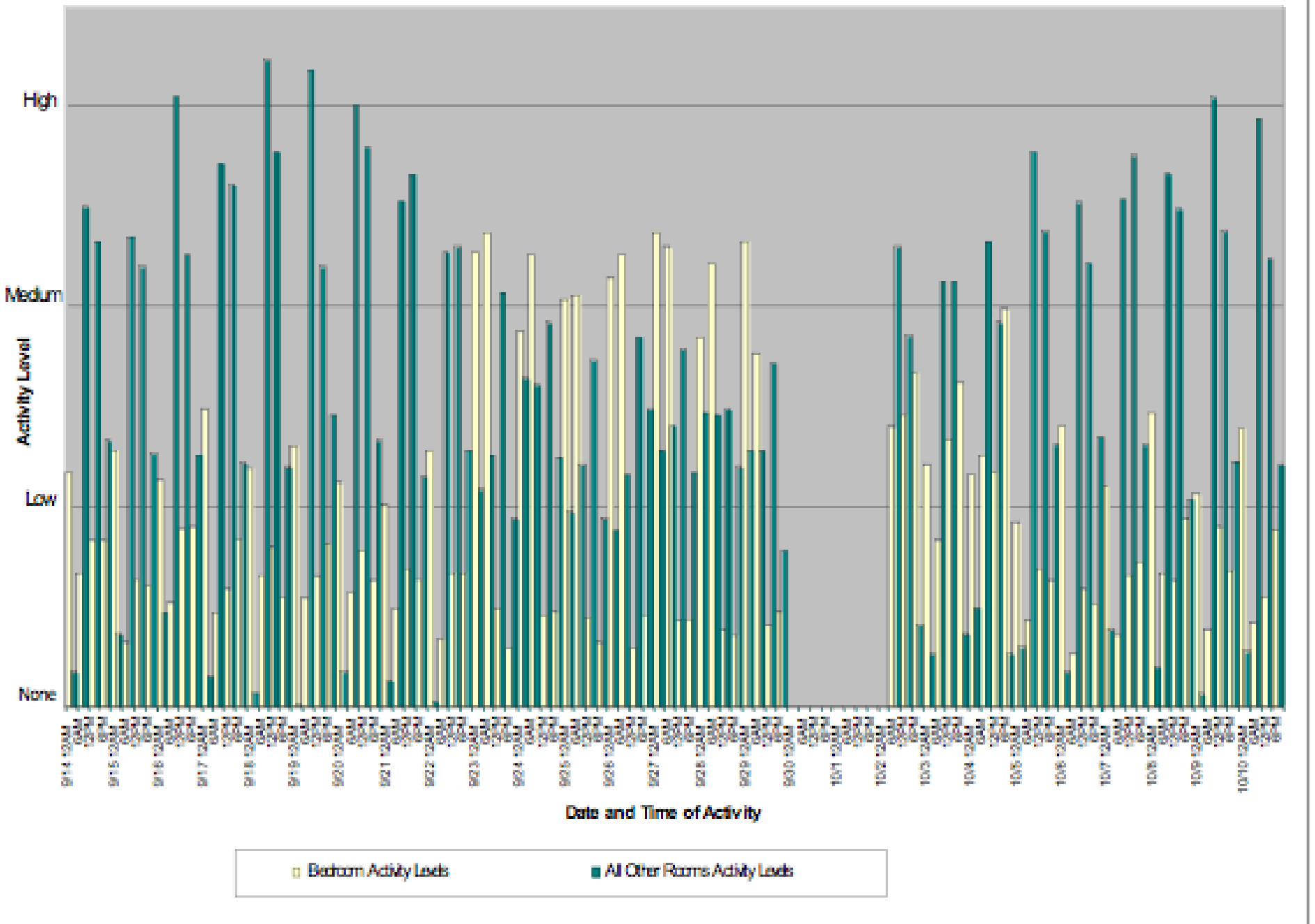
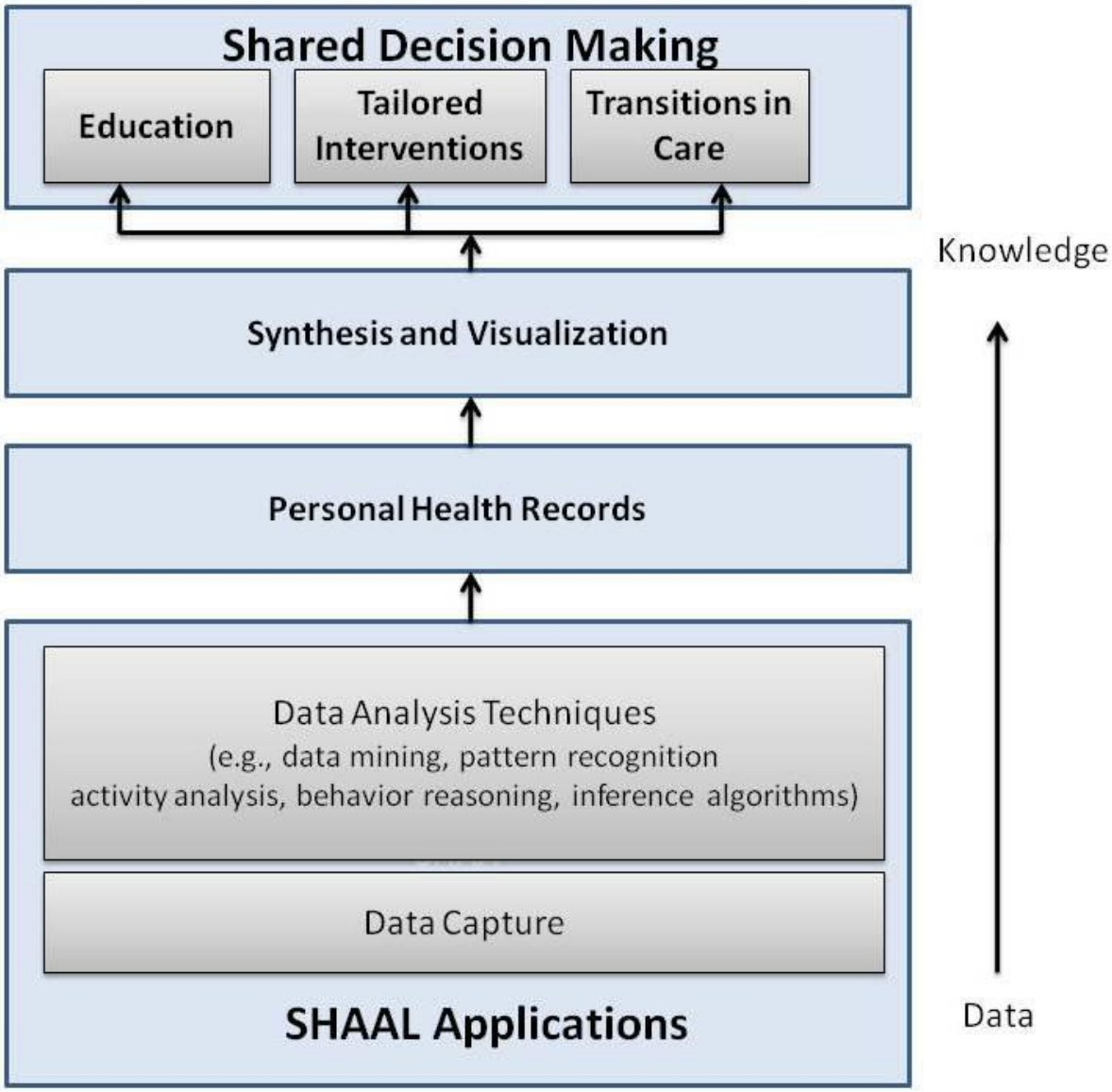

High
Medium
Low
None
Activity Level
Date and Time of Activity
Bedroom Activity Levels
All Other Rooms Activity Levels


Shared Decision Making
Education
Tailored Interventions
Transitions in Care
Synthesis and Visualization
Personal Health Records
Data Analysis Techniques
(e.g., data mining, pattern recognition
activity analysis, behavior reasoning, inference algorithms)
Data Capture
SHAAL Applications
Knowledge
Data

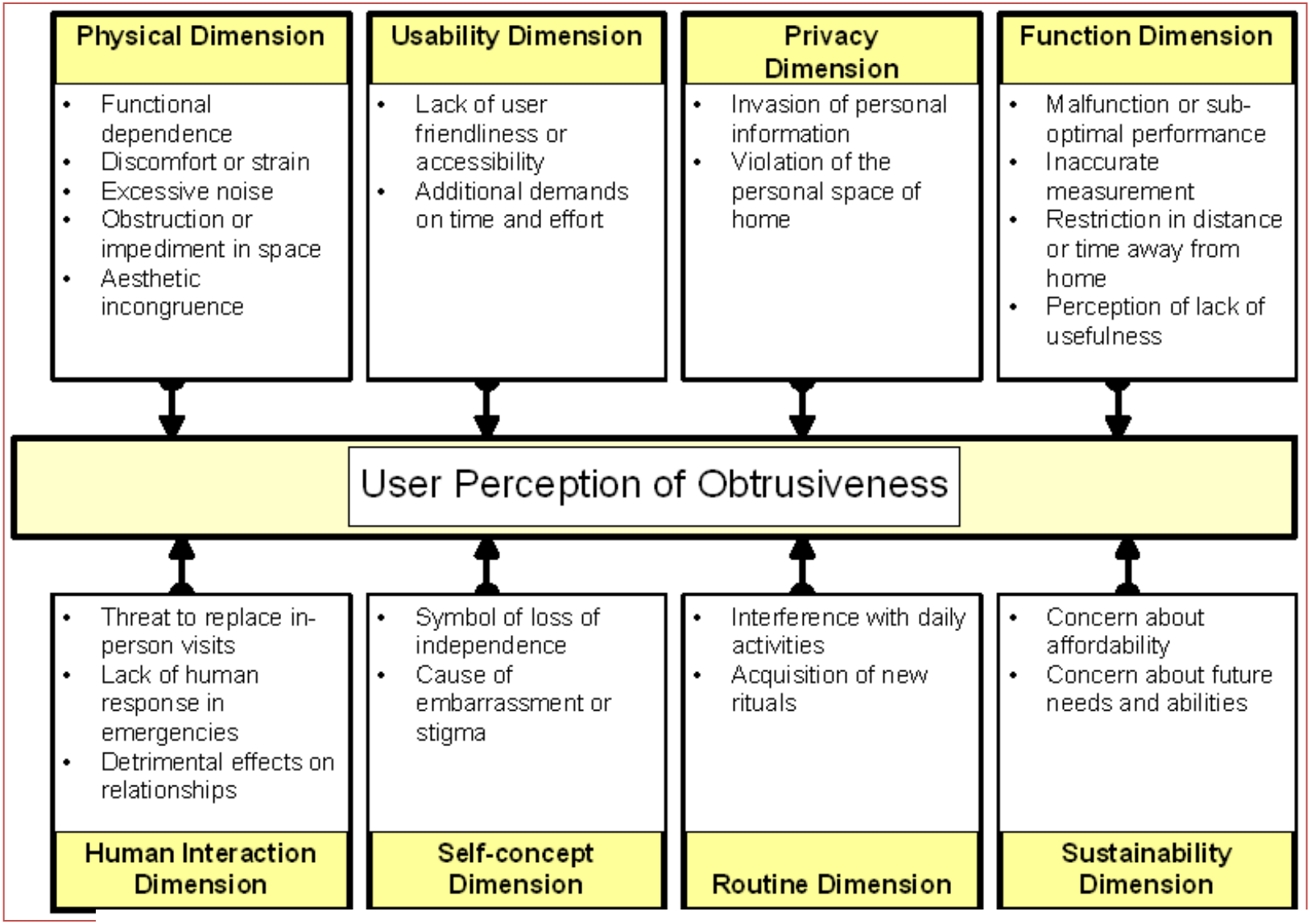
Privacy

Belotti and Sellen Framework

	Feedback About	Control Over
Capture	When and what information about me gets into the system.	When and when not to give out what information. I can enforce my own preferences for system behaviours with respect to each type of information I convey.
Construction	What happens to information about me once it gets inside the system.	What happens to information about me. I can set automatic default behaviours and permissions.
Accessibility	Which people and what software (e.g., daemons or servers) have access to information about me and what information they see or use.	Who and what has access to what information about me. I can set automatic default behaviours and permissions.
Purposes	What people want information about me for. Since this is outside of the system, it may only be possible to infer purpose from construction and access behaviours.	It is infeasible for me to have technical control over purposes. With appropriate feedback, however, I can exercise social control to restrict intrusion, unethical, and illegal usage.

Belotti V, Sellen A. Design for Privacy in Ubiquitous Computing Environments. Proceedings of the Third European Conference on Computer Supported Cooperative Work (ECSCW'93)

Obtrusiveness Framework



Hensel, B. K., Demiris, G., & Courtney, K. L. (2006). Defining obtrusiveness of home telehealth technologies: A conceptual framework. *Journal of the American Medical Informatics Association, 13*(4), 428-431.

Discussion

- Smart home technology has the potential to support independence and aging in place.
- Technical, organizational, ethical and policy challenges
- Promoting dependency rather than supporting independence
  - Reduction of social contact
  - Substitute personal forms of care and support
  - Over-reliance on automation

Contact

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