



Senior Care: Improving Quality of Life Through Natural Language Interactions with Social Robots.

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Smart robotics to support elderly care.

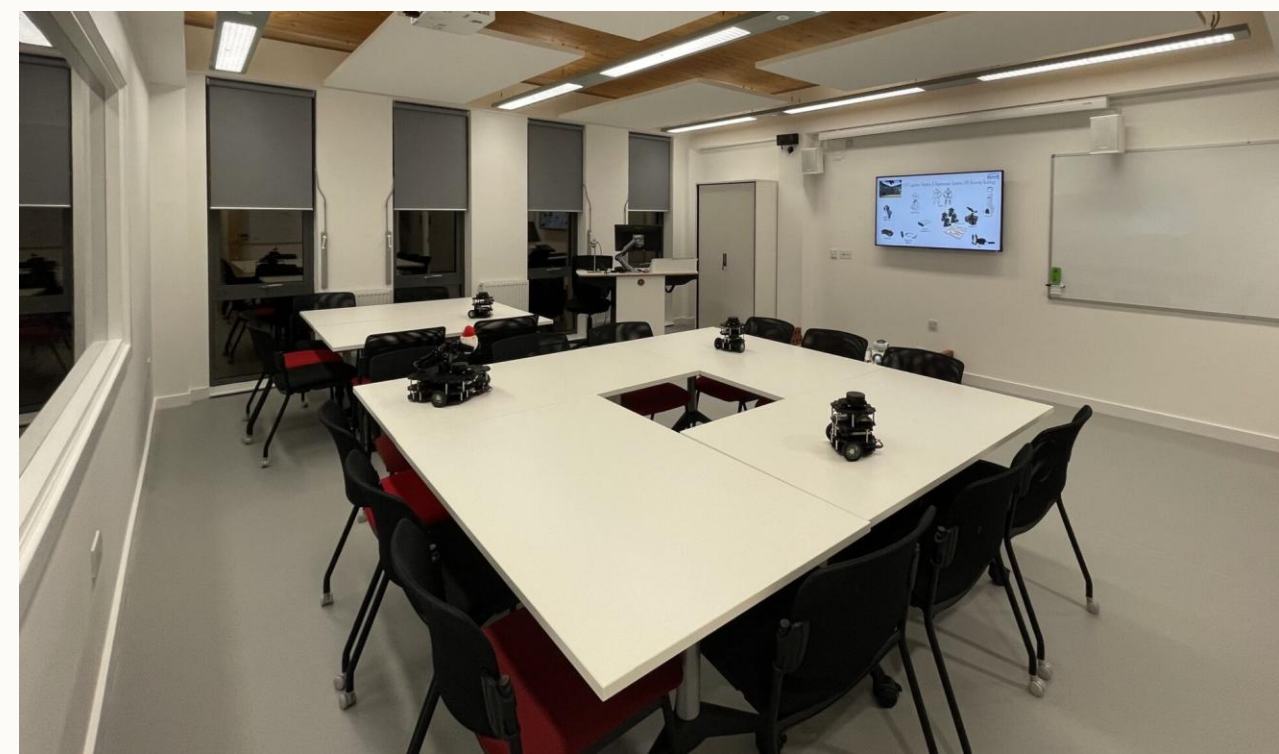
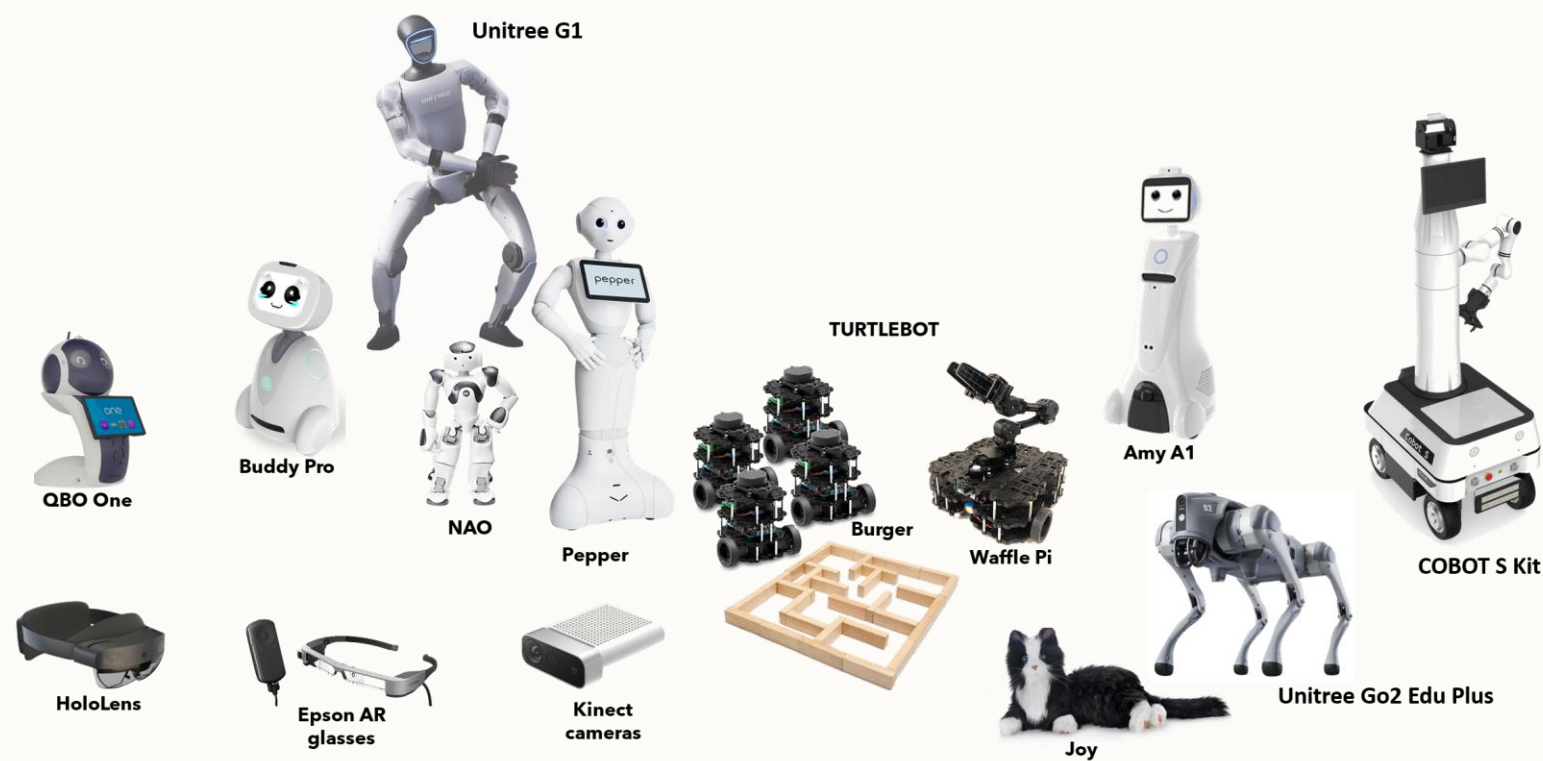
- Societies globally are getting older at a pace much faster than in the past.
- Individuals aged 60 have already outnumbered children younger than 5, with this demographic projected to surpass 1.4 billion by 2030 (according to WHO)
- Health systems in place feel fragmented, reactive and disconnected, often creating inequity and ageism and leaving both patients and providers unhappy
- Availability of paid and unpaid caregivers is dwindling, leading to overburdened carers
- This demographic shift and the associated public health challenges have accelerated the research in advanced technologies in healthcare, especially artificial intelligence (AI) and robotics, to support eldercare



Masala, G. L., & Giorgi, I. (2025). Artificial Intelligence and Assistive Robotics in Healthcare Services: Applications in Silver Care. International Journal of Environmental Research and Public Health, 22(5), 781.

Robotics and Assistive technologies CEntre (RACE)

<https://research.kent.ac.uk/race/>



Human Robot Interaction

HRI is the study of interactions between humans and robots.



Human Robot Interaction

HRI focuses on developing robots that can interact with people in various everyday environments.

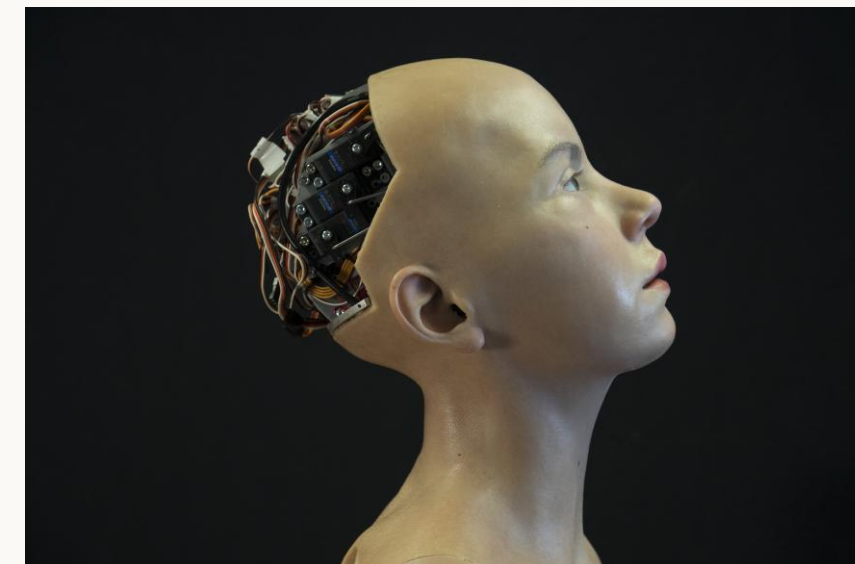
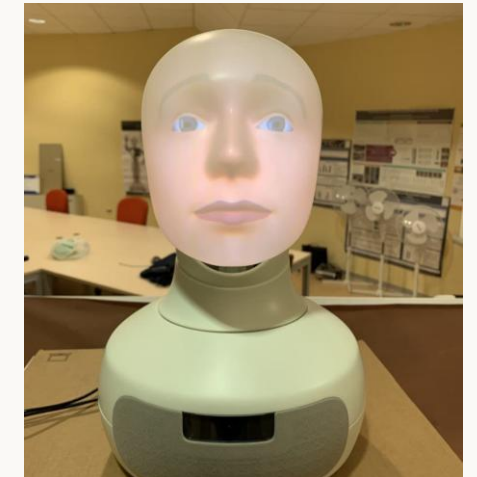
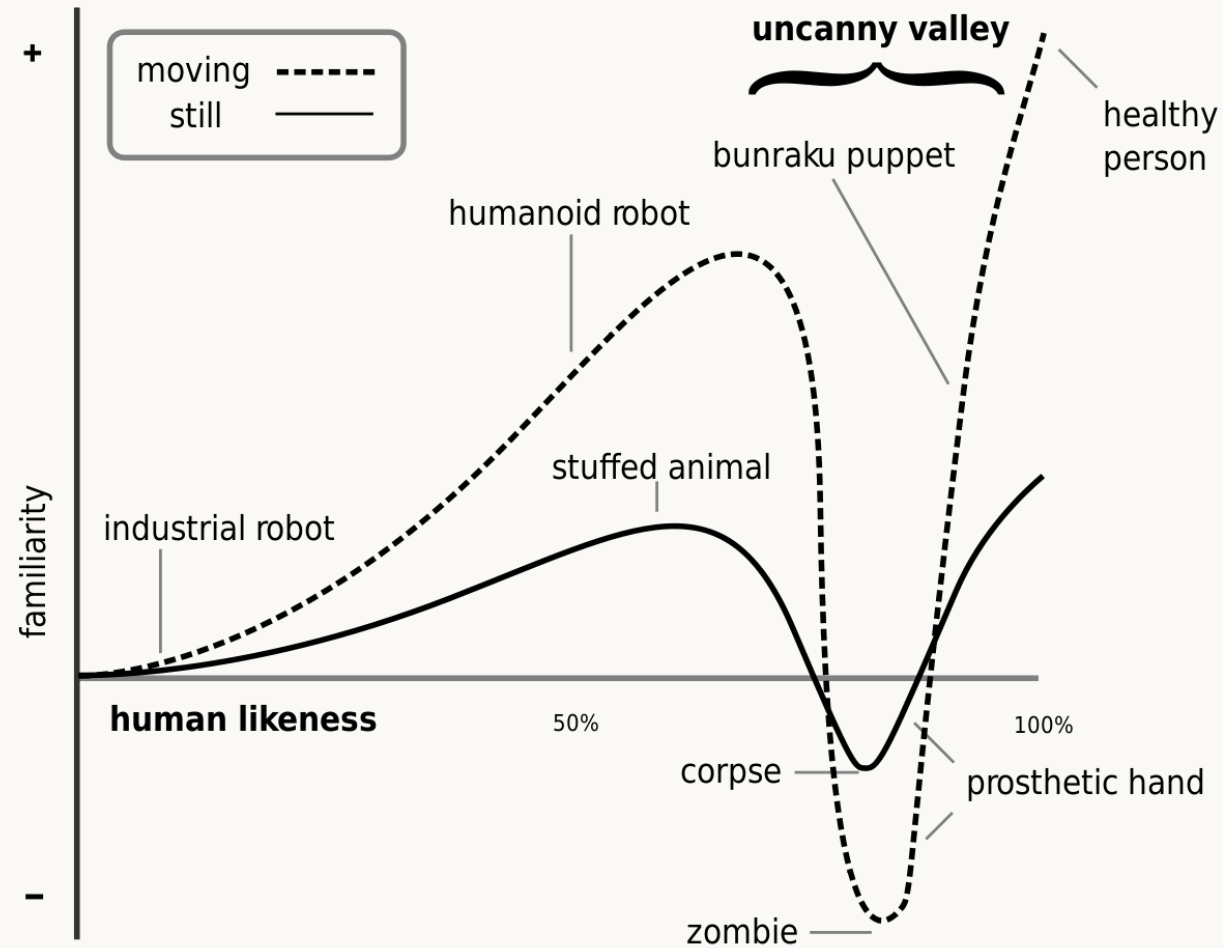
Robots are not just a tool but, rather, collaborators, companions, guides, tutors..



Human Robot Interaction

- Most people have seen only a picture of a robot!
- Does the robot ***intimidate*** people?
- Does the ***first impression*** matter?
- Does this impression ***change*** over the course of one encounter?
- ***Reject*** at first sight?

The uncanny valley



Mori, M. (2012). Translated by MacDorman, K. F.; Kageki, Norri. "The uncanny valley". *IEEE Robotics and Automation*. 19 (2): 98–100.

Social robots and Human-Robot Interaction

Popular humanoids: It has been demonstrated that a person, when presented with a new robot, typically a robot capable of engaging with them using natural language, is excited.

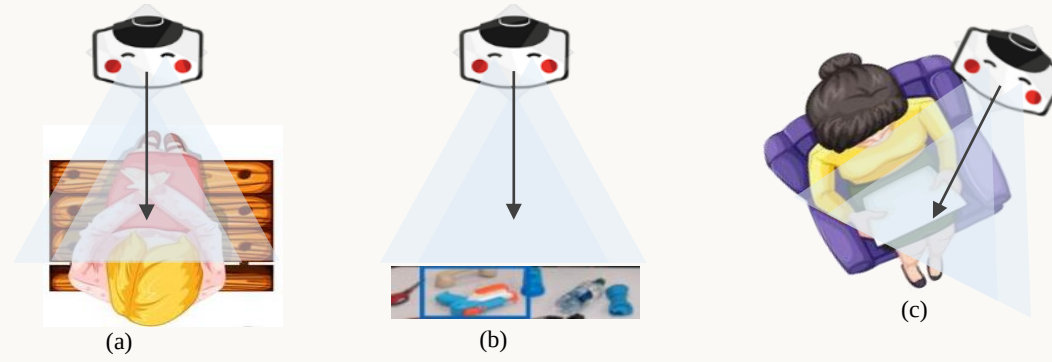
Anthropomorphic vs puppet

E.g. patients affected by dementia using robot “animals”



Relevant research on human-robot interaction with geriatrics revealed optimistic results from petting animal-like robots, with similar effects as in therapies with animate pets in improving pain, and lowering anxiety or blood pressure.

HRI WITH NAO



E x e r c i s e R o u t i n e
2

(Do the routine, use
emergency 'stop exercise' key
word)

Entertainment, to combat loneliness, and support the human physical and mental well-being.

- verbal conversations
- browsing a Webpage
- storytelling

Disease management: helping users with the daily intake of their medicines.

- Managing the regular intake of medications by reminding, describing or pointing to the correct scheduled medicine
- Exercise routine



SOCIAL ROBOTS AND HUMAN-ROBOT INTERACTION

Ingredients for research in HRI:

- Hypothesis
- Set up the theoretical experiment
- Request an ethical approval
- Coding
- Set up lab (furniture, toys, cameras)
- Survey preparation
- Recruitment participants
- Analysis (quantitative and qualitative results)

PILOT STUDIES



PILOT 1

Stevie in your care home

The applicability of the socially assistive robot Stevie in a day centre for people with dementia

ref

Taylor, L., Downing, A., Noury, G. A., Masala, G., Palomino, M., McGinn, C., & Jones, R. (2021). Exploring the applicability of the socially assistive robot Stevie in a day centre for people with dementia. In 2021, the 30th IEEE International Conference on Robot & Human Interactive Communication



PILOT 2

NAO “Friendly but Faulty”

To err is human, but is it also robot?

ref

Giorgi, I., Tiroto, F. A., Hagen, O., Aider, F., Gianni, M., Palomino, M., & Masala, G. L. (2022). Friendly but faulty: A pilot study on the perceived trust of older adults in a social robot. *IEEE Access*, 10, 92084-92096.



PILOT 3

Do you trust my advice?

NAO, your health adviser, is giving you recommendations on supplements and vitamins. Do you trust *him*?

ref

Giorgi, I., Minutolo, A., Tiroto, F., Hagen, O., Esposito, M., Gianni, M., ... & Masala, G. L. (2023). I am robot, your health adviser for older adults: Do you trust my advice? *International Journal of Social Robotics*, 1-20.



PILOT 4

Trust in differently intelligent robots!

NAO and Buddy are playing the “Country/Town/River” game.

ref

Giorgi, I., Rajapakse, S., Palomino, M., & Masala, G. L. (2025). Older Adults’ Perceptions of Robots with Differing Intelligence in Social Multi-Robot Interactions. *ACM Transactions on Human-Robot Interaction*.

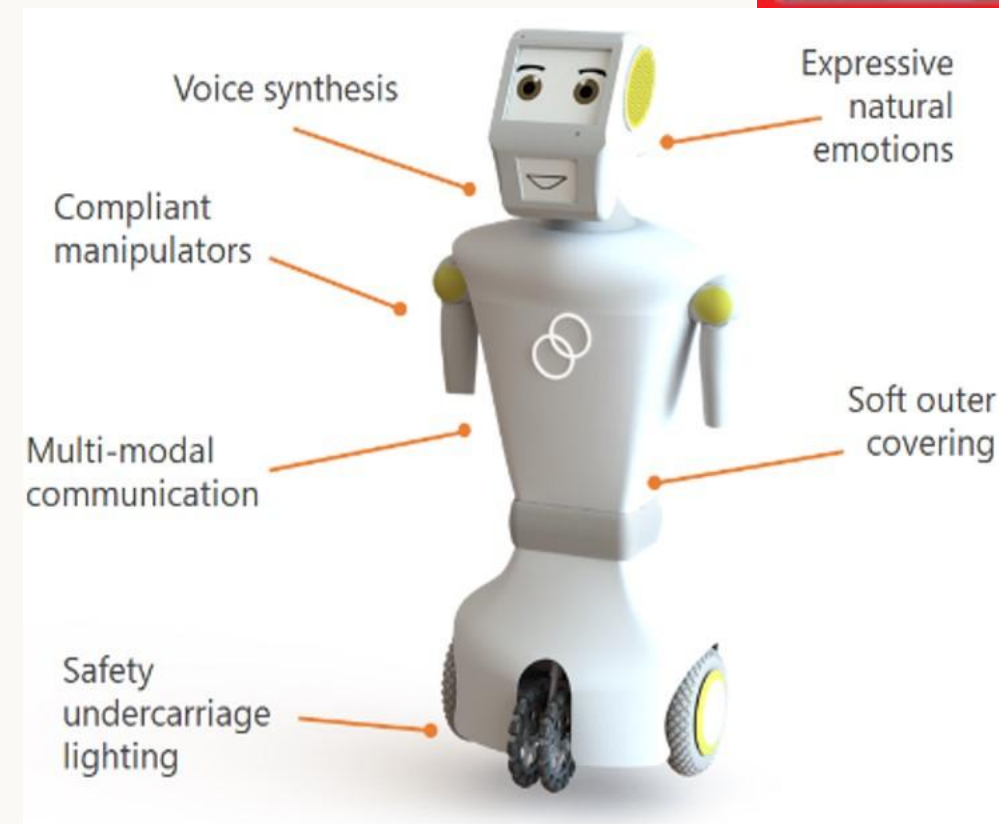
PILOT Study 1 “Stevie in care home”

Pilots with elderly using Stevie (collaboration with Trinity College Dublin)

Stevie's pilot at ROMAN 21 IEEE Conference



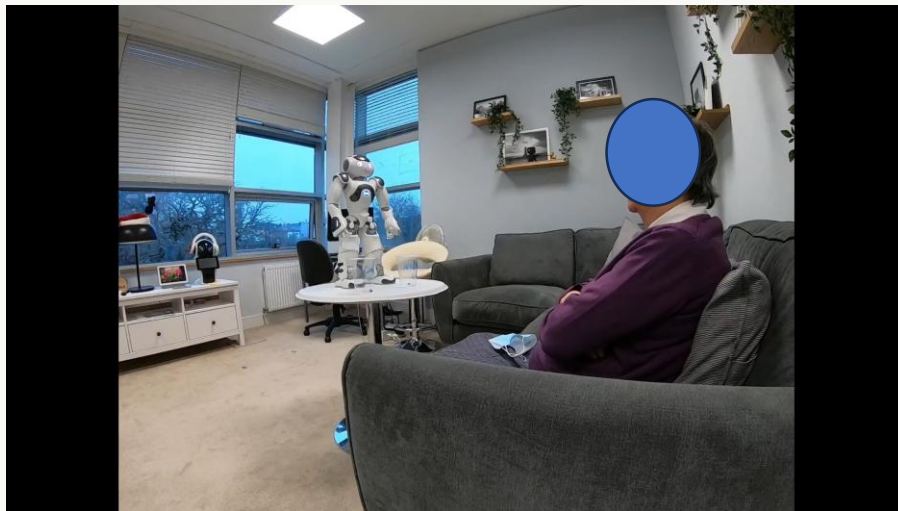
The applicability of the socially assistive robot Stevie in a day centre for people with dementia



PILOT Study 2 “Friendly but faulty”

Goal: Explore seniors’ trust in assistive robotics.

Idea: Enhance the anthropomorphic skills and personality of NAO in terms of behaviour, gestures and personable touch to compare the seniors’ feelings over a cold version of NAO.



15. Did you touch the robot? Yes ☐ No ☒

If yes, how did it make you feel?

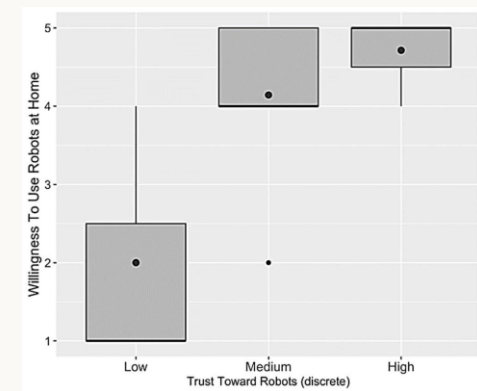
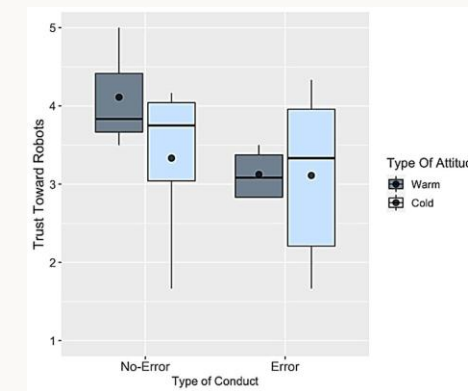
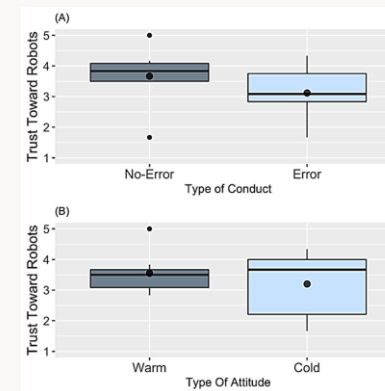
16. Can you describe your experience in 3 sentences?

*Fun, Was not clear what it was saying,
patient, his voice was different.
disabled children might enjoy.*

NAO
“warm”
right pills

Results pilot study 2

- Empathic attitude and non-functional touch strengthened trust IF & ONLY WHEN the robot’s conduct was error-free.
- A high degree of trust indicates a greater willingness to accept the domestic use of robots in health-related contexts.
- A robot's warm attitude: not always a successful recovery strategy from failure in high-severity tasks.
- Deterioration of participants’ trust in the robot when the robot committed an error.



PILOT Study 3 “Do You Trust My Advice?. ”

Goal: Acceptance and Trust in communicative robots in medicine intake

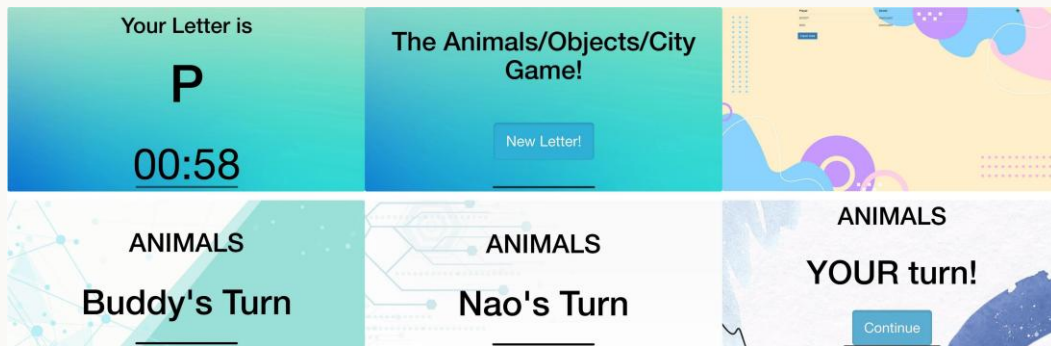


Results Pilot Study 3

- Older adults did not ill-favour robot-based advice: they trusted the robot equally when it gave information-type and recommendation-type advice.
- Higher trust in the robot was accompanied by higher levels of compliance with its advice (higher acceptance, low levels of negative feelings).
- Perceived easiness of interacting with the robot was strongly and positively associated with the perceived level of the robot's intelligence.
- Trust in the robot is associated with a greater willingness to accept a robot in health facilities and at home if trust occurs for tasks of high severity.

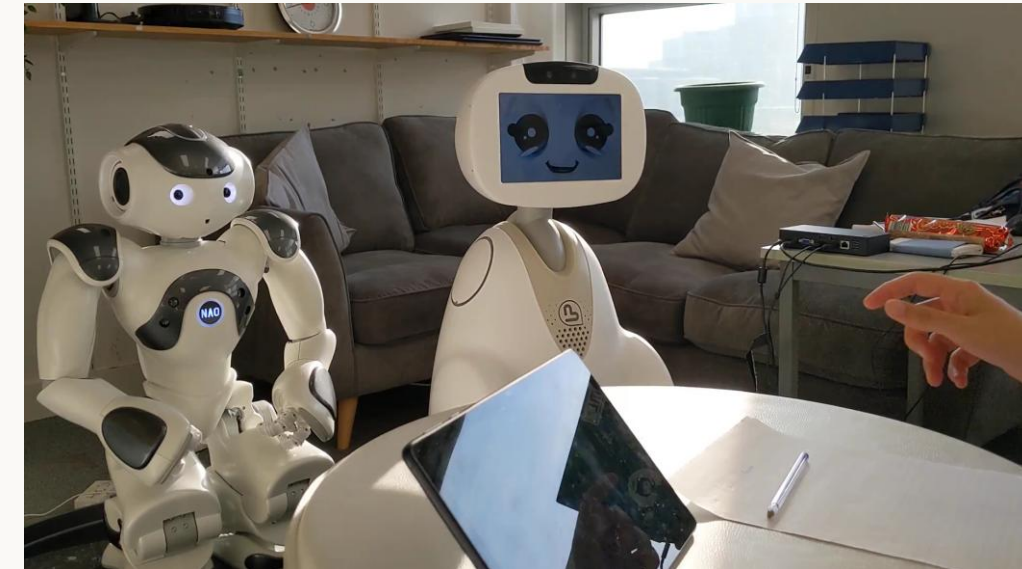
PILOT Study 4 “Trust in differently intelligent robots!”

GOAL: Older adults’ perceptions and Trust in robots with differing intelligence



Front-end and back-end web app for game playing on a tablet.

Wearable devices (smart watch).



Results Pilot Study 4

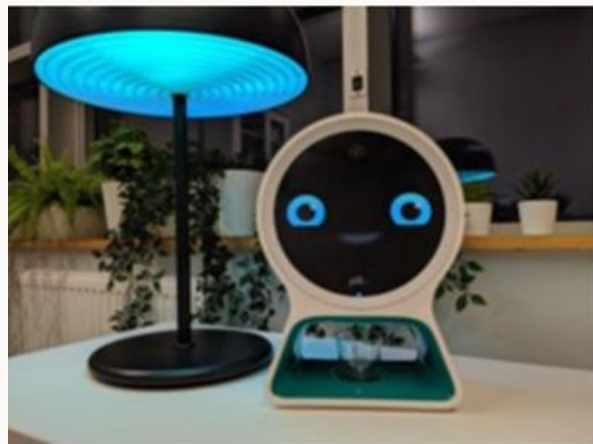
- Older adults consistently rated the more intelligent robot as more trustworthy and fit for use.
- Less trusting participants can increase trust even toward the less intelligent robot after positive interactions with the robot.
- While many favoured the intelligent robot for its competence, others preferred the less intelligent robot for its **perceived warmth and fallibility**, finding human-like imperfection more relatable.

Take-home message

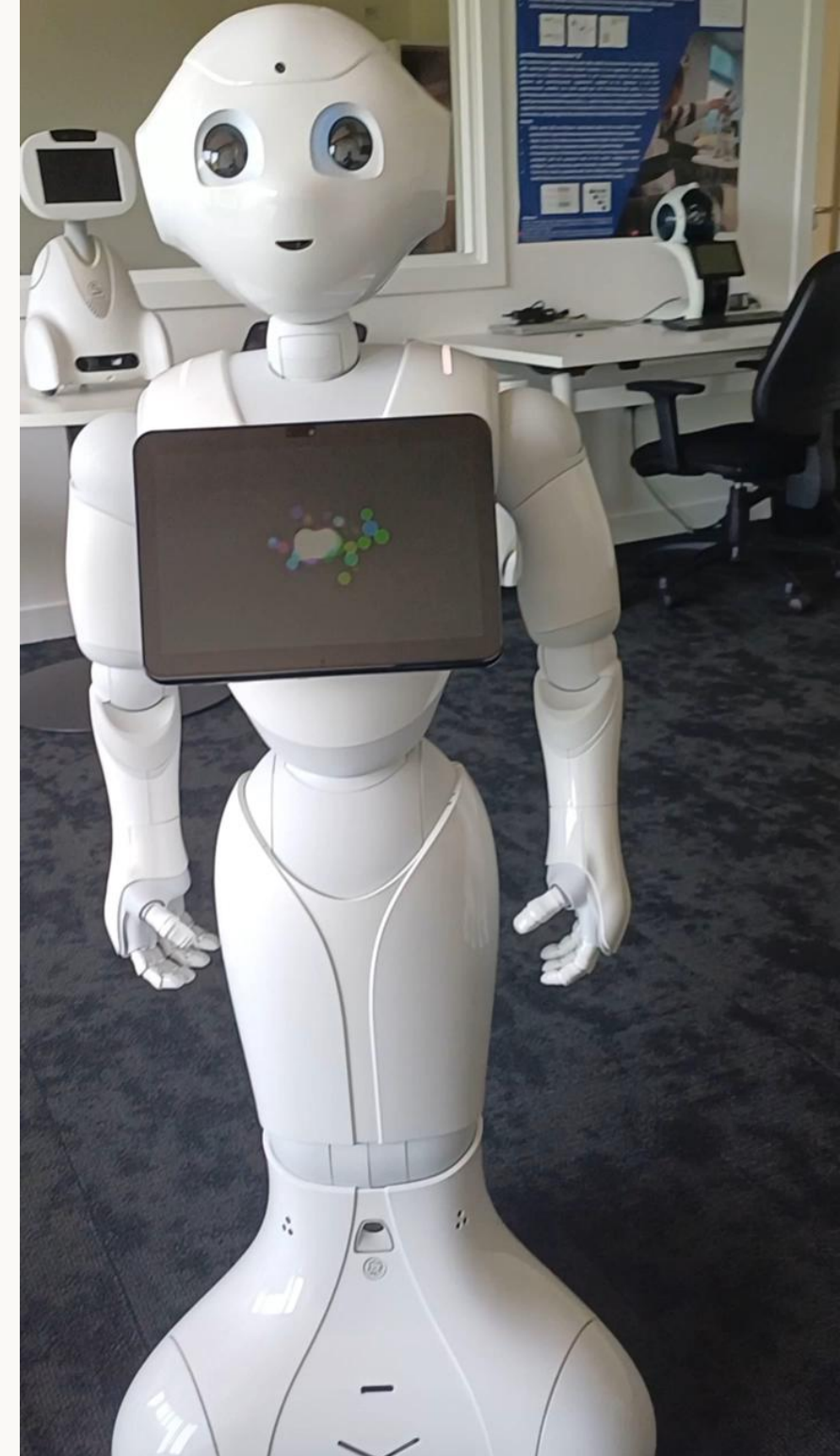
Human-robot interaction holds immense promise for enhancing our lives and pushing the boundaries of what is possible.

We need to create technologies that adults can feel trustworthy, safe and fit for use.

Smart devices, robots, and AI can significantly contribute to support older adults with direct, to combat loneliness, to delay their cognitive decline, to regulate their lifestyle and medicine intake.



Pria <https://www.okpria.com/>



Social Robots for Prevention of Cognitive Decline (CoRAS lab)