The Role of Robotics in Improving the Health of the Ageing Population

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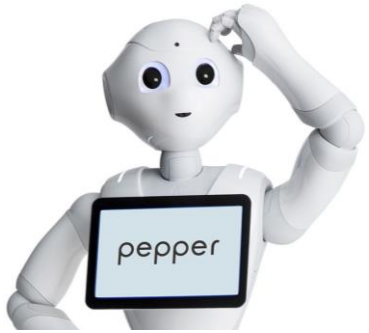
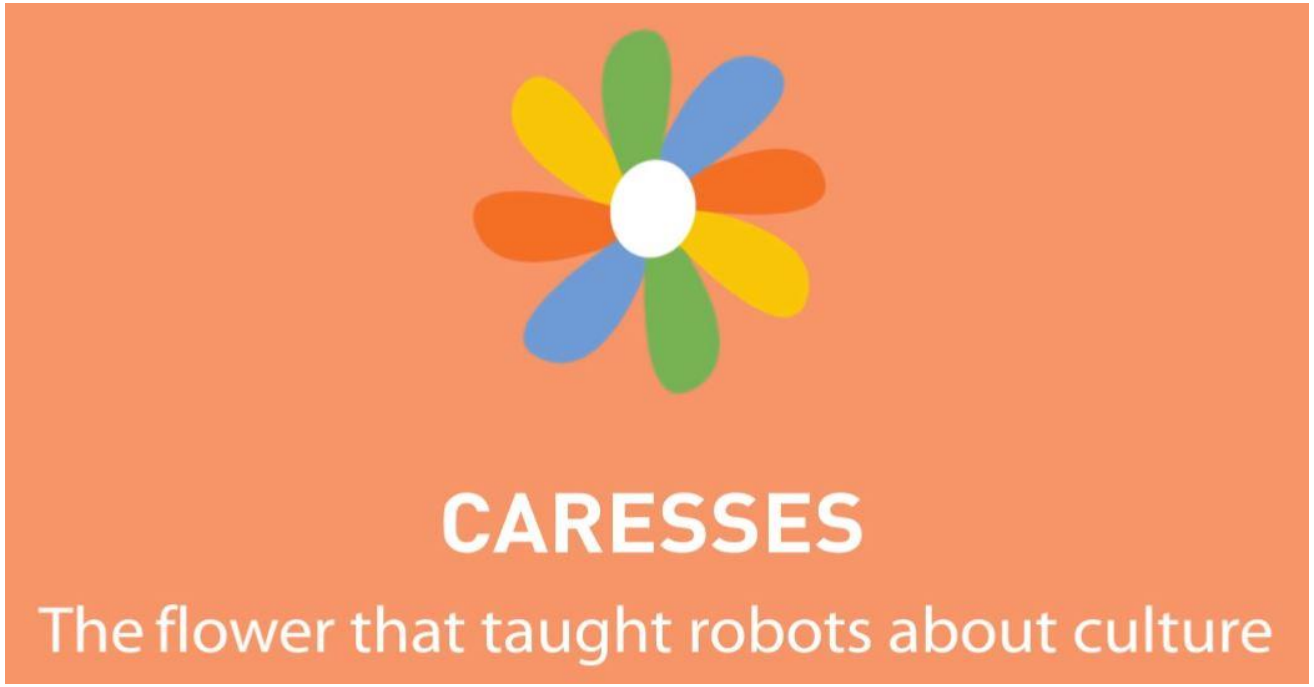


- **CARESSES** is an international, multidisciplinary project that started in January 2017 and will end in January 2020.
- The CARESSES project is based on the **concept of cultural competence**, and the theory that **when robots take culture into account during their interactions with people, they will be received more positively and will be more likely to be accepted**. This is important because without acceptance, no matter how capable or feature rich a robot may be, its unlikely to used. This is the same for all health interventions; **acceptance from users is critical to overall success**.
- Also, from a commercial perspective, the concept could open new avenues for marketing robots across different countries

What is CARESSES?



The CARESSES concept

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- The idea of developing culturally-aware robots is something that has never been done before. The EU reviewers stated our project is both ground-breaking and represents the beginning in a new area of research
- We have had (and continue to have) substantial international media attention particularly from the UK, most recently in Parliament on Tuesday
- The project has been presented at and written about in many scientific spaces (including Nature!)

What is CARESSES?

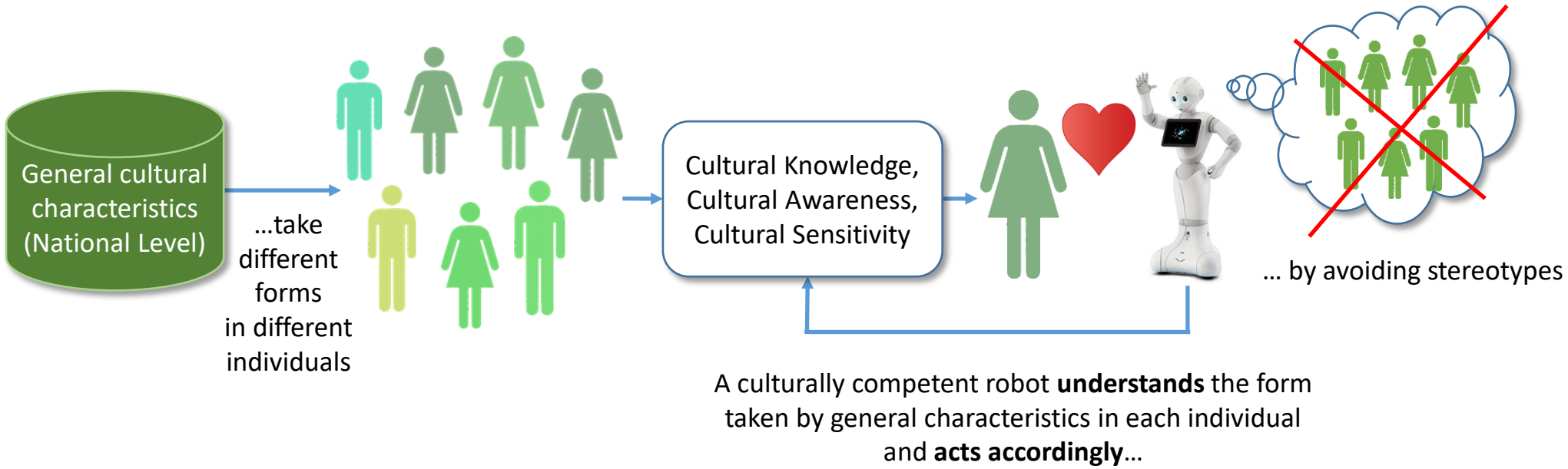
- The project is motivated by the fact that ageing populations across the world are placing health systems under increasing pressure.
- Elderly care robots may be a means to **relieve that pressure** in hospitals and care homes, as well as a way to **improve care delivery** at home and **promote independent living** for the elderly.
- Please note that this is about exploring the potential of *assistive* robots, not robots that act as replacement for care. Therefore, **this project is not about replacing jobs** but attempting to improve the overall the care package
- Currently there is a substantial lack of evidence about this, so there is a moral imperative to investigate this and reflect upon the evidence produced.

The CARESSES concept

- Therefore, the goals of the project are to design, develop, test and evaluate robots configured to assist care home residents in a culturally appropriate manner.
- The testing and evaluation phases will be conducted through a controlled trial at Advinia Healthcare UK's homes (who are also a full research partner within the consortium) and the HISUISI care home in Japan.

The CARESSES project

We consider **personal robots** that are physically identical, but we make them **act and communicate** in different ways **to match the culture, customs, and etiquette** of the person they are assisting.



The idea

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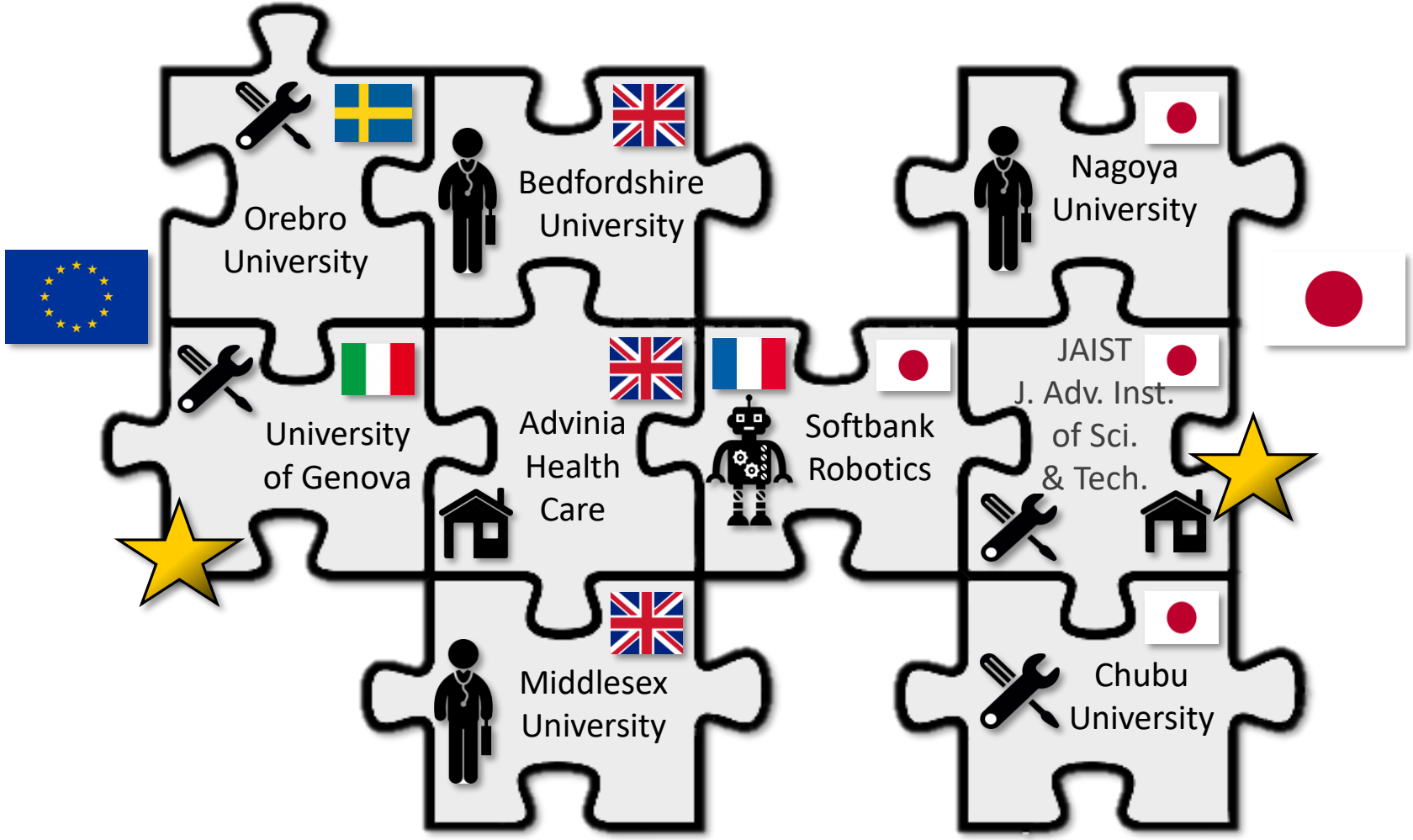
Overall aim and idea behind the CARESSES project:

- The idea is that the robot will start with cultural assumptions extracted from best evidence on national-level cultural values but then, during interactions with patients, learn about the individual's own cultural values and preferences and provide care and support accordingly, providing a much more personalised experience.
- Built on the premise that cultural competence among nursing staff is associated with better patient outcomes.

The idea



Health & user evaluation

Robot technology

Technical development

Testing facility

The consortium

KRA1 - Transcultural Robotic Nursing

KRA2 - Cultural Knowledge Representation

System Integration

Testing in Health-Care Facilities

KRA3 - Culturally sensitive planning and execution

KRA4 - Culture-Aware Interaction in a Smart ICT environment

End-User Evaluation

Study began in January 2017 and will be completed in January 2020

Methodology: key research areas, integration, testing and evaluation

Testing methodology - overview

Testing in care homes	White-English group	Indian group	Japanese group
Number of clients	15	15	15
Number of informal caregivers	15-30	15-30	15-30
Domicile	Advinia (UK)	Advinia (UK)	HISUISI (JP)
Client & informal caregiver language	English	English	Japanese
Additional Eligibility criteria	• Clients are unlikely to express aggression towards themselves, the robot, and/or the researcher • Clients possess sufficient cognitive ability to participate in the study		
Testing procedure			
Duration of robot interaction testing period	• 2 weeks: • Week 1: 3 days, 2 hours per day (rotated) - WITH TRAINING • Week 2: 3 days, 4 hours per day (rotated) - WITH SUPPORT ON STANDBY		
Testing sequence	1. Experimental arm (clients allocated to culturally aware Pepper robot) 2. Control arm 1 (clients allocated to non-culturally aware Pepper robot) 2. Control arm 2 (care as usual i.e. no Pepper robot)		
Number of clients in control arms	5 (Control arm 1) 5 (Control arm 2)	5 (Control arm 1) 5 (Control arm 2)	5 (Control arm 1) 5 (Control arm 2)
Number of clients in experimental arm	5	5	5

Evaluation goals:

- To quantitatively assess differences in outcomes between the experimental intervention compared to control groups 1 & 2 in relation to improvements in **quality of life** (using SF-36) of users and their caregivers, **caregiver burden** (ZBI).
- Also to examine differences in: user satisfaction of Pepper (**QUIS**), perceptions of Pepper's cultural competence (**Adapted CCATool**), changes in attitudes towards care robots (**TBD**)
- To qualitatively investigate views towards the robot's cultural competence, quality of service provided, impact upon independence, autonomy, quality of life and caregiver burden, experiences related to using the technology (clients and caregivers).

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Motivation:

- Ageing populations across the world are placing health systems under increasing pressure.
- Elderly care robots can be a means to relieve that pressure in hospitals and care homes, as well as a way to improve care delivery at home and promote independent living for the elderly.
- Care robots that are culturally aware, competent and personalised are likely to be met with greater acceptance from both the elderly and their caregivers compared to non-culturally aware, non-personalised robots
- https://www.youtube.com/watch?v=eLTKhfVYrTw

1. Cultural competence
2. Evidence of effectiveness
3. Ethics and acceptability (including assisting not replacing staff)
4. Sensible policy
5. Tackling cultural attitudes and perceptions that hinder uptake

Five reasonable points of action

- Cultural competence means taking into consideration the person's cultural background during provision of care.
- Good evidence from the nursing literature that cultural competence helps to produce better patient outcomes (Truong et al, 2014; Weech-Maldonado et al, 2013; Govere et al, 2016)
- Therefore, imperative we test whether robotic cultural competence has potential to improve outcomes. This is the aim of the CARESSES project (Bruno, Papadopoulos, Sgorbissa et al, 2017)

CARESSES
The flower that taught robots about culture

1. Cultural competence

- There is clear need for more rigorous research on *IF, TO WHAT DEGREE, and FOR WHOM* assistive robots increases wellbeing.
- Also WHY and HOW, including WHAT NEEDS TO CHANGE so that future assistive robots and AI can have a positive impact
- Currently preliminary evidence is limited BUT positive for improving wellbeing among older adults (Lihui et al 2018).

2. Evidence of effectivness

- We need to learn what all the ethics issues are, and how to manage them appropriately. For example:

✓Assisting and complimenting care, not replacing jobs

✓Ensuring staff do not reduce quality of care due to reliance on robot, or drop in morale because of stigma and fear associated with socially assistive robots

✓Protecting privacy, dealing with data as per GDPR

- Without understanding what the issues are and how to manage them ethically and sensitively, we significantly increase risk of harm

3. Embracing ethics

- Crucial that policy is anchored in the evidence, not in political agenda or personal opinions
- So if research reveals that assistive robots improves wellbeing for some types of people in certain ways within particular contexts and circumstances, then policy recommendations should not extend beyond this.
- There is no need to rush widescale implementation so we should take our time and get the policies right.
- For this we will again need more evidence and thus more research.

4. Sensible policy anchored by evidence

- Currently much stigma in the UK. However, stigma is a socio-cultural product e.g. in Japan perceptions of social robotics in healthcare are much more positive (Haring et al, 2014)
- Socio-cultural perceptions are strongly influenced by the media. Therefore, media have moral duty to report upon the concept of social robotics in a responsible manner, reporting factual information, rather than playing on fears and anxieties for hopes of better ratings and larger audiences
- This is important as if we do all the latter points, but cultural perceptions are unfairly negative and stigmatising, then uptake will be resisted and potential boosts in wellbeing not realised. So we should be steered by the evidence and not unnecessarily held back by stigma

5. Tackling the stigma of social robotics, negative cultural attitudes and perceptions that hinder uptake

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Contact:

- If you wish to contact me for further information about this project (which I would very much welcome) my details are:
- My email: gurch.randhawa@beds.ac.uk
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- CARESSES website: http://www.caressesrobot.org/
- CARESSES Facebook: https://www.facebook.com/caressesproject/
- CARESSES Twitter: @caressesproject
- CARESSES ResearchGate: https://www.researchgate.net/project/CARESSES-Culture-Aware-Robots-and-Environmental-Sensor-Systems-for-Elderly-Support

Thank you

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