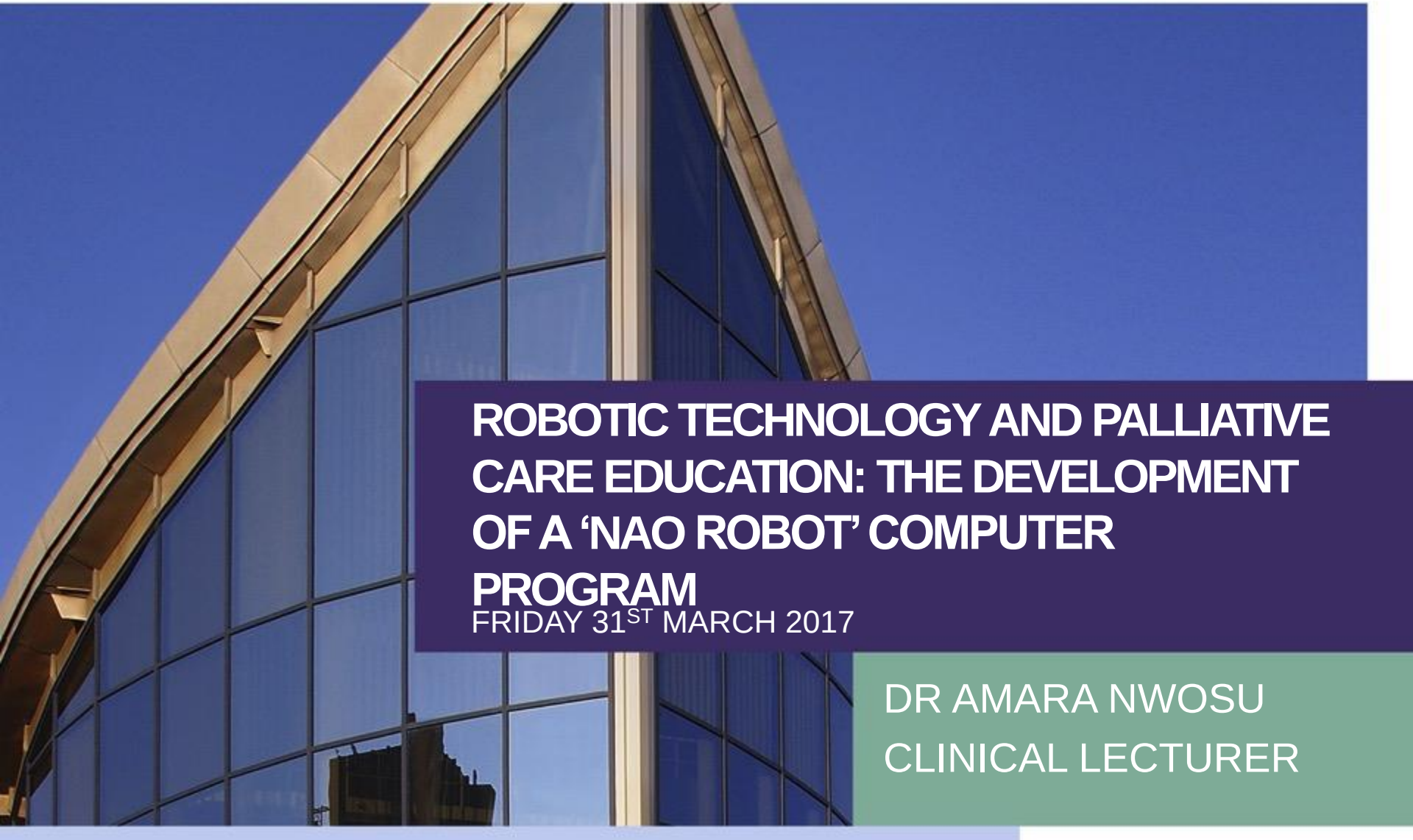
The Royal Liverpool and Broadgreen University Hospitals NHS

Marie Curie Cancer Care

University of Liverpool

The Marie Curie Palliative Care Institute Liverpool



ROBOTIC TECHNOLOGY AND PALLIATIVE CARE EDUCATION: THE DEVELOPMENT OF A 'NAO ROBOT' COMPUTER PROGRAM

FRIDAY 31ST MARCH 2017

DR AMARA NWOSU
CLINICAL LECTURER

PROJECT TEAM

Name	Role	Institution
Bethany Sturgeon	**PhD Student in Robotics**	**University of Liverpool, University of Bristol**
Dr. Terry Payne	Senior Lecturer in Computer Science	University of Liverpool
Dr. Stephen Mason	Research and Development Lead	Marie Curie Palliative Care Institute Liverpool, University of Liverpool
Dr. Amara Nwosu	Clinical Lecturer in Palliative Care	Marie Curie Palliative Care Institute Liverpool, University of Liverpool

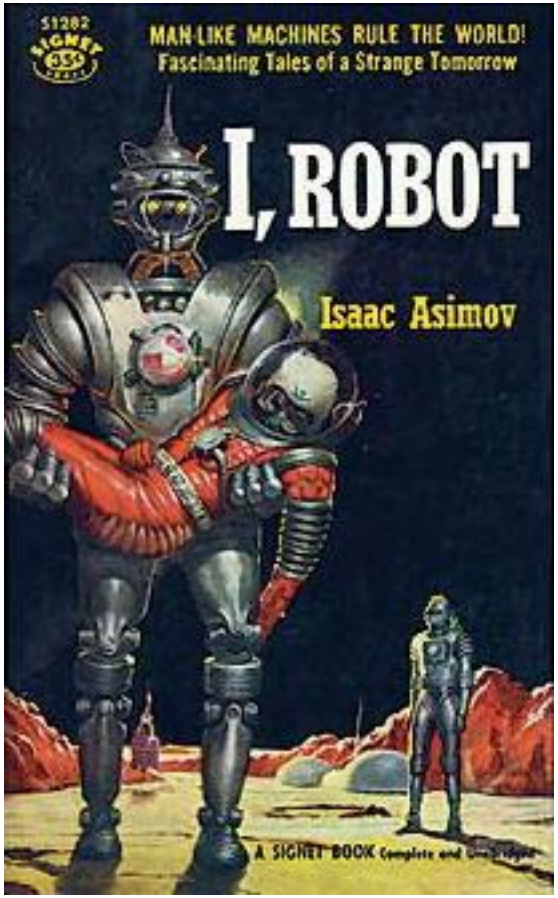
Bethany unfortunately is unable to attend today
Please see her poster number 7

TECHNOLOGY AND HEALTH
WORLD ECONOMIC FORUM

- Healthcare is increasing challenge
- Large GDP of most economies
- Key issue in Brexit vote
- Affordable Care Act repeal

- Technology is at the heart of societal and business disruption
- Digital technology offers potential of new ways to provide healthcare
- Important in developing world with little or no access to specialised services

‘How are robots currently used in healthcare?’



SURGICAL PRECISION

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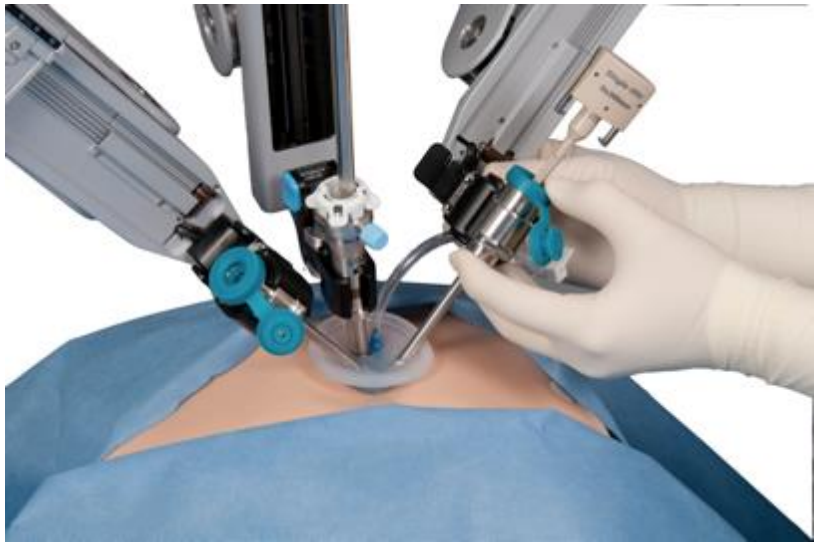
daVinci

- Improve surgical precision
- Enable surgeons to do specialised procedures in remote locations



REHABILITATION

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- Cyber kinetic exoskeleton
- Improved rehabilitation potential
- Spinal and stroke patients
- Enable paralyzed patients to walk again

ACCESS TO SPECIALISTS
MEDICATION DELIVERY PROCESS

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- Telemedicine to provide remote access to specialists e.g. Thrombolysis services
- Developing countries

- Automated medication dispensers
- Pharmacy management solutions

MEDICAL CLEANING ROBOTS

COMPANION ROBOTS

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- Uses ultra-violet light to eradicate bateria

- ‘Paro the Robotic Seal’ is used in Japan for companionship in dementia patients.

COGNITIVE TECHNOLOGIES IN SOCIETY

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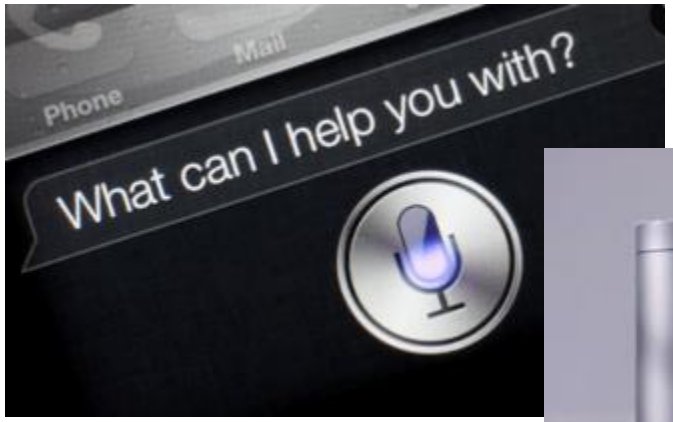

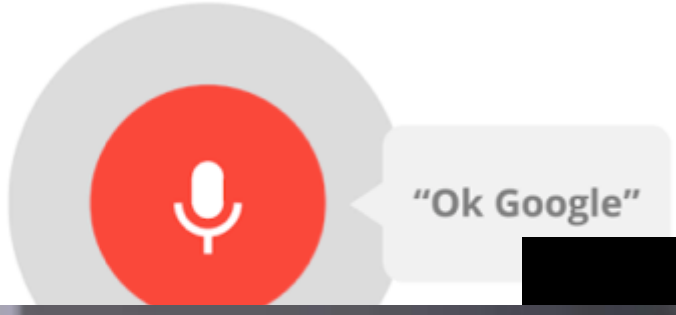

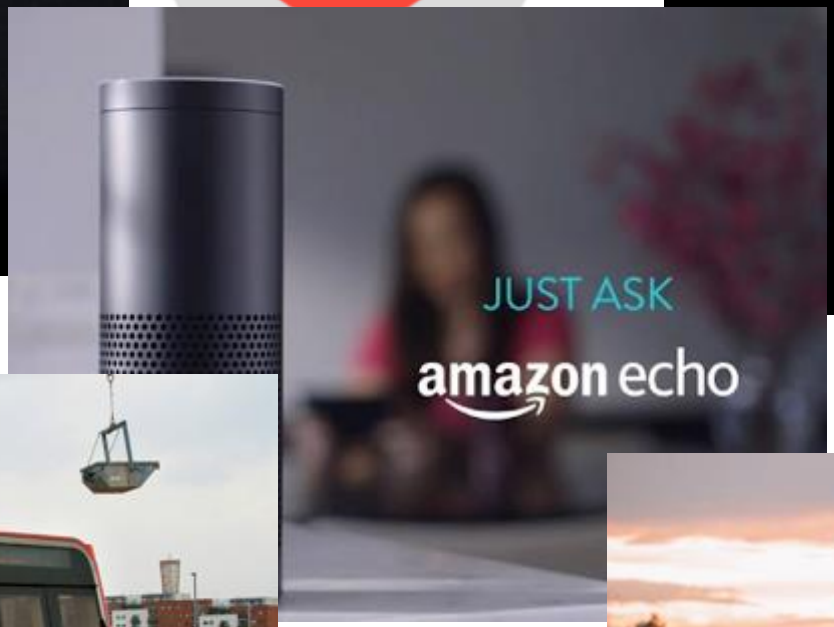

ROBOTICS & COGNITIVE TECHNOLOGIES IN PALLIATIVE CARE?

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- Not evaluated in advanced disease
- Technology may provide healthcare professionals with new opportunities to support education.

- In future, important to consider the potential of cognitive technologies to palliative care to:
  - Establish ‘use cases’ for appropriate use
  - Identify limitations
  - Establish governance

TECHNOLOGY EDUCATION

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- Collaborative project with computer science – University of Liverpool.
- Exploratory study
- Can robotic technology assist palliative care education delivery?

'Is it possible to program a robot to convey emotions through its posture, movement and speech, in order to facilitate human-computer interaction for palliative care issues?'

NAO ROBOT

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- Semi autonomous robot
- Programmable
- HD cameras for facial recognition
- Voice recognition
- Text to speech synthesis
- Previous work available about

Programmed by Beth to convey:

- Anger
- Sadness
- Relaxed
- Crying
- Scared
- Tired
- Laughing

NAO DEMONSTRATION

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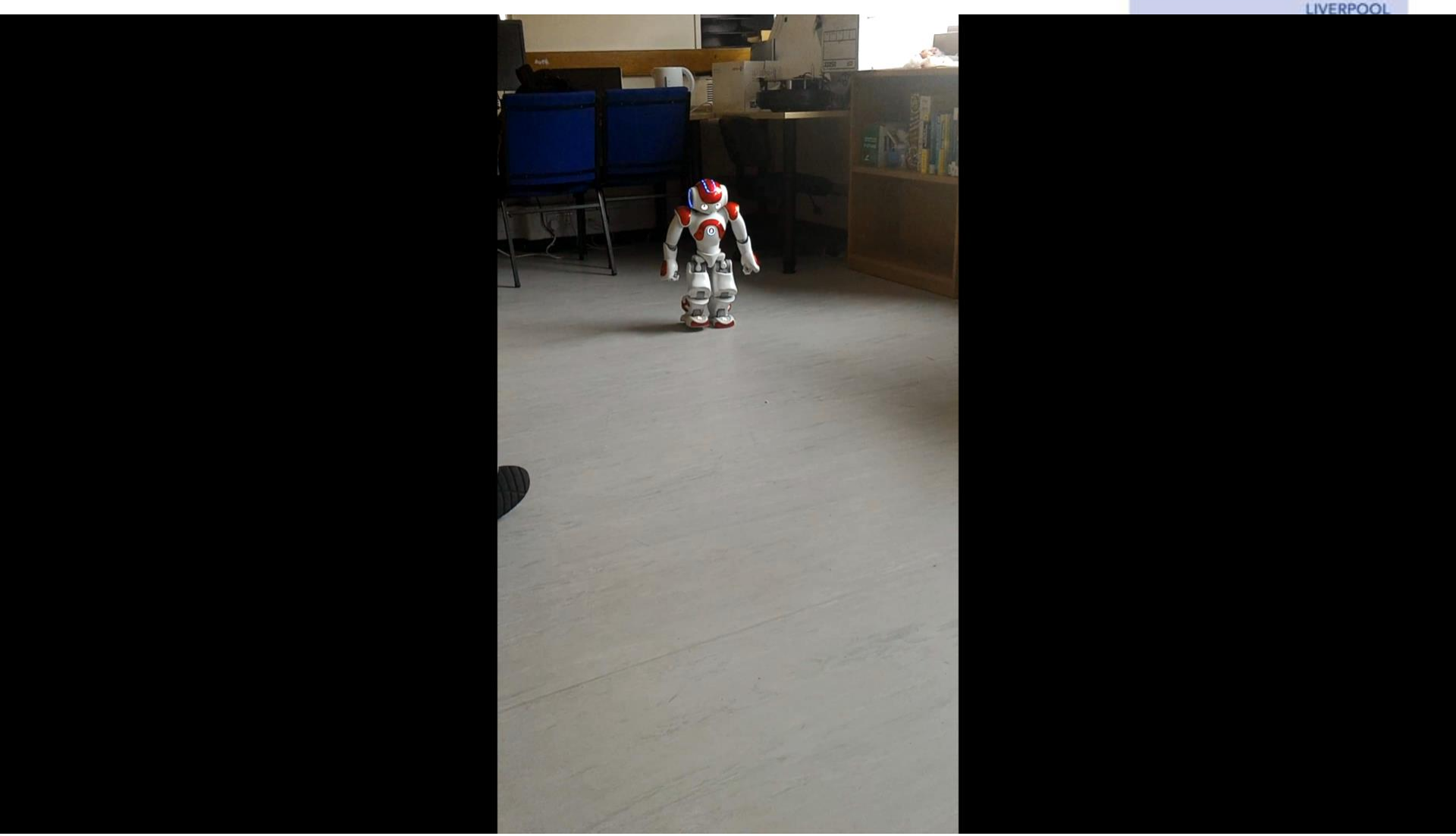

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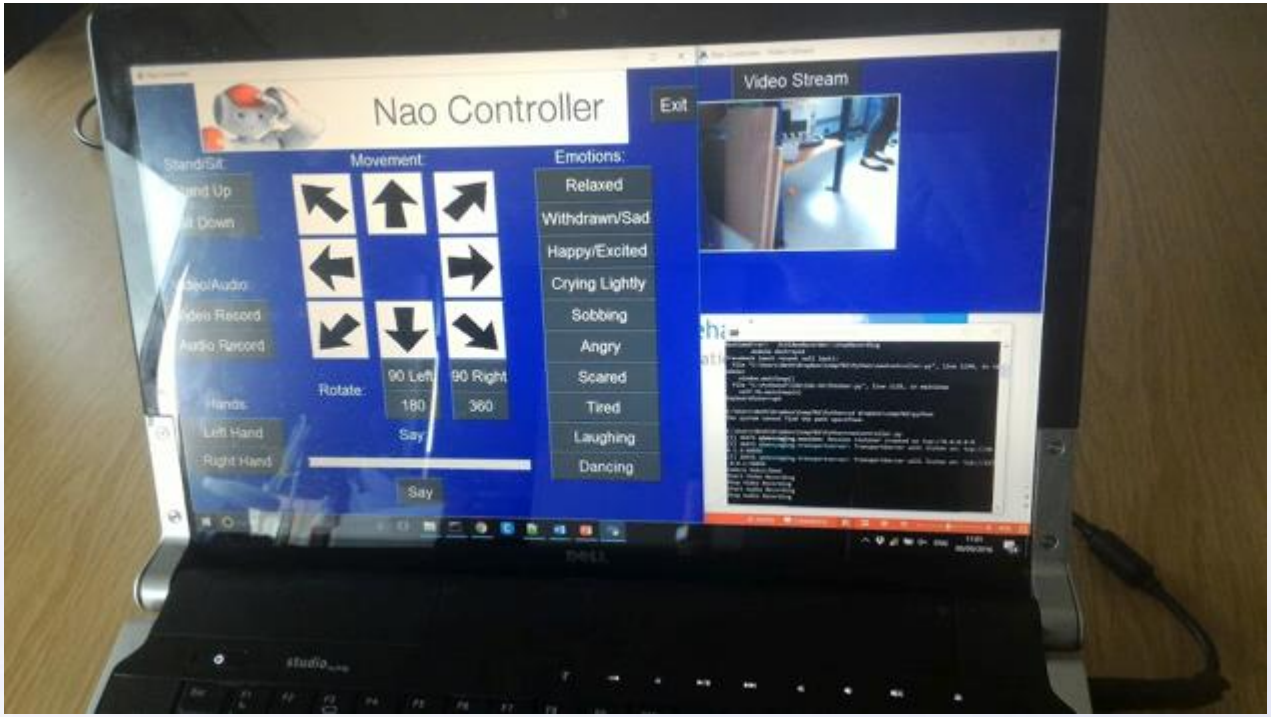

Happy

Anger

Crying

Sitting

Withdrawn

OUTCOMES
NEXT STEPS

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"We programmed a robot to convey emotional responses to posed questions"

- **Future work will:**
  - Further validation of emotional responses in palliative care scenarios.
  - Automation of responses.
  - Incorporation with simulation-based education training.
  - Qualitative work
  - Use case development for cognitive technologies in palliative care education.

THANK YOU
FOR INFORMATION

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