

Trustworthy Robots - Credibility beyond Safety

Trust by physical and behavioral design

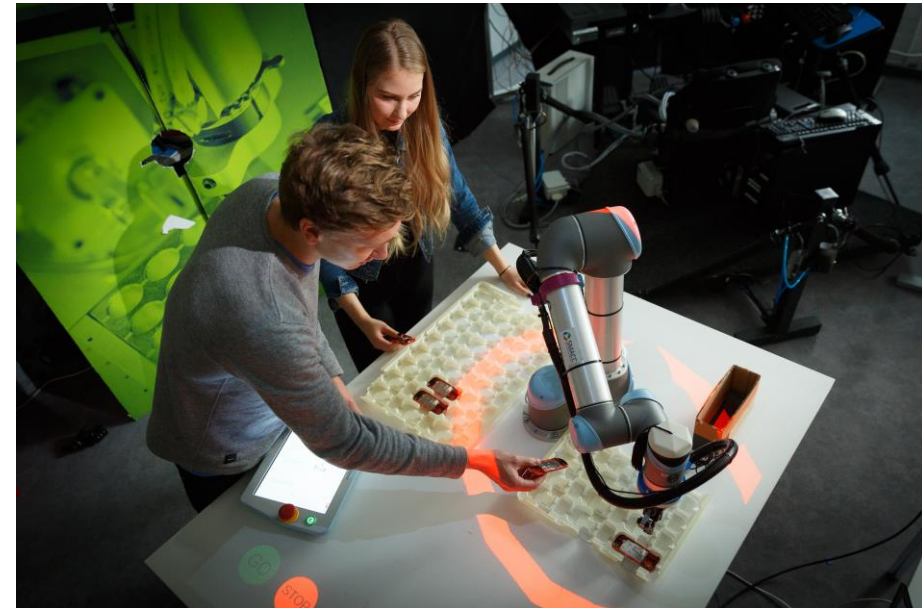
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ERF Workshop

21.3.2019

How to achieve robot trust?

- Trust by physical design:
How does the appearance of a robot effect trust?
- Trust by behavioral design:
How do the actions and behavior of a robot contribute to trust?
- How to measure trust?



Trust by physical design

Appearance matters

- However, often we cannot change appearance:
- Closed design, expensive design tools

Solution:

- Parametric design tool in FreeCAD for robot heads
- Base template design that is adaptable
- Modular and open-source
- Sensor integration, face features



<https://youtu.be/2lJgnSlbGh0>

<https://github.com/CognitiveRoboticsTUT/MaFaRo>

Many Faced Robot - Design and Manufacturing of a Parametric, Modular and Open Source Robot Head,
Submitted, Ubiquitous Robots, 2019

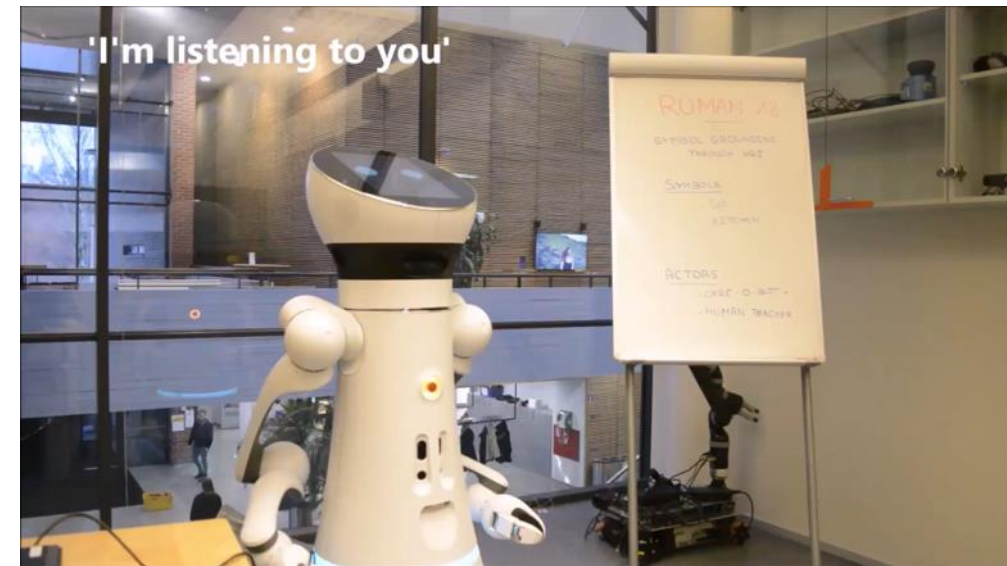
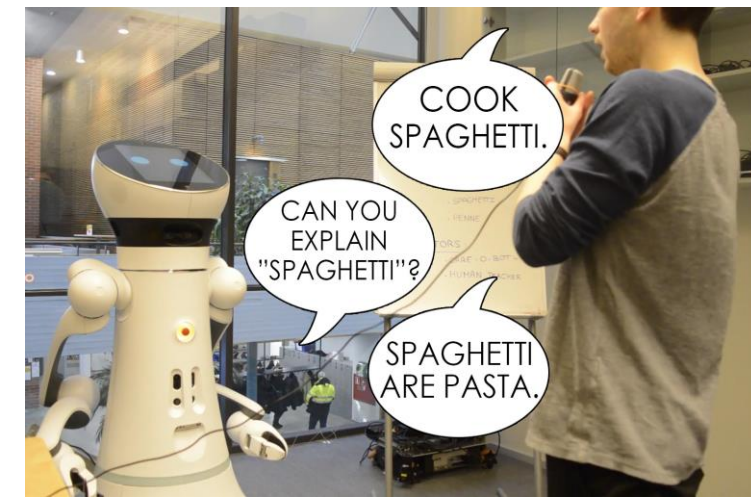
Trust by behavioral design

Communication matters

- How do people communicate?
- Miscommunication, ambiguities

Solution:

- Interactive communication
- Handle ambiguities
- Teach new skills and knowledge
- Change, adapt plans and tasks on the fly



<https://youtu.be/eEBUDBFesao>

<https://github.com/Zorrander/cogrob-tut-hri>

Human-Robot Interactive Learning Architecture using Ontologies and Symbol Manipulation,
in IEEE RO-MAN, 2018.

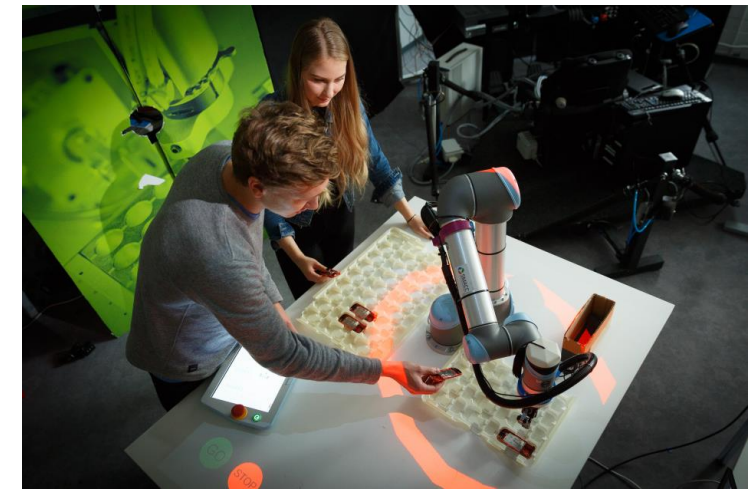
Trust by behavioral design

Interaction matters

- Different modalities offer different benefits
- Information exchange should be bidirectional

Solution:

- Two-way human-robot communication
- Projection of information
- Virtual Graphical User Interface



<https://youtu.be/CFKKANvWc3A>

Depth-sensor-projector safety model for human-robot collaboration,
in IEEE/RSJ IROS, Workshop on Robotic Co-workers 4.0, 2018



Thank You!

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