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

[Video Link]
https://youtu.be/2UgnS1bGh0
[GitHub Repository]
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

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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