PANEL on Collaborative (Human & Computing) Systems [ACHI] Topic: Has Human-Machine Interaction Become Too Complex?

Panelists

Marc Seißler, University of Kaiserslautern, Germany
Dominik Ertl, Vienna University of Technology, Austria
Didier Puzenat, Université Antilles-Guyane, France
Karen Petersen, TU Darmstadt, Germany
Sylvain Martel, Ecole Polytechnique de Montreal (EPM), Canada
Bernd Radig, Technische Universitët München, Germany

Questions

- Why has the interaction between humans and computers become so complex for some systems, while for others it remains unchanged?
- What can be done to decrease the complexity?
- Is it important to have computers/robots mimic human reactions?

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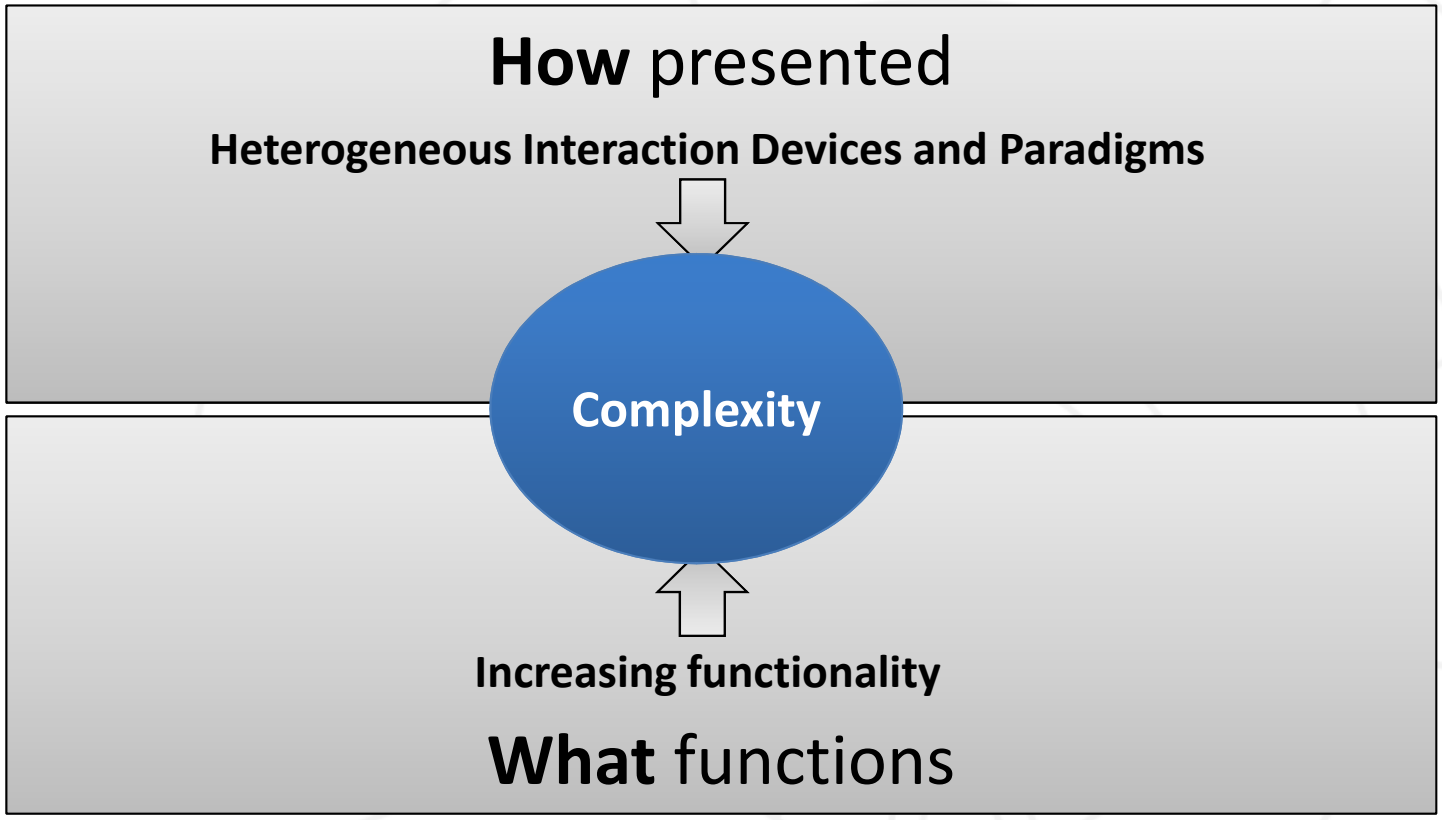
PANEL on Collaborative (Human & Computing) Systems
Does Human-Machine Interaction Go Too Complex?

Marc Seissler – University of Kaiserslautern, Center for Human-Machine-Interaction

Fourth International Conference on Advances in Computer-Human Interactions
ACHI 2011
February 23-28, 2011 - Gosier, Guadeloupe, France

Where does complexity come from?



Claim

We still live in a **feature-driven world!**

What the user
needs

User wants to
slice an Apple

What companies
offer

But ***why*** is that?

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Hypothesis

Companies (and we) are missing a understanding of **how to *communicate useability* to the customers**

Therefore, they/we try to **compete via features**…

- … that are hard to understand for the customer/user
- … that don‘t tell her anything about how good the product fulfills her „requirements“

5x Zoom
14,1 Megapixel
…

4x Zoom
14,0 Megapixel
…

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Discussion Points

- How can we make Usability more *tangible / quantifiable*?
- How can we convince companies/developers to focus on the users‘ needs?
- How to propagate user-centered design processes?

Does Human-Machine Interaction Go Too Complex

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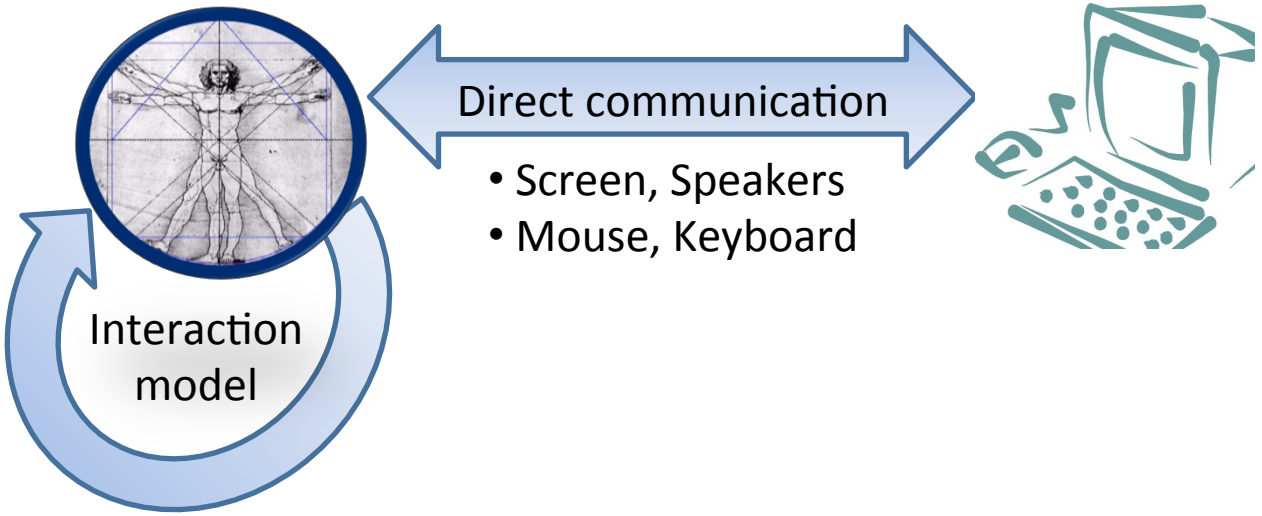
Statement

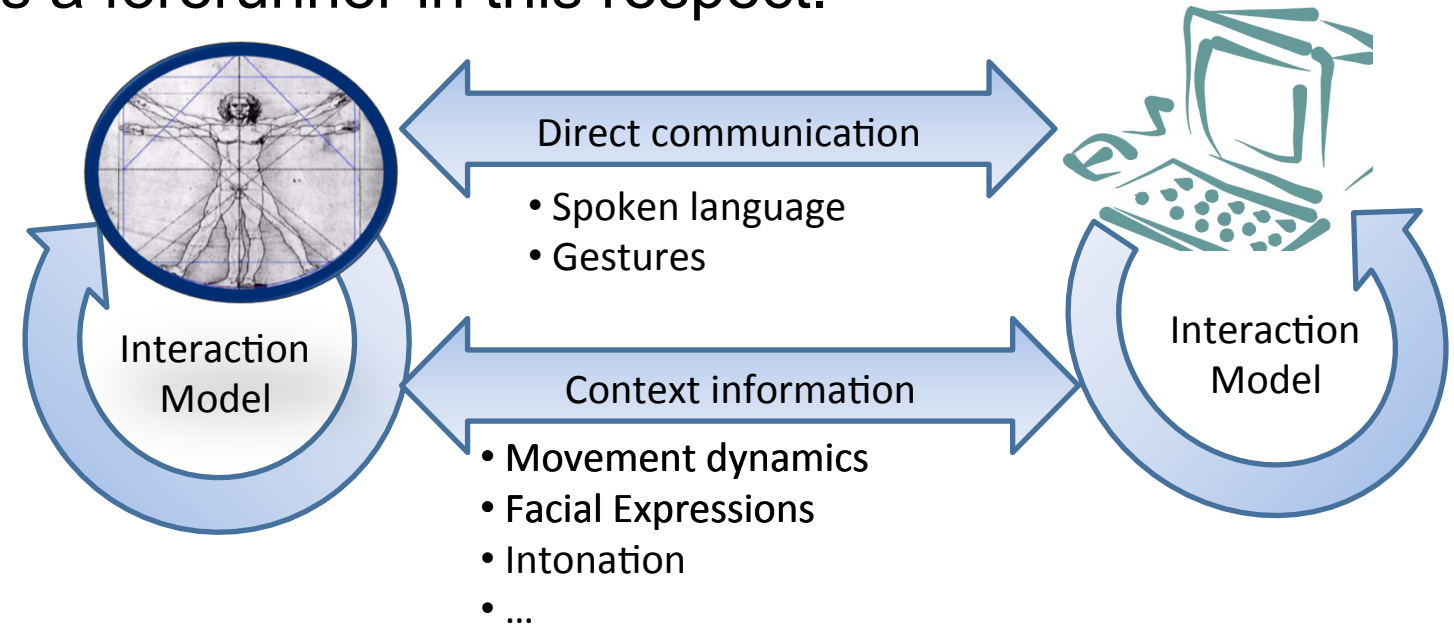
- Human machine interaction has gone too complex because we too often restrict the communication to an unimodal channel.



Traditional Human-maschine communication is sparse.

Statement

- Mutlimodal communication (including gestures, facial expression, haptics etc.) is the solution. Game industry is a forerunner in this respect.



Human-human communication is context-dependent.

Challenges

- Cooperative development (psychology, computer science, electrical and mechanical engineering)
- Multimodal communication channels, which improve their competence by adapting to individuals and learning from misunderstandings

=> simpler human-machine interaction.

On the Complexity of Remote Human-Robot Team Interaction

TECHNISCHE UNIVERSITÄT DARMSTADT

TECHNISCHE UNIVERSITÄT DARMSTADT

Simulation, Systems Optimization and Robotics

Research Training Group: Cooperative, Adaptive and Responsive Monitoring in Mixed Mode Environments

Current Human-Robot Remote Interactions

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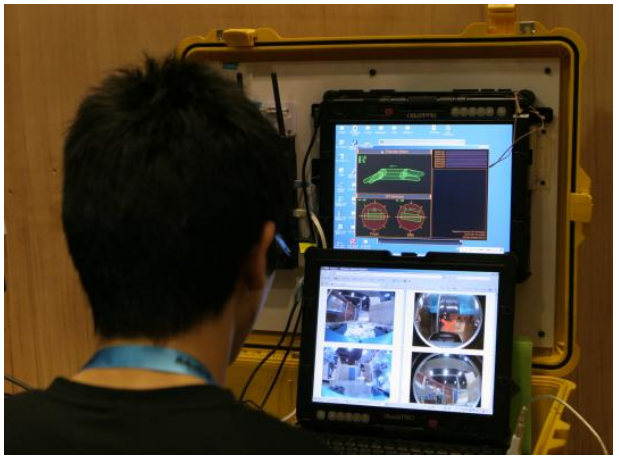
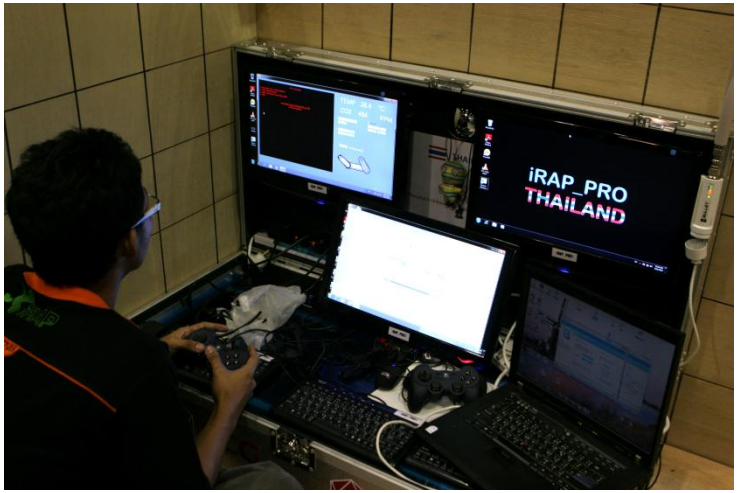
- Teleoperation interfaces
  - Require extensive operator training
  - High concentration needed during operation
  - Extension to multiple robots difficult
  - Do not account for specific strengths of humans and robots
- Complementary Capabilities of humans and robots
  - **Strengths of robots**
    - Repeatable / repetitive tasks
    - Operation in structured, well-defined environments
    - Fast analysis of large amounts of data
  - **Strengths of humans**
    - Reasoning
    - Solving of unfamiliar problems
    - Data interpretation (especially images)





Future Directions

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- Supervisory control instead of teleoperation
  - Increase number of robots supervised by a single human
  - Requires higher robot autonomy
  - Accounts for specific capabilities of humans and robots

Research questions

- Task distribution between robots and humans
  - Duties of robots and humans
  - Communication between robots and humans
  - Interaction initiative
- Situation Overview
  - What does the supervisor need to know?
  - How can he / she obtain this knowledge?
- Interfaces for large-scale remote interaction

- USABILITY -
THE GAP BETWEEN ACADEMIA AND INDUSTRY

Dominik Ertl
Vienna University of Technology
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USABILITY

- Usability is studied since decades
  - Incorporating usability into requirements engineering tools [Goodwin,'87]
  - Designing for usability: key principles and what designers think [Gould,'85]
  - Functionality and usability [Goodwin,'87]
  - Standards versus guidelines for designing user interface software [Smith,'86]
- In 2011? "Usability is solved, have to go beyond..." [Fitzpatrick et al.]

SOME LEARNED, BUT OTHERS...

- Unfortunately, there is no academia-industrial complex for usability...

- Some companies learned...
- Other companies did not (see http://weblog.usability.at/)
- Transfer of results from usability research into real products not satisfying!

3 HYPOTHESES

- Hypothesis 1: Hallway tests with aimed users would identify a lot of usability issues within one hour of product usage.

- Hypothesis 2: There is not enough time and money for product engineers to solve these issues due to the tight deadlines of software/hardware delivery.

- Hypothesis 3: Awareness for usability engineering is still lacking in current curriculums of most engineering studies.

Does Human-Machine Interaction Go Too Complex?

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12 mars 2011

Human-Human Interaction Complexity

Is human-human interaction less complexity than human-machine interaction ?

$\rightarrow$ obviously no.

So, how do we deal with of human-human interaction complexity ?

$\rightarrow$ one way is constant adaptation to the other.

Examples : a speaker (or teacher) $\rightarrow$ an audience ;
a physician $\rightarrow$ his patient ;
a seller $\rightarrow$ his client ;
etc.

Human-Human Interaction Complexity

Issue : to adapt you must evaluate the other,
especially :

- what he wants ;
- his level of understanding of the subject and/or of the speech ;
- eventually his skills regarding what we want him to do ;
- his emotional state ;
- etc.

$\Rightarrow$ To avoid useless complexity
an interface should adapt to the user

$\Rightarrow$ an interface should evaluate the user (in real-time).

About emotions

Let's focus on emotions, the interface car use :

- actions of the user on the interface ;
- eventually other available inputs (image, sound) ;
- eventually previous knowledge of the user ;
- etc.

What to do then ?

- emotion can be dangerous,
  example system administration in an hurry,
  email while user angry, etc.
- emotion can be a shortcut for cognition,
  emotion can be very valuable for creation, etc.

$\Rightarrow$ not always easy to adapt efficiently the interface...