Setting Standards
–
From Blue Sky to Applied Research and back again!

Jan Alexandersson
DFKI: IUI, CCAAL,
OpenURC Alliance e.V.

Agenda

metalogue

ISO

AMI CONSORTIUM

i2 HOME

SmartSenior

MOBIA Mobil bis ins Alter

UCH Secure Universal Control Hub

OPEN URC

ISO

Vi tal

Mensch-Technik-Interaktion Smart KOM

Verbmobil

DFKI is a Research Maelstrom!

R Rd RD rD D

BASIC RESEARCH

APPLIED RESEARCH

ADVANCED DEVELOPMENT

PRODUCT DEVELOPMENT

Quelle: http://machinedesign.com/contributing-technical-experts/what-s-difference-between-research-and-development

Dialogue with different Stakeholders

CeBIT

8. AAL KONGRESS
29. + 30. April 2015, Frankfurt/Main

IFA
CONSUMER ELECTRONICS UNLIMITED

The Innovation Cycle

Research & Development
Create Knowledge and Research Capacity

Innovation
Create Tangible Assets, IPR & Know-How

Industrial Projects
Sell based on Assets, IPR & Knowhow

Requirements
Synthesize Industry Needs

metalogue

HOME

PhD Theses

ISO

"Know-hows"

OPEN URC

MOBIA
Mobil bis ins Alter

Dissemination

UCH
Secure Universal Control Hub

CeBIT

ISO

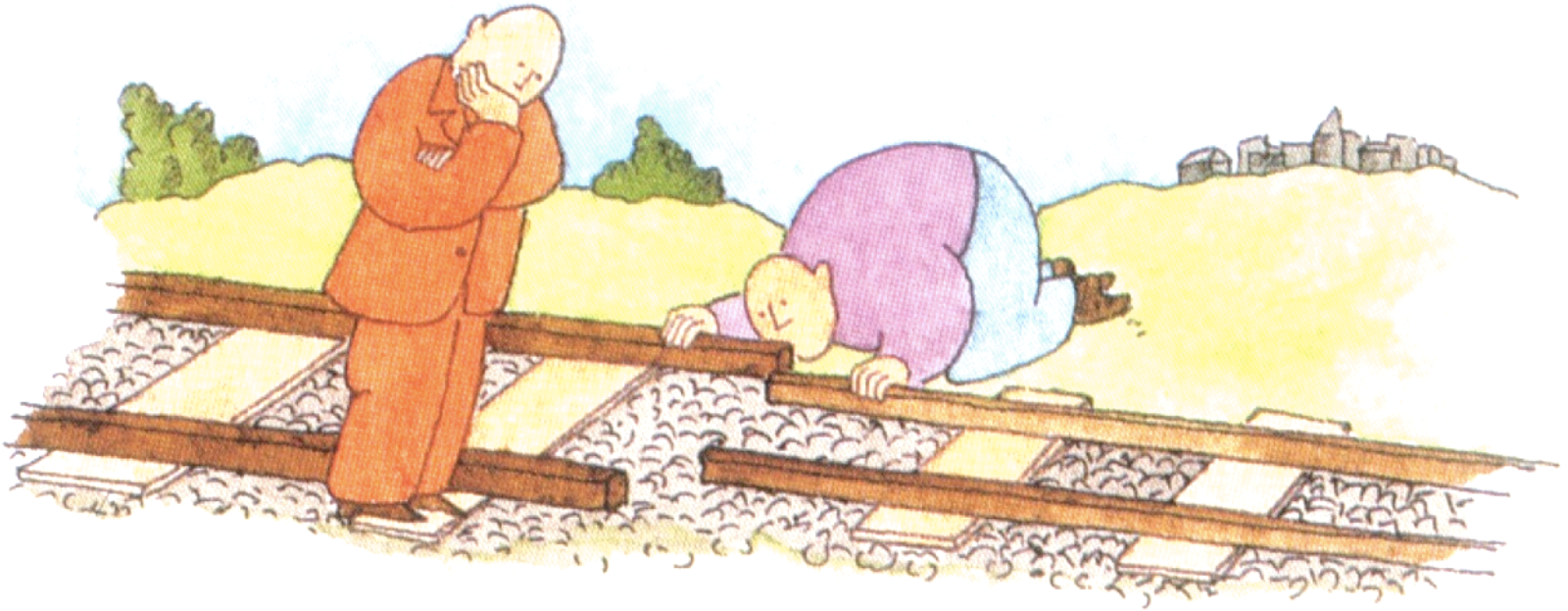
ISO

B/S/H

ycto

digitalSTROM

Why Standards?



Chop – Ukraine

Why Standards?

Refusals

- Boring
- “It restricts my creativity!”
- Usually based on old ideas…
- I didn’t know about this one – there are so many…
- ISO standards are not free of charge!
- …

Justifications

- We have to little time to re-invent the wheel!
- It is better to start out with standards and improve them in case they are not satisfying!
- Standards save money!
- Sharing of resources
- …

Why Standards?

- Some killer arguments:
  - Standards are more thoroughly reviewed than papers/ articles
  - A standard is not going to be replaced by another one!
  - Filing an ISO standard means international impact!

Knowhow about standards is attractive for DFKI partners – both industry and academia – and is thus an excellent basis for new Projects!

How to File an ISO Standard*

1. **Proposal**: New standard is proposed to relevant ***technical committee***
   - If proposal is accepted, goto 2
2. **Preparatory:** ***Working group of experts*** start discussion to prepare a working draft
   - As working group is satisfied with the working draft, goto 3
3. **Committee:** 1st working draft shared with technical committee and with ISO Central Secretary
   - If consensus is reached within the TC, goto 4
4. **Enquiry:** Draft shared with all ISO national members, who are asked to comment
   - If consensus is reached, goto 5
5. **Approval:** Final draft sent to all ISO members
   - If standard is approved by member vote, goto 6
6. **Publication:** ISO International Standard

* http://www.iso.org/

ISO/IEC 24617-2

- ***Technical committee***: ISO/TC 37/SC 4 Language resource management
  - Chairperson: M. Laurent Romary
  - Secretary: Mr. Key-Sun Choi
- ***Working group of experts***: Harry Bunt (chair), **Jan Alexandersson**, Jean Carletta, Jae-Woong Chae, Alex Chengyu Fang, Koiti Hasida, Olga Petukhova, Andrei Popescu-Belis, Claudia Soria, David Traum
- ***Expert Consultants Group***: James Allen, Jens Allwood, Nick Campbell, Roberta Catizone, **Thierry Declerck**, Anna Esposito, Raquel Fernandez, Giacomo Ferrari, Dirk Heylen, Julia Hirschberg, Kristiina Jokinen, Maciej Karpinski, Staffan Larsson, Kiyong Lee, Oliver Lemon, Carlos Martinez-Hinarejos, Paul Mc Kevitt, Michael McTear, David Novick, Tim Paek, Patrizia Paggio, Catherine Pelachaud, Massimo Poesio, German Rigau, Laurent Romary, Nicla Rossini, Milan Ruska, Candice Sidner, marieke van Ielka van der Sluis, Kristinn Thorisson, Aesoon Yoon, Yorick Wilks

Agenda

metalogue

AMI CONSORTIUM

ISO

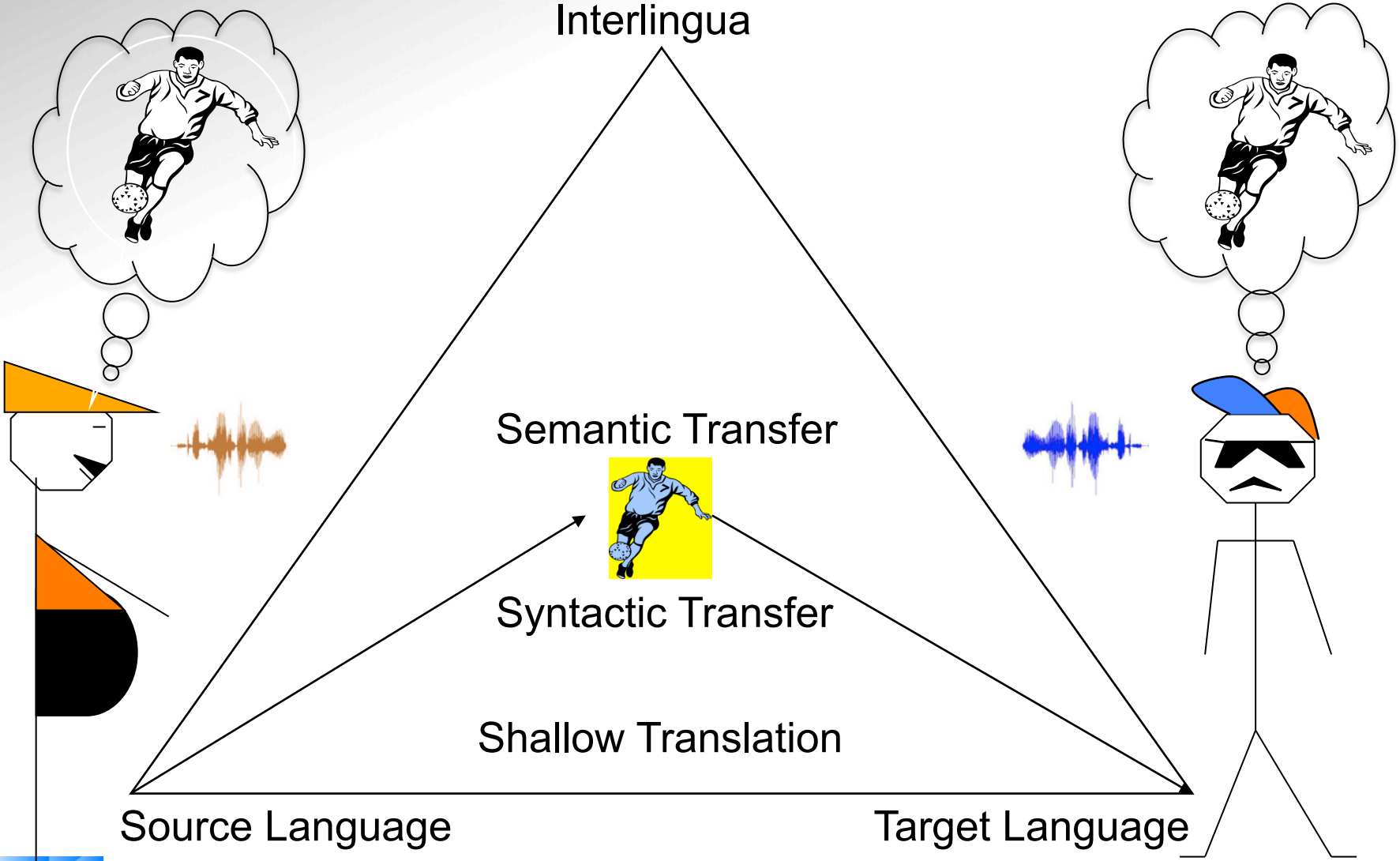
Mensch-Technik-Interaktion Smart KOM

Verbmobil

- Metalogue
  - Training of Debate und Call-center based on Multimodal Recognition, Modelling and Metacognition
- AMI/AMIDA
  - Augmented Multi-party Interaction
- SmartKom
  - Multimodal Command & Control
- VerbMobil
  - Spontaneously spoken translation of negotiation dialogues

VerbMobil – The early years...

Vouquois' Translation Triangle

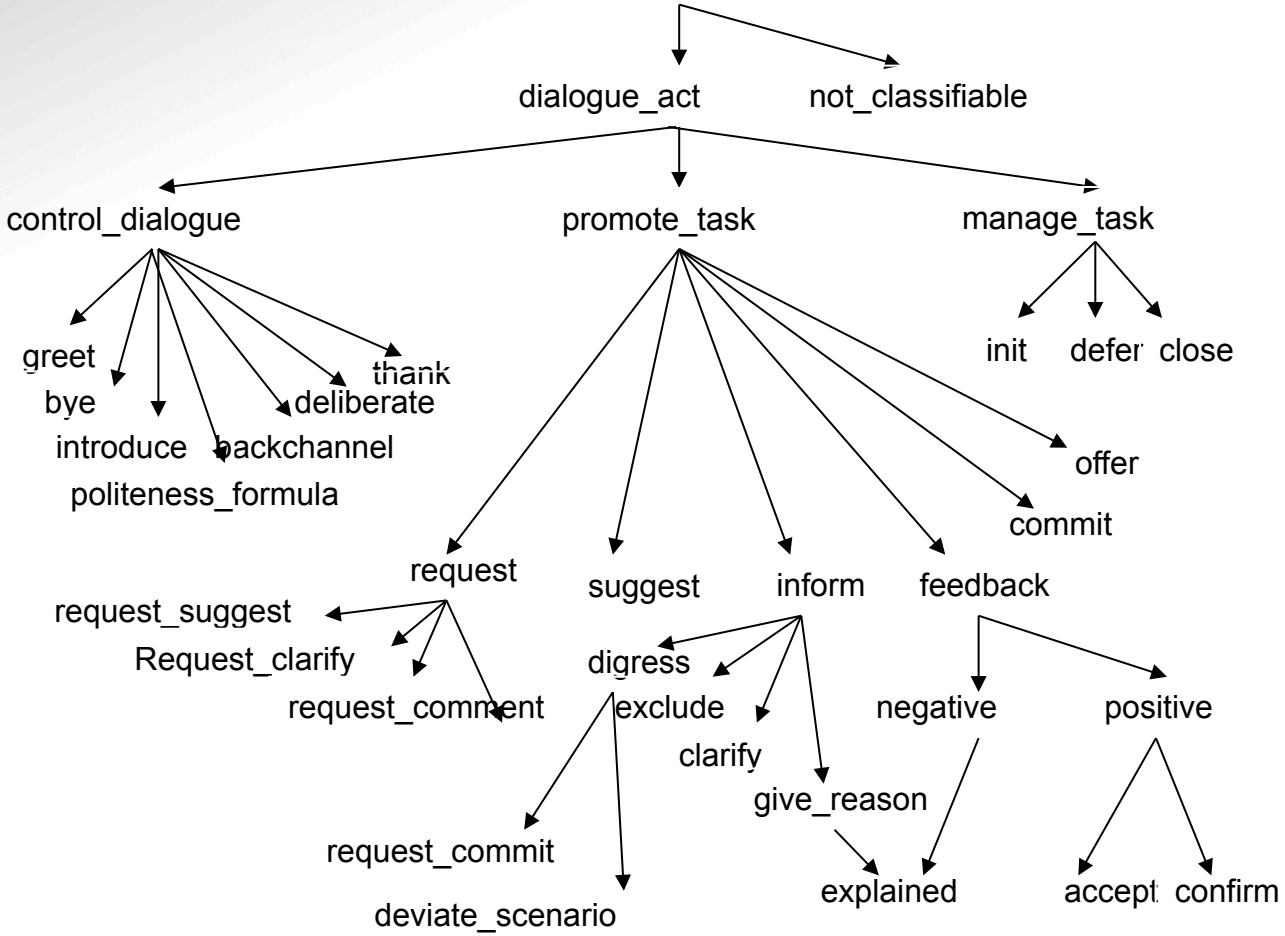


Modelling in VerbMobil

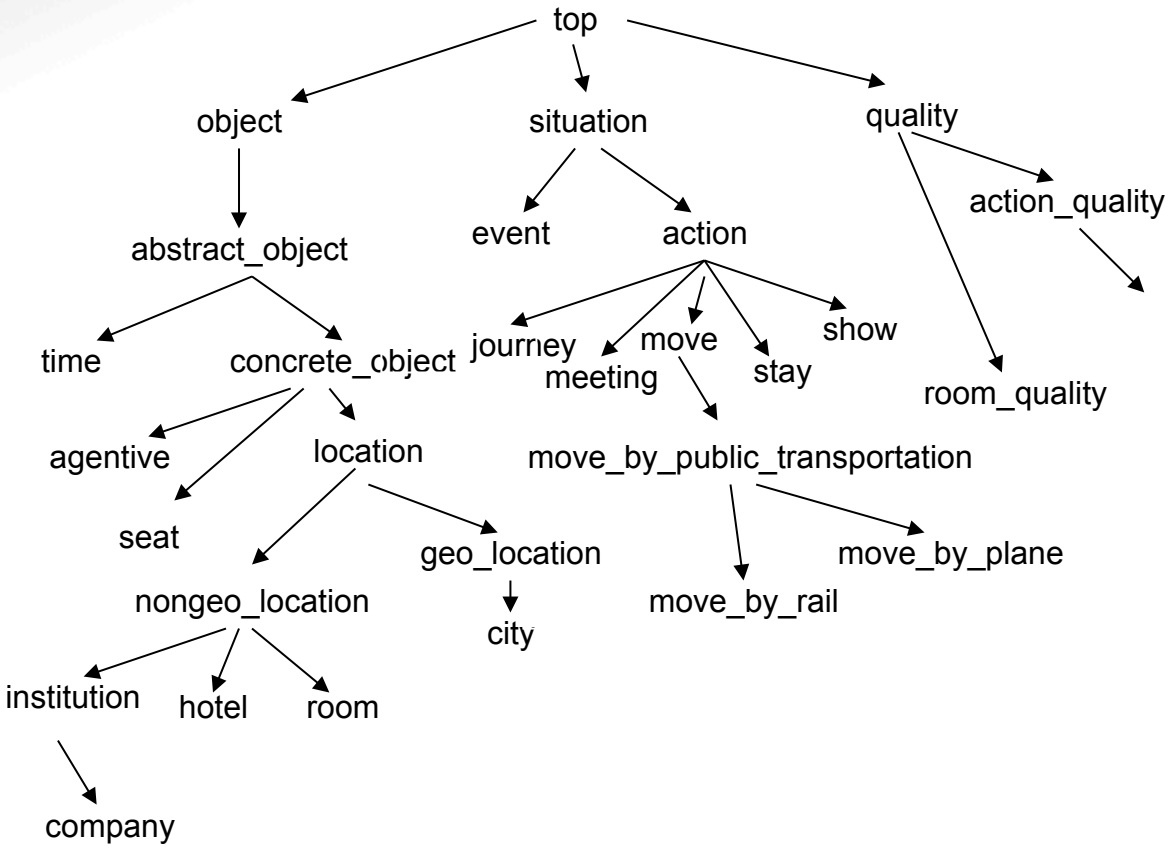
- The meaning of a user contribution represented according to Levinson*: illocutionary force and propositional content
  - Illocutionary force by VerbMobil Dialogue Acts representing a speakers “primary communicative intention”**
  - Propositional content: semantic representation languages (DLR = Typed Frames + TEL)

* Stephen C. Levinson. *Pragmatics*. Cambridge University Press, 1993
** Alexandersson et al. Dialogue Acts in VerbMobil-2, *Verbmobil-Report Nr.226,* 1

VerbMoibil-2 Dialogue Acts



VerbMobil-2 DLR



Examples

Transliteration:

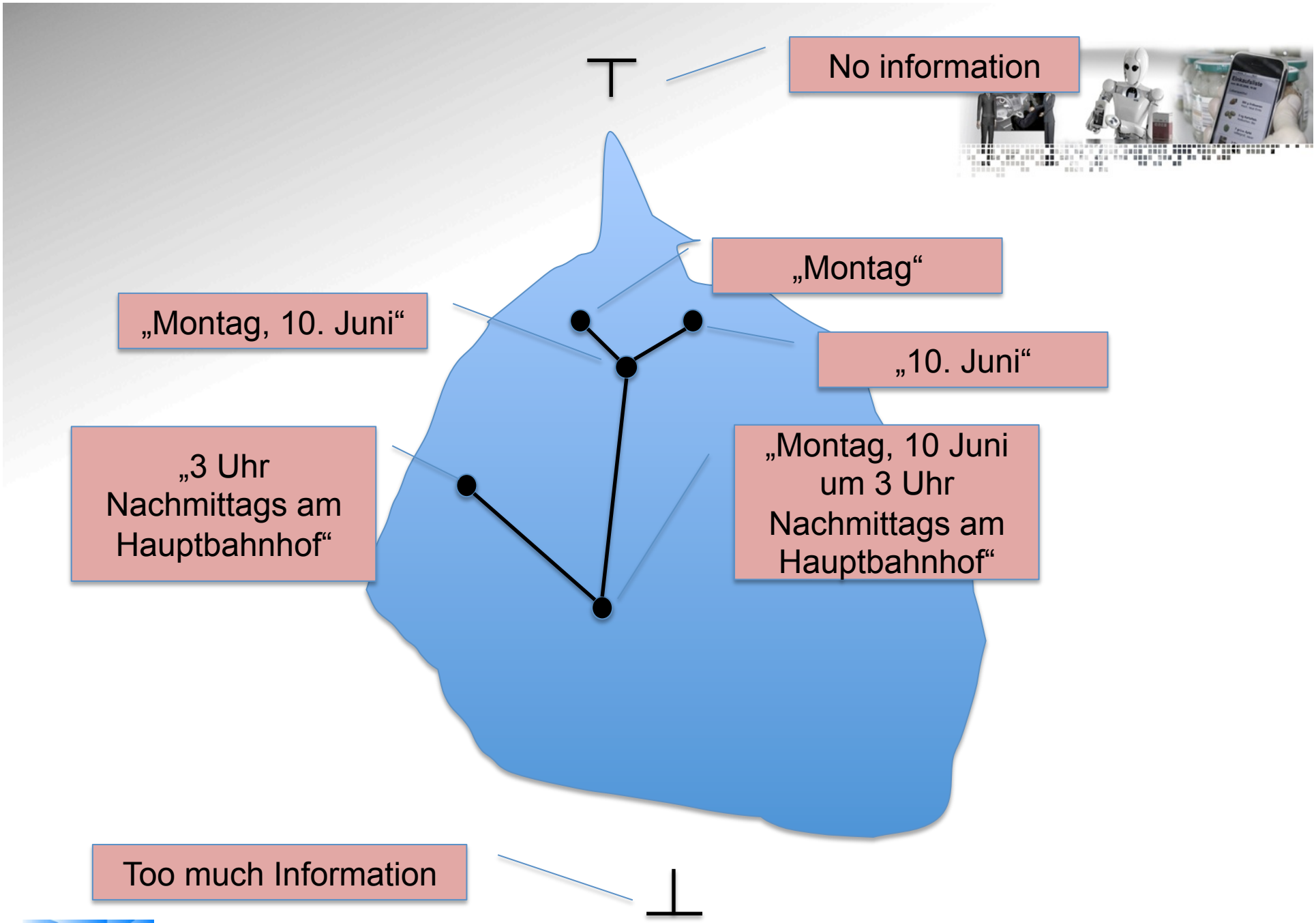
- “When would be a good time for us to meet?”
  - Dialogue Act: Request
  - Proposotional Content: meeting[has_time]

Speech Recognition output:

– “I would so we were to leave Hamburg on the first“
  - Dialogue Act: Inform
  - Proposotional Content: has_move:[move,has_source_location:[city,has_name='hamburg'],has_departure_time:[date,time='day:1']]]]

Unification

- *Subsumption* is a partial order relation between terms in a knowledge representation
- By subsumption, we can order the terms into a lattice
- In such a lattice, we call the greatest lower bound the unification of two terms
- Example: “Montag, 10. Juni” is the *unification* of “Montag” and “10. Juni”


⊤
No information
„Montag“
„Montag, 10. Juni“
„10. Juni“
„3 Uhr Nachmittags am Hauptbahnhof“
„Montag, 10 Juni um 3 Uhr Nachmittags am Hauptbahnhof“
Too much Information
⊥

Unification is not enough!

- Unification can be used to constrain/guide computing consistent structures
  - Example: Unification grammars
- But unification cannot be used to model contradictory, yet natural phenomena
  - Example from SmartKom:

    U: What is running on **TV** tonight?

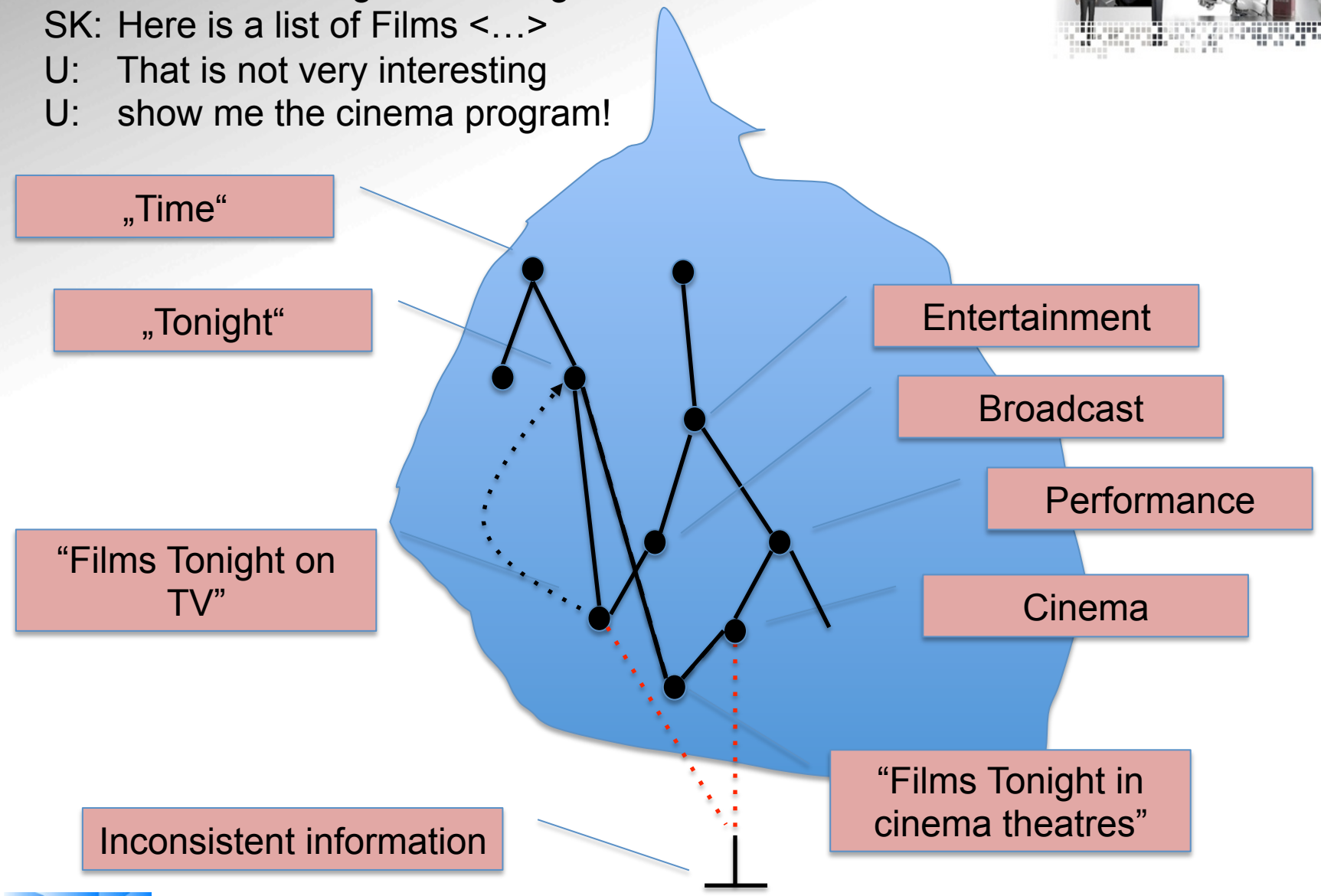
    SK: Here is a list of Films <…>

    U: That is not very interesting

    show me the **cinema program**!

SmartKom-Home

U: What is running on TV tonight?
SK: Here is a list of Films <…>
U: That is not very interesting
U: show me the cinema program!



Overlay = Default Unification + Score

- Formalization:
  - $C \sqcup_c B = \{C \sqcup B' \mid C' \sqsubseteq B$ is maximal such that $C \sqcup B'$ is defined$\}$
  - Translation into English:
    - In order for you to default unify C with B
      Compute all generalizations of B (call them B')
      Select the most specific one(s) that unify with B
- Default unification may produce many results

→ Rank the results based on a scoring mechanism that, for instance, expresses the semantic distance between C & B'

Overlay

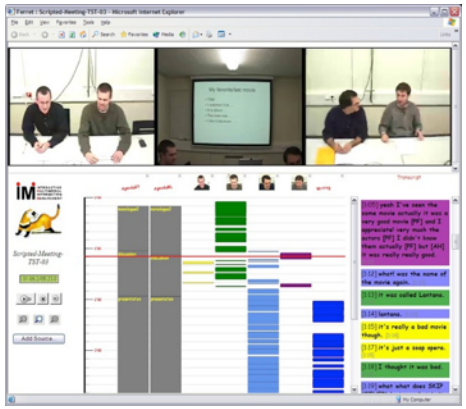
- Conclusion:
  - With Overlay, it is possible to combine “new information” with “old information” that is partially incompatible resulting in (maximally informative) consistent information
- Research Questions:
  - What old information should be discarded?
  - Intelligent scoring/search?

SIXTH FRAMEWORK PROGRAMME

2004 – 2009

AMI/AMIDA

- Augmented Multi-Party Interaction
- Scenario:
  - Designing a remote control
  - Different roles
  - Meeting recordings at different stages of the development process
- Modelling with dialogue acts and propositional content



Some Lessons Learned

- To represent user intentions with dialogue acts and propositional content
- Sometimes, an utterance requires multiple dialogue acts
- Combining information chunks can be done with
  - Unification in case of compatible information
  - Overlay in case of contradicting, yet compatible information
- When predicting/computing meaning of user contributions:
  - Statistics/scores is almost always mandatory
  - Meaning is always dependent on the context → Discourse Memory
- We cannot have enough training data!

ISO 24617-2
Semantic Annotation Framework
Part 2: Dialogue Acts

ISO 24617-2

- In the1990th, several special-purpose dialogue act annotation schemata were developed:
  - Trains (Allen et al, 1994); Map Task (Carletta et al, 1996); VerbMobil (Alexandersson et al, 1998); …
- Discourse Resource Initiative developed the Dialogue Act Markup using Several Layers – DAMSL (Allen & Core, 1997); MRDA (Dhillon et al, 1994)
- Several extensions thereof:
  - Swithboard-DAMSL (Jurafsky et al, 1997)
  - COCONUT (di Euogenio et al, 1998)
  - DIT++ (Bunt, 2006; 2009)

ISO 24617

- EU project LIRICS (initiated by ISO/TC 37/SC 4 Language resource management)
  - Current state-of-the-art makes it feasible to develop an ISO-standard for a general purpose dialogue act annotation, ISO 24617-2 “Semantic Annotation Framework, Part 2: Dialogue acts”
- ISO 24617 consists of 6 “projects”*:
  1. Time and Events (published in 2012)
  2. **Dialogue acts (published in 2012)**
  4. Semantic roles (preliminary working draft)
  6. Principles of semantic annotation (working draft)
  7. Spatial information (in progress)
  8. Relations in discourse (in progress)

*http://semantic-annotation.uvt.nl

ISO 24617-2 – Considerations

- Dialogue is highly contextual
  - assigning the meaning of single contributions is only possible in the context in which it was uttered
- Surface form of So-called “indirect speech” acts are common in every-day language
  - “Can you (please) pass me the salt?” vs. “Pass me the salt (please)!”
  - “Where is Lee’s office” vs. “Do you know where Lee’s office is?” vs. “Show/Tell me where Lee’s office is”
- Many utterances are multifunctional, that is, they serve multiple purposes
- Grounded on theoretical as well as empirical evidence!

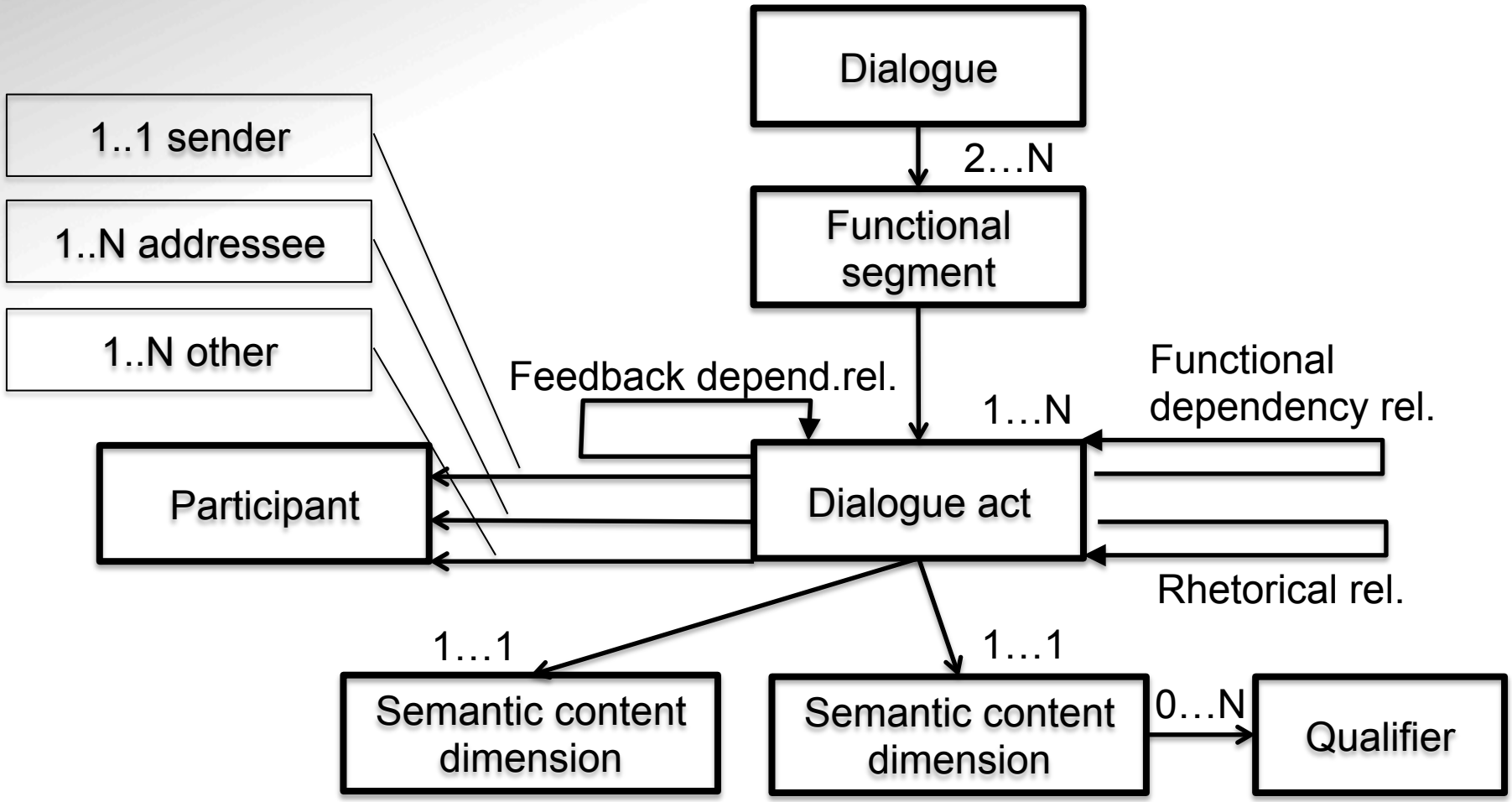
ISO 24617-2 – Solution

- Intention-based rather than form-based approach
  - Human annotators are better in perceiving the intention behind the utterance
  - Therefore, use hierarchies of
    - Communicative functions
    - Function qualifiers
- Information-state update:
  - Rather than basing the annotation on surface properties of the communication, use the intended impact on the hearers' information state

Some Inspirational Work

- Austin, J.L.(1962) *How to do things with words*. Clarendon Press, Oxford, UK
- Searle, J.R. (1969) *Speech Acts*. Cambridge, UK: Cambridge University Press
- Mann, W. and S. Thompson (1988) *Rhetorical Structure theory: Toward a functional theory of text organization*. MIT Press, Cambridge, MA
- Hovy, E. and **E. Maier** (1992) Parsimonious or profligate: how many and which discourse structure relations? ISI research report, Information Sciences Institute, University of Southern California, Marina del Rey
- Allwood J. (1994) Obligations and options in dialogue. *THINK Quarterly* 3(1): 9-18
- Allen, J. and M. Core (1997) DAMSL: Dialogue Act Markup in Several Layers (Draft 2.1). Technical Report, Multiparty Discourse Group, Discourse Resource Initiative, September/October 1997
- **Alexandersson**, J., B. Buschbeck-Wolf, T. Fujinami, M. **Kipp**, S. Koch, E. **Maier**, N. **Reithinger**, B. Schmitz and M. **Siegel** (1998). *Dialogue acts in VERBMOBIL-2*. Verbmobil Report 226. Saarbrücken: DFKI
- **Klein**, M. (1999) Standardization efforts on the level of dialogue acts in the MATE project. In *Proceedings of the ACL Workshop "Towards Standards and Tools for Discourse Tagging*", pp. 35-41
- Traum, D. and S. Larsson (2003) The Information State Approach to Dialogue Act Management. In J. van Kuppevelt and R. Smith (eds.) *Current and New Directions in Discourse and Dialogue*. Dordrecht: Kluwer
- Bunt et al. (2009) The DIT^{++} taxonomy for functional dialogue markup. In *Proceedings of AAMAS 2009 Workshop "Towards a Standard Markup Language for Embodied Dialogue Acts* (*EDAML 2009*), Budapest, pp. 13-24
- Petukhova, V. and H. Bunt (2012) The coding and annotation of multimodal dialogue acts. In *Proceedings 8th International Conference on Language Resources and Systems* (*LREC 2012*), Istanbul, pp 1293-1300

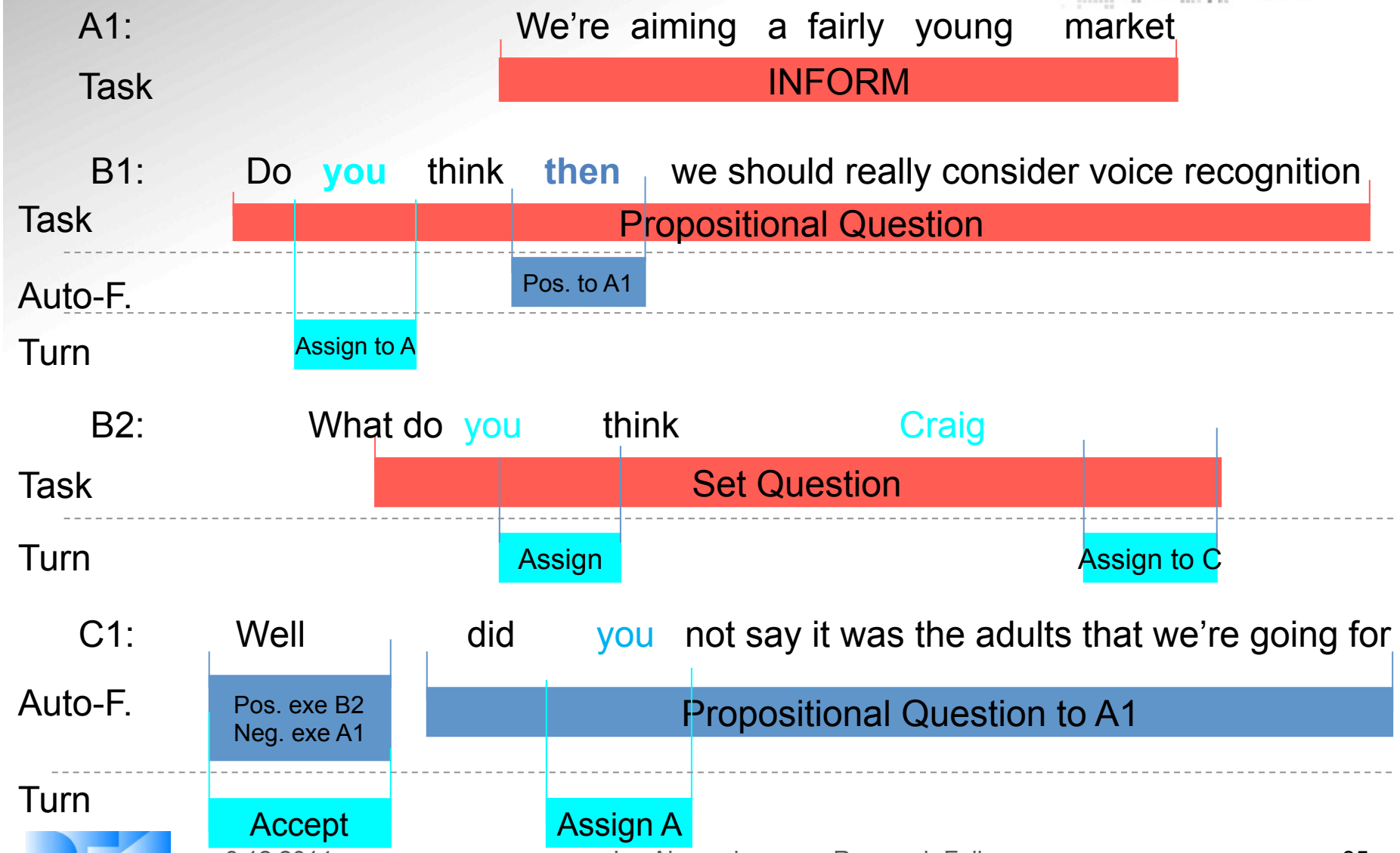
ISO 24617-2 – The Meta Model



The 9 Core Dimensions

1. Task
2. Auto-feedback: about the speaker
3. Allo-feedback: about the addressee
4. Turn management
5. Time management
6. Discourse structuring
7. Own communication management
8. Partner communication management
9. Social obligations management

An example (AMI/AMIDA)



Automatic Classification AMI/AMIDA (F-Score)

(Similar results on the Map Task corpus)

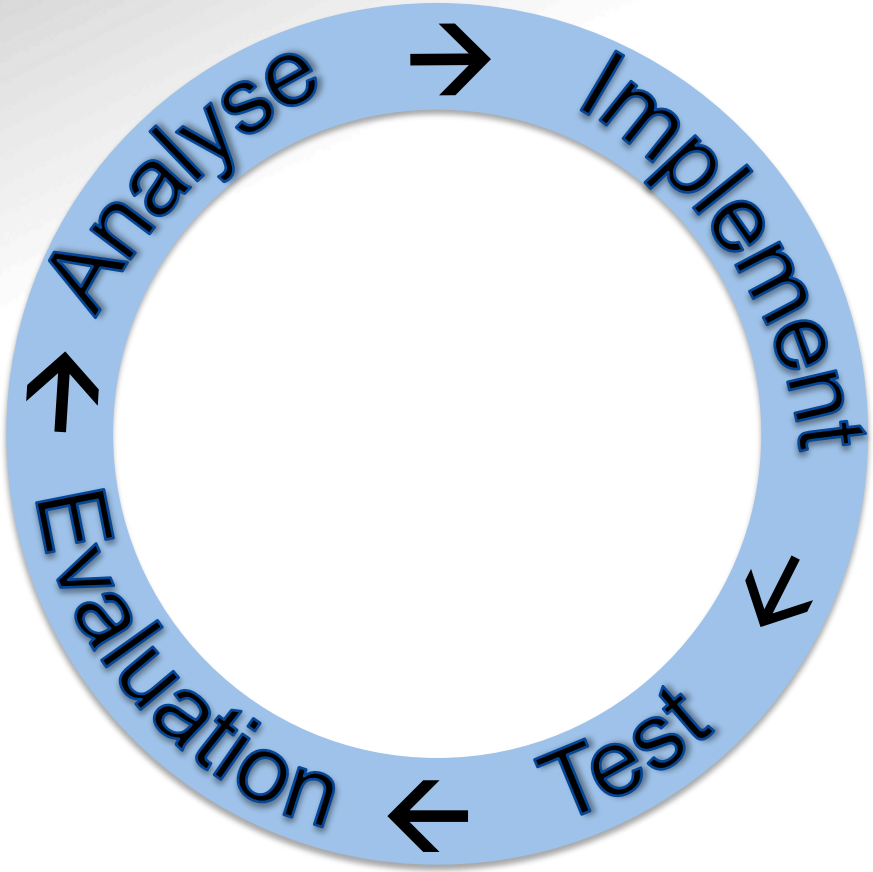
	Dialogue Act	Freq	Bayesian Net	Ripper
1	Task	31.8	**82.6**	86.1
2	Auto-feedback: about the speaker	20.5	96.9	**98.1**
3	Allo-feedback: about the hearer	0.7	**96.3**	95.7
4	Turn management	50.2	90.9	**91.2**
5	Time management	26.7	90.4	**93.4**
6	Discourse structuring	2.8	**82.1**	78.3
7	Own communication management	10.3	78.4	**81.6**
8	Partner communication management	0.3	**71.8**	70.0
9	Social obligations management	0.5	98.6	**98.6**

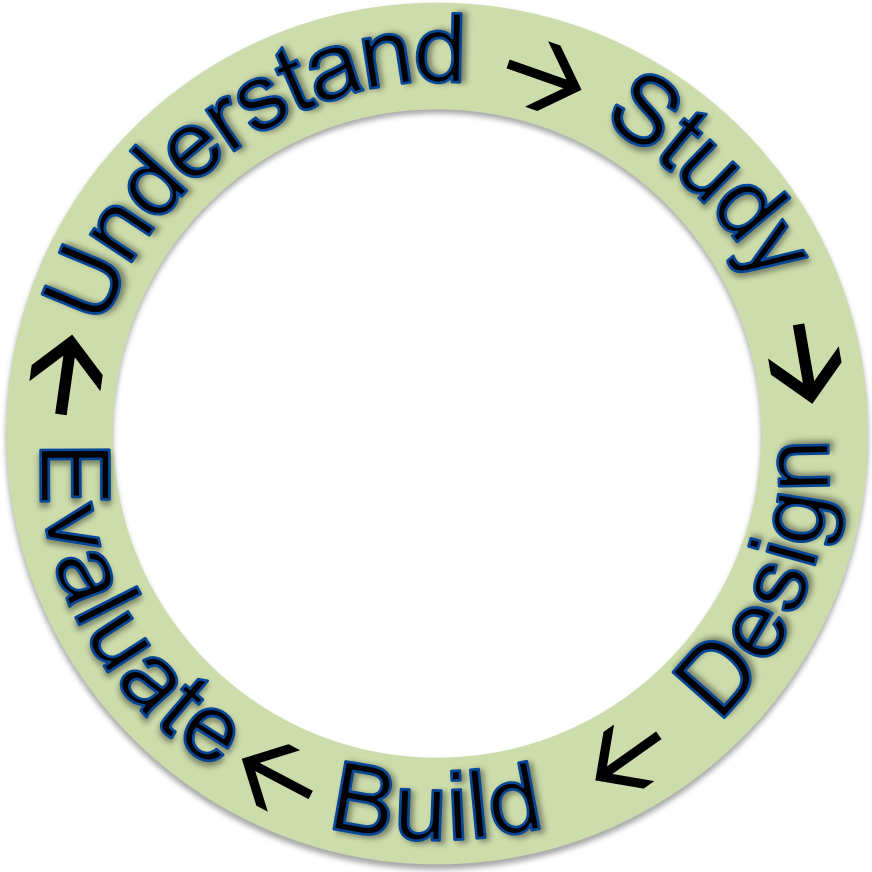
Petukhova & Bunt, 2014, Computing Meaning, Vol. 4, Springer

Agenda

- **SmartKom**: Dialog-based Human-Technology Interaction by Coordinated Analysis and Generation of Multiple Modalities
- **i2home**: Intuitive Interaction for everyone in Smart Homes
- **SmartSenior**: Längere Selbstständigkeit von Seniorinnen und Senioren
- **OpenURC Alliance e.V.**
- **Mobia**: Mobil bis ins Alter
- **SUCH**: Secure UCH

Applied Research for and with Humans





Lift UIs

4
3
2
1
E
0

Hotel
Aranzazu
Donostia

Lift UIs

Somewhere in Indianapolis

South parking deck of Piedmont Hospital, Atlanta, GA (USA)

Asian Civilizations Museum, Singapore:
→ 2 Levels

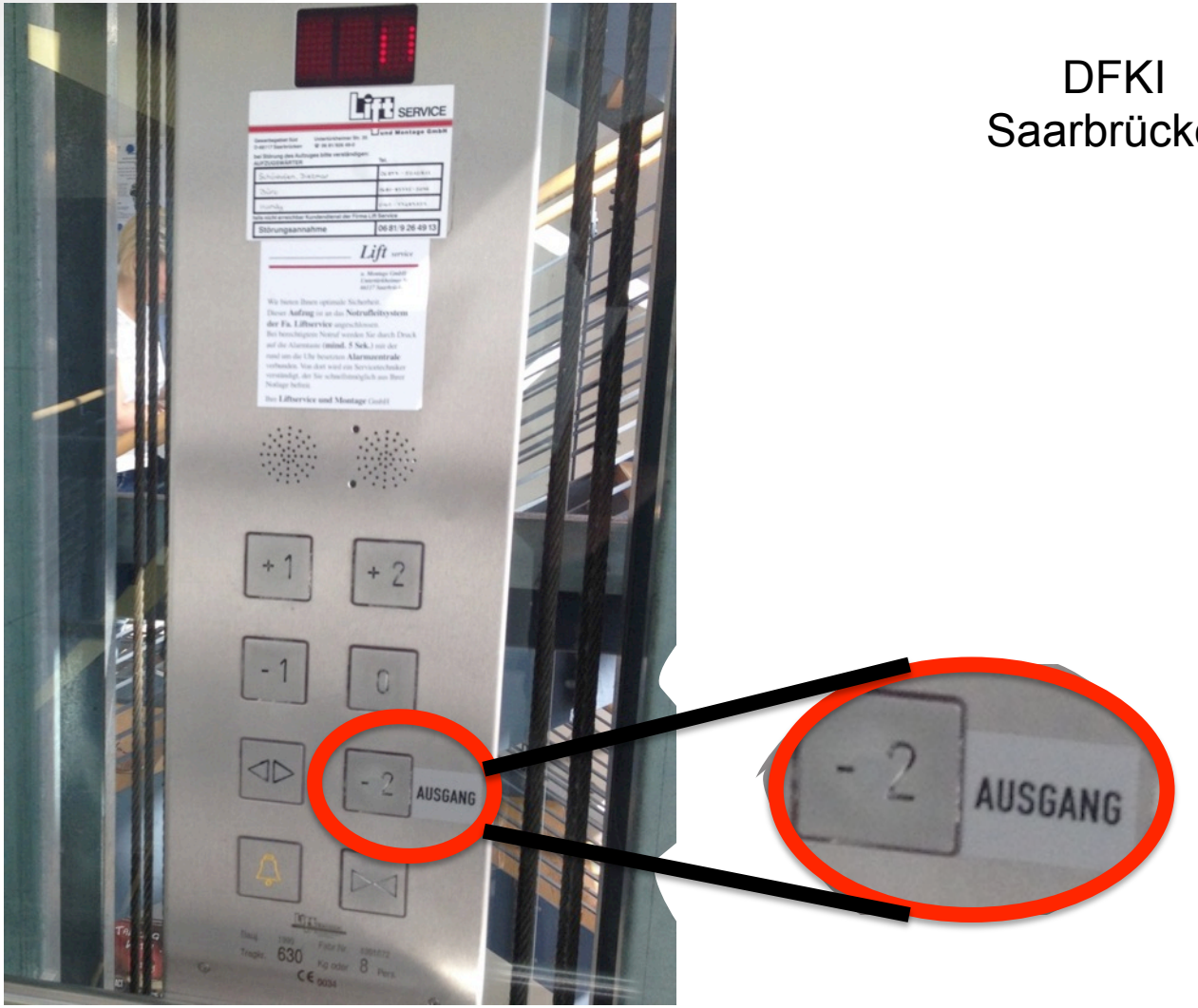
What is the Situation today?

DFKI
Berlin

What is the Situation today?

DFKI
Saarbrücken

+2
+1
0
-1
-2



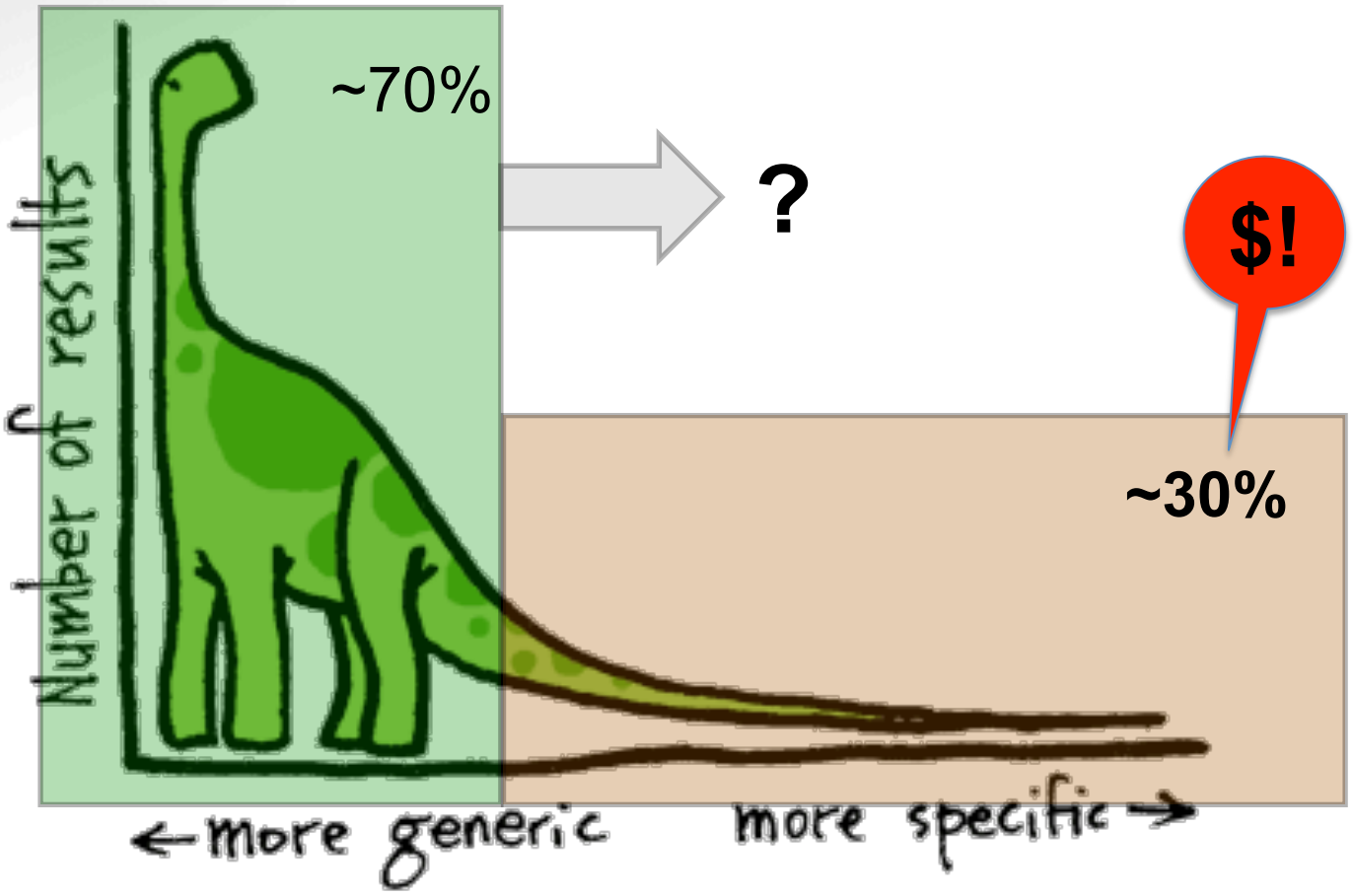
Conclusion

There is an urgent need for alternative user interfaces for lifts! Too!

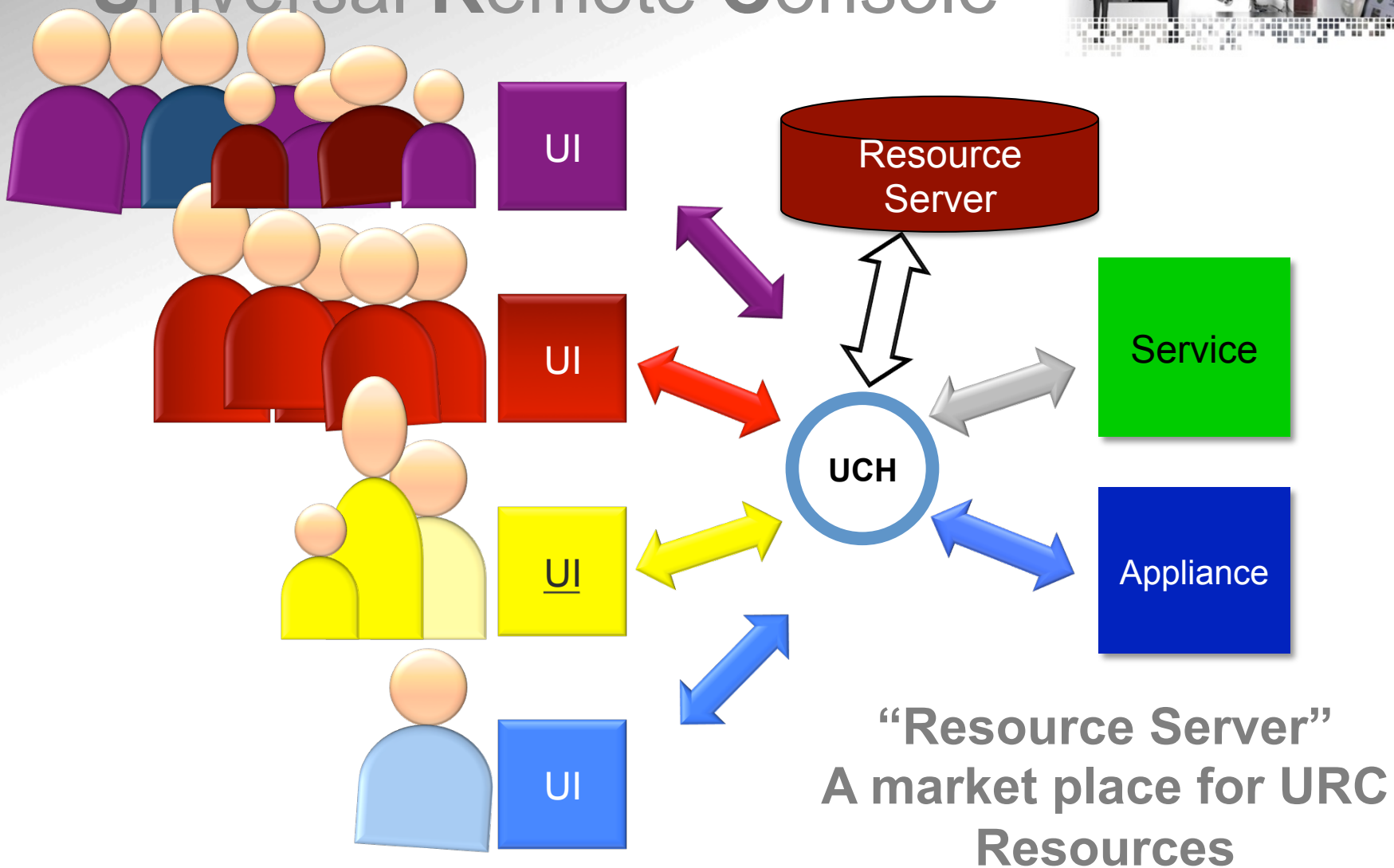
Some Facts

- „**Simple to use**“ is the third most important factor for home cinema equipment [CEA, 2006]
- **13%** of the US population believes that consumer electronics equipment is easy to use [Philips NA CEO Zeven]
- **50%** of all malfunctioning products returned to stores by consumers are in full working order, but customers can't figure out how to operate the devices [Den Ouden, 2006]

One-Size-Fits-All UIs



Universal Remote Console



“Resource Server”
A market place for URC Resources

The URC Standard development

- The development of the Universal Remote Console standard was based on the desire to have a one open standardised interface technology for alternative user interfaces
- ANSI 24752 (under INCITS* V2**) working group partners
  - Trace, IBM, NIST, Microsoft
  - Ansi standard filed in 2008
- Continued during the i2home project to ISO 24752 under ISO/IEC JTC1 SC35, User Interfaces
- Today, responsibility is with the OpenURC Alliance Technical Committee

*InterNational Committee for Information Technology Standards, http://www.incits.org
**Committee on Information Technology Access Interfaces

Green: ongoing
Red: submitted and pending

AHA Platform (EIT; EU)

eRehab (Sp)

Cloud4All (FP7; EU)

Mobia (BMBF; DE)

Smart Energy For All (Energy; PT)

2012

SensHome (Saarland)

2010

URC4ALL (Tools; UCH workbench; PT)

RehabTV (Sp)

2008

VITAL (FP6; EU)

i2Life (eHealth; PT)

HELASCoL (AAL; EU)

2006

BrainAble (AAL, eHealth; EU)

V-Bucks (Energy; US)

USG, USG2, USG3 (T-Systems; Automotive; DE)

SmartSenior (DE)

SmartMediaManager (US)

(FP6; EU)

MovAR (Eureka; E

VRinMotion (QREN; PT)

ARC (AAL; AU)

Bedmond (AAL; EU)

SmartSenior (DE)

TICE.WeCan (eHealth; PT)

TICE.Mobilidade (PT)

TICE.MindCare (eHealth;

TICE.PING - Public Transport (PT)

SUCH (Saarla

SEMPROM(DE)

AAL4ALL (AAL; PT)

SaarAAL (Saarland)

O.Palliative (Sp)

Vade Mecum (BMBF; DE)

>> 100 Mi Euro Funding

The OpenURC Alliance e.V.

www.openurc.org

OPEN URC™

openURC™ is an international consortium of companies promoting the adoption of ISO/IEC 24752 or Universal Remote Console™

Search

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News

Latest news

OpenURC in SmartSenior meeting

OpenURC was presented at the SmartSenior meeting in Berlin at the beginning of this week. Pics and (German) info at DFKI's Facebook page.
Presenter: Prof. W. Wahlster, CEO of DFKI

Dual Reality in the Bremen Ambient Assisted Living Lab

Dual reality models are virtual representations of the real world, which are at the same time networked to that world. They not only mirror the appearance of the actual environment but also its functionalities and they are able to interact with it.
Read more...

Home

Welcome to openURC Alliance website! openURC's mission is to promote the Universal Remote Console and associated standards and its application. We believe that effective intuitive, pervasive and personalized User Interfaces will largely determine the shape of technological products in the future. They will allow the simple and easy usage of any device or service by any type of user, from the technological expert over mainstream consumers to people with special needs, ensuring that every person has access to technology and technology products, in one completely individual, personalized, user-friendly, inter-operable, pervasive, and seamless environment.

Two Projects with URC

- Mobia – Mobil bis ins Alter
  - BMBF project (1.11.2011 – 31.10.2014)
    - Partner: Saarbahn GmbH, iso-institut e.V., DFKI GmbH, ZBB, b2m AG
    - Objective: Reduce barriers in public transport by the development of a technology-supported human service system
  - http://www.mobia-saar.de
- Secure UCH – SUCH
  - Saarland/EFRE project (1.5.2013 – 31.4.2015)
    - Partner: consistec GmbH, DFKI GmbH
    - Objective: ISO/IEC 15408 Common Criteria-driven implementation of ISO/IEC 24752 Universal Remote Console middleware Universal Control Hub (UCH)
  - http://aal.dfki.de

Deutsches Forschungszentrum für Künstliche Intelligenz GmbH

www.saarbahn.de

MOBIA
Mobil bis ins Alter

B2M SOFTWARE AG

ZBB
Bildung für alle – Zukunft schaffen

Institut für Sozialforschung und Sozialwirtschaft e.V. Saarbrücken
iso

LANDESHAUPTSTADT SAARBRÜCKEN
unglaublich vielfältig

Project description

Passengers

MOBIA
Mobil bis ins Alter

Public transport

Technology development

Human Service development

Mobile User Interfaces

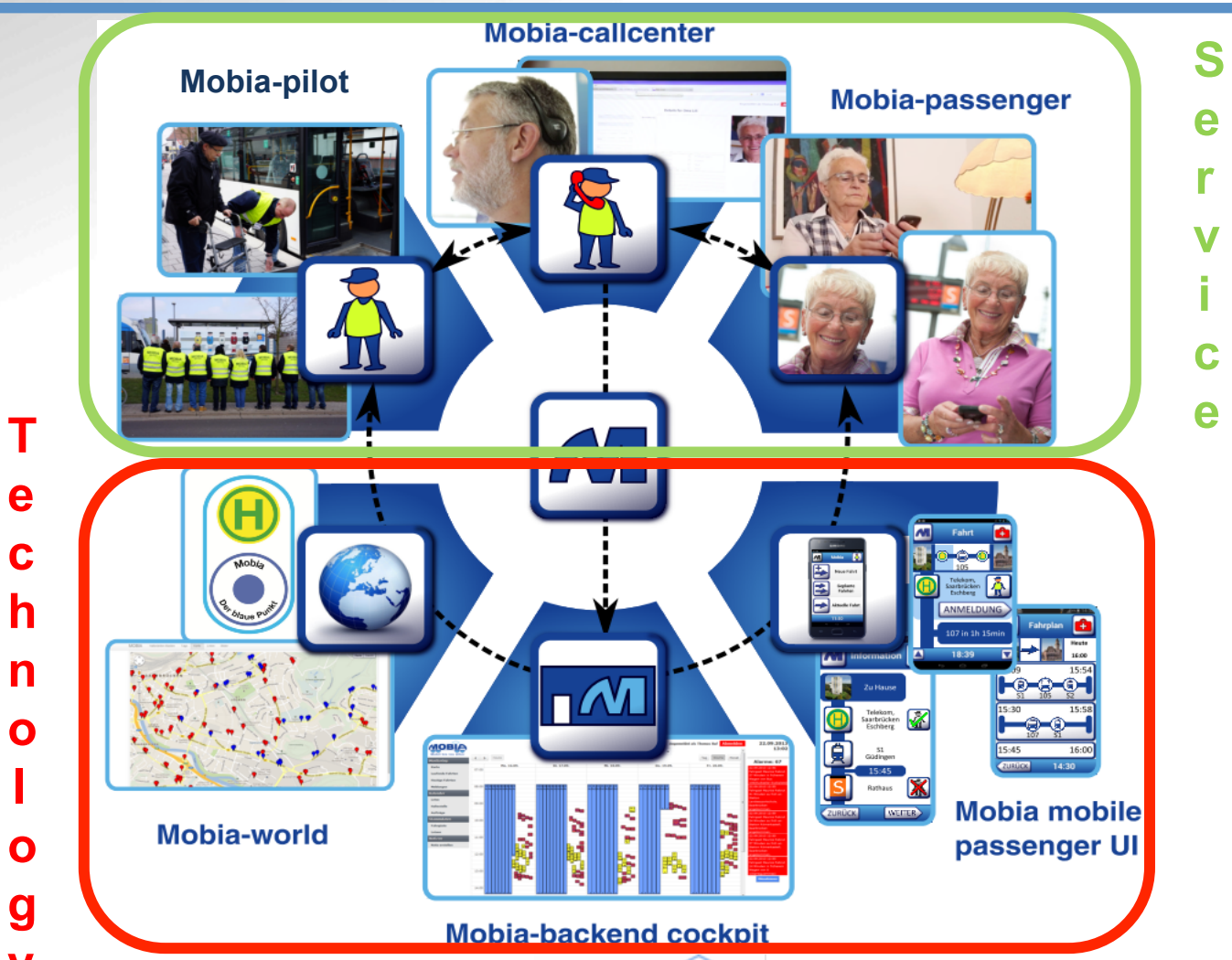
Call Center

Mobility Helpers

For passengers

For MobilityPilots

The Mobia-System



MOBIA
Mobil bis ins Alter

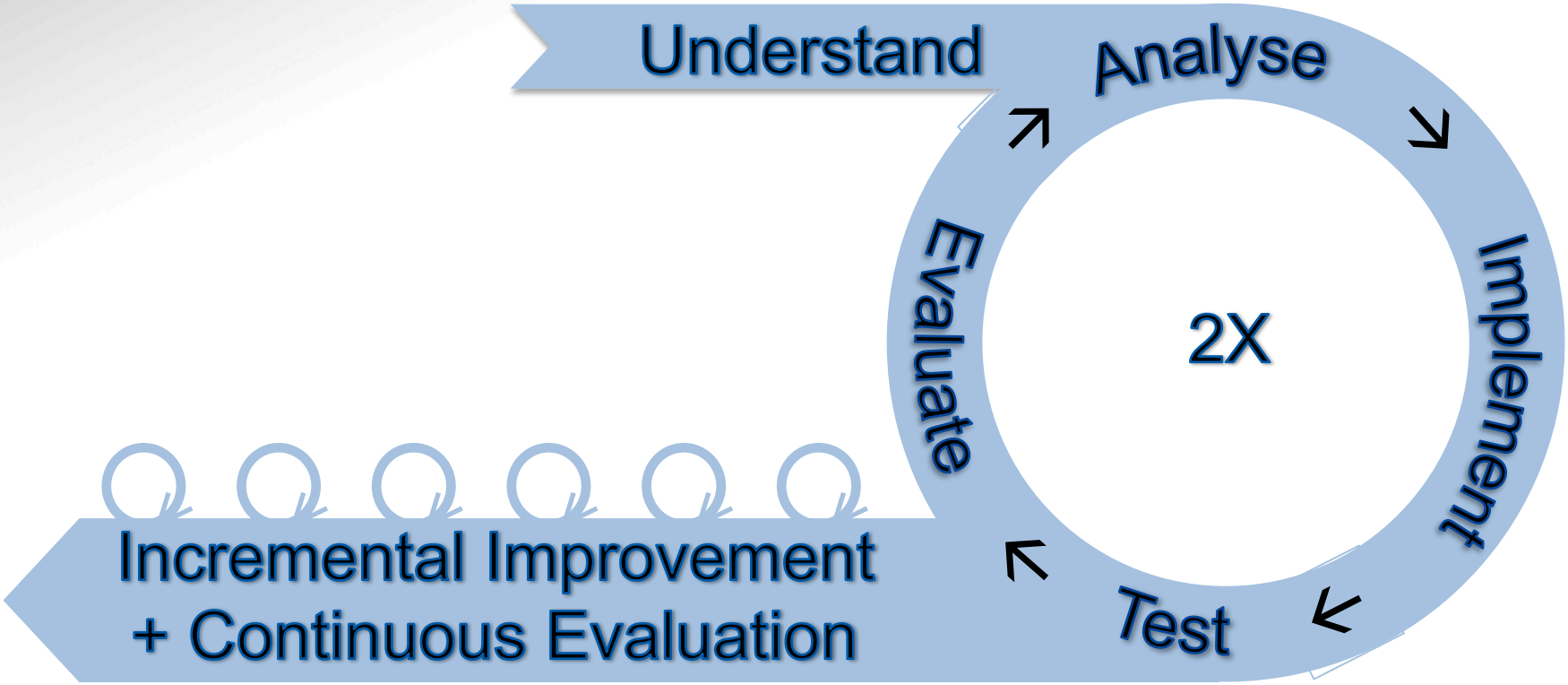
Field Test Start (DFKI)

First Regular's Table

Award: Deutschland, Land der Ideen

MOBIA
Mobil bis ins Alter

The Mobia Research Methodology



MOBIA
Mobil bis ins Alter

Mobia Results

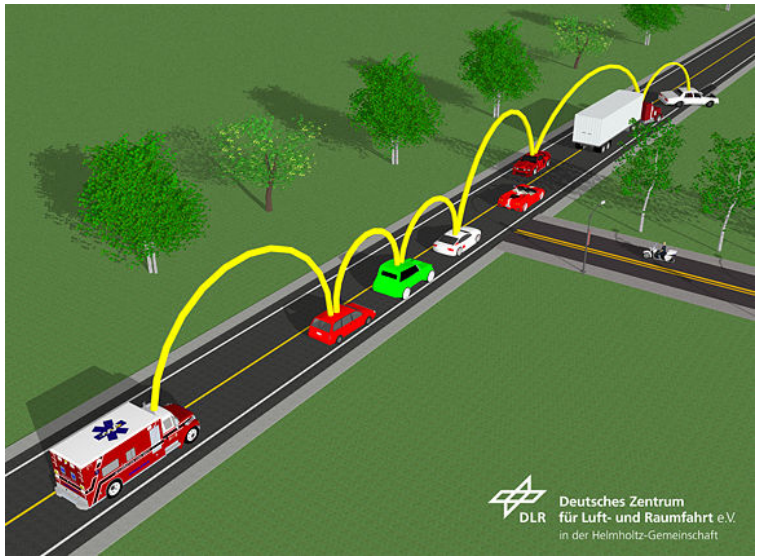
- A complete working technology-supported service system
- Continuous one-year evaluation in central Saarbrücken with ~60 persons
- Accessible User Interface tailored for elderly persons
- Saarbahn is now hiring 12 full time mobility pilots

- Next steps
  - Mobia 2.0 proposal (INNOVAKOMM) Extend Mobia to work in complete Saarland
  - Cooperation with SIAM

MOBIA
Mobil bis ins Alter

Mobia and SIAM

- Background SIAM:
  - User-centered Car2X-Communication
  - Persuasive
- Goal: Demonstration during SIAM project end presentation
- Scenario:
  - A driver (of a car) is proposed to catch bus 124 to Saarbrücken Rathaus at the University Campus (Mensa) in 10 minutes.
  - The driver is informed that there is a free parking place 1 minutes walk from the bus stop
  - The driver can order the complete Mobia service package: door-to-door service



MOBIA
Mobil bis ins Alter

SUCH

Secure Universal Control Hub

consistec
ENGINEERING & CONSULTING

Smart Environments & personal information

- Many persons are reluctant to provide his/her personal information to an unknown environment
- Example: A recent study by PwC's Health Research Institute:
  - 80 Percent Of Patients Worry About Health Data Security

SUCH

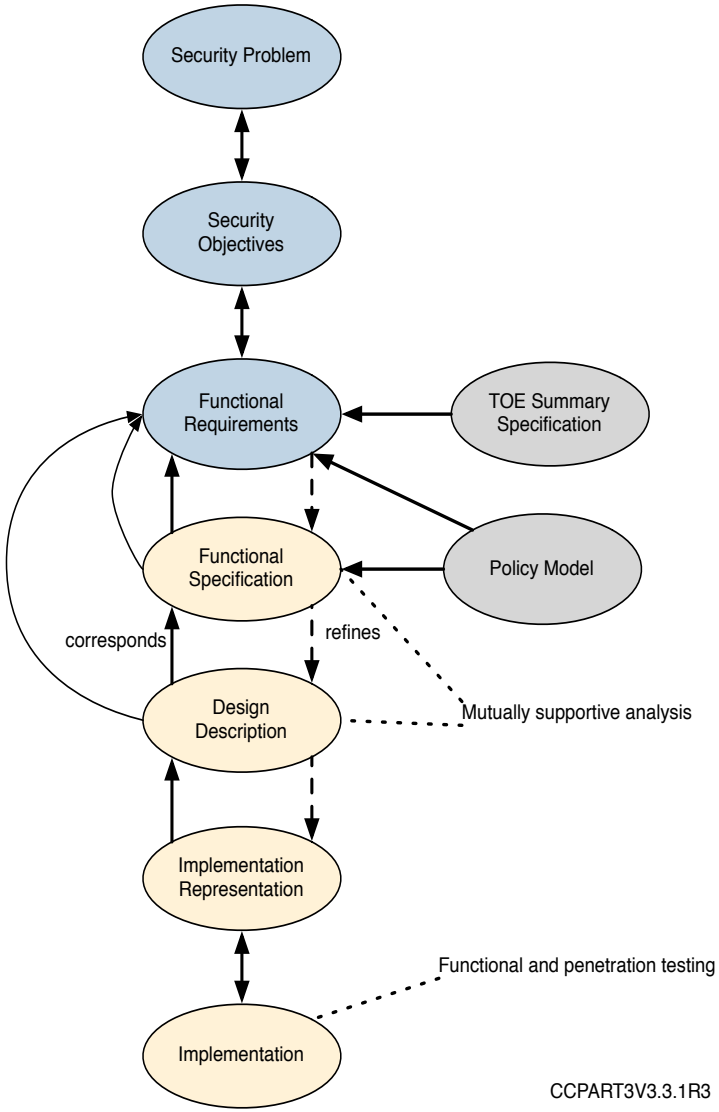
- Q: How can we provide a **trustful** platform that handles personalised information?
- A: Implement according to the ISO/IEC 15408 Common Criteria (CC) Methodology!

The CC Method:

1. Development along rigid prescriptions including a lot of mandatory documentation
2. World-wide certificate by neutral third party

Evaluation Assurance Level

- EAL1: Functionally Tested
- EAL2: Structurally Tested
- EAL3: Methodically Tested and Checked
- **EAL4: Methodically Designed, Tested and Reviewed**
- EAL5: Semiformally Designed and Tested
- EAL6: Semiformally Verified Design and Tested
- EAL7: Formally Verified Design and Tested

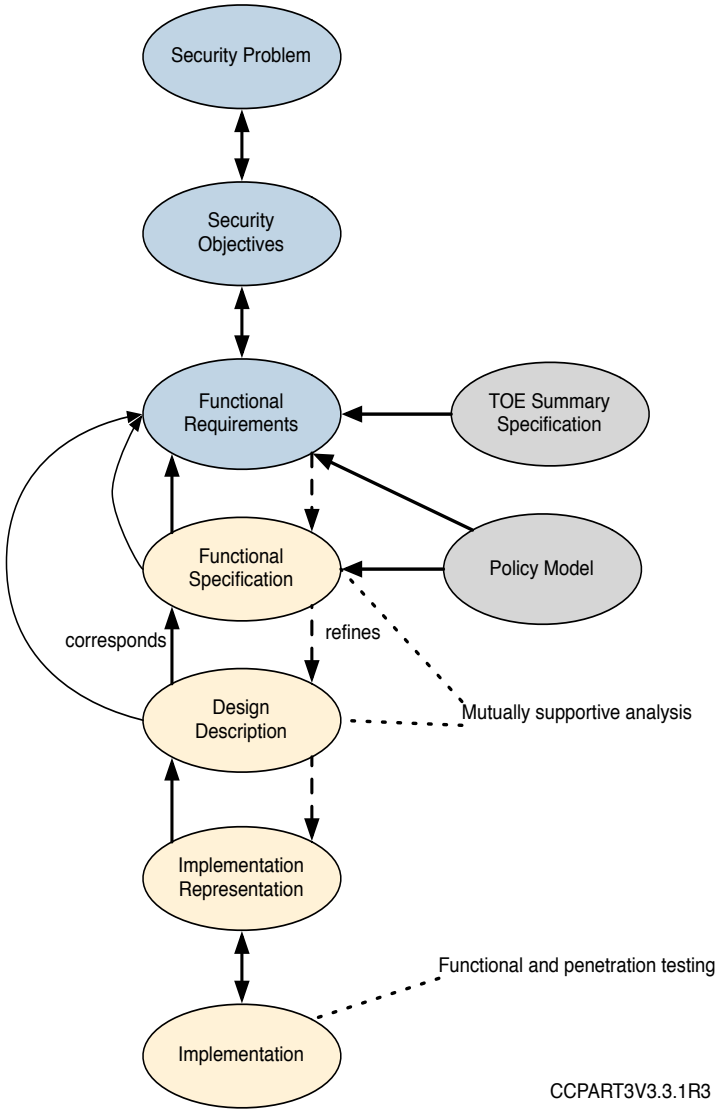


Security by Design

- Methodology
  - Security analysis
  - Security mechanisms & Architecture
  - Implementation
- Result
  - Documentation for Common Criteria (CC)
  - Evaluation through external independent organisation

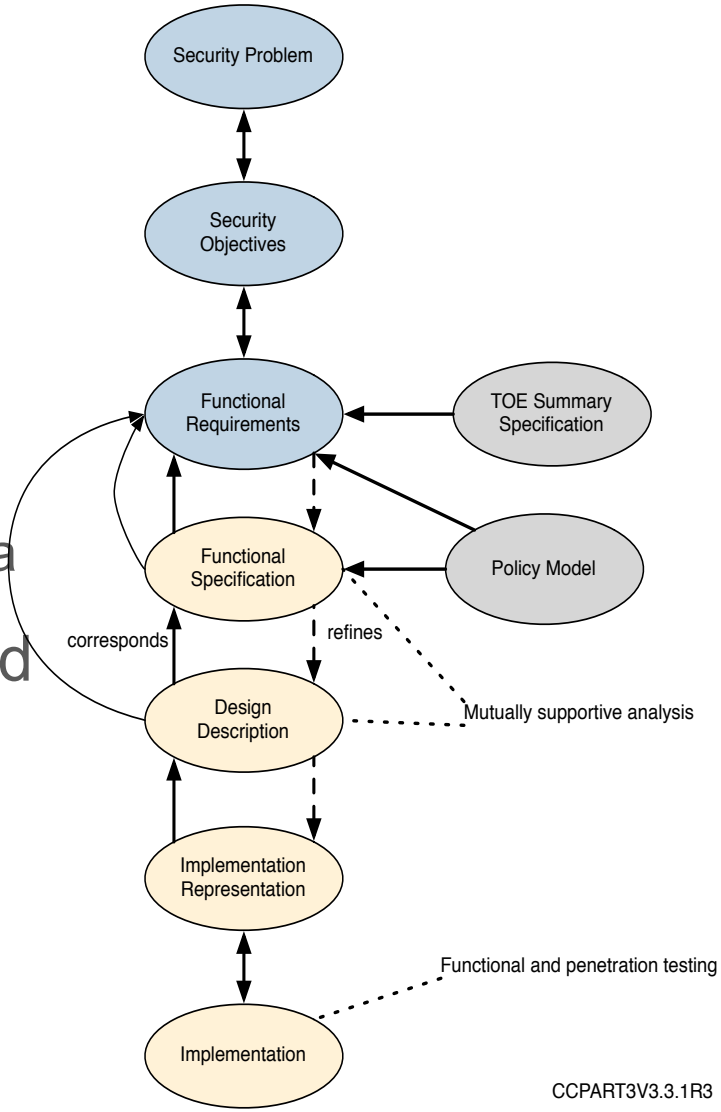
→ Certification CC

(Possible but not mandatory)

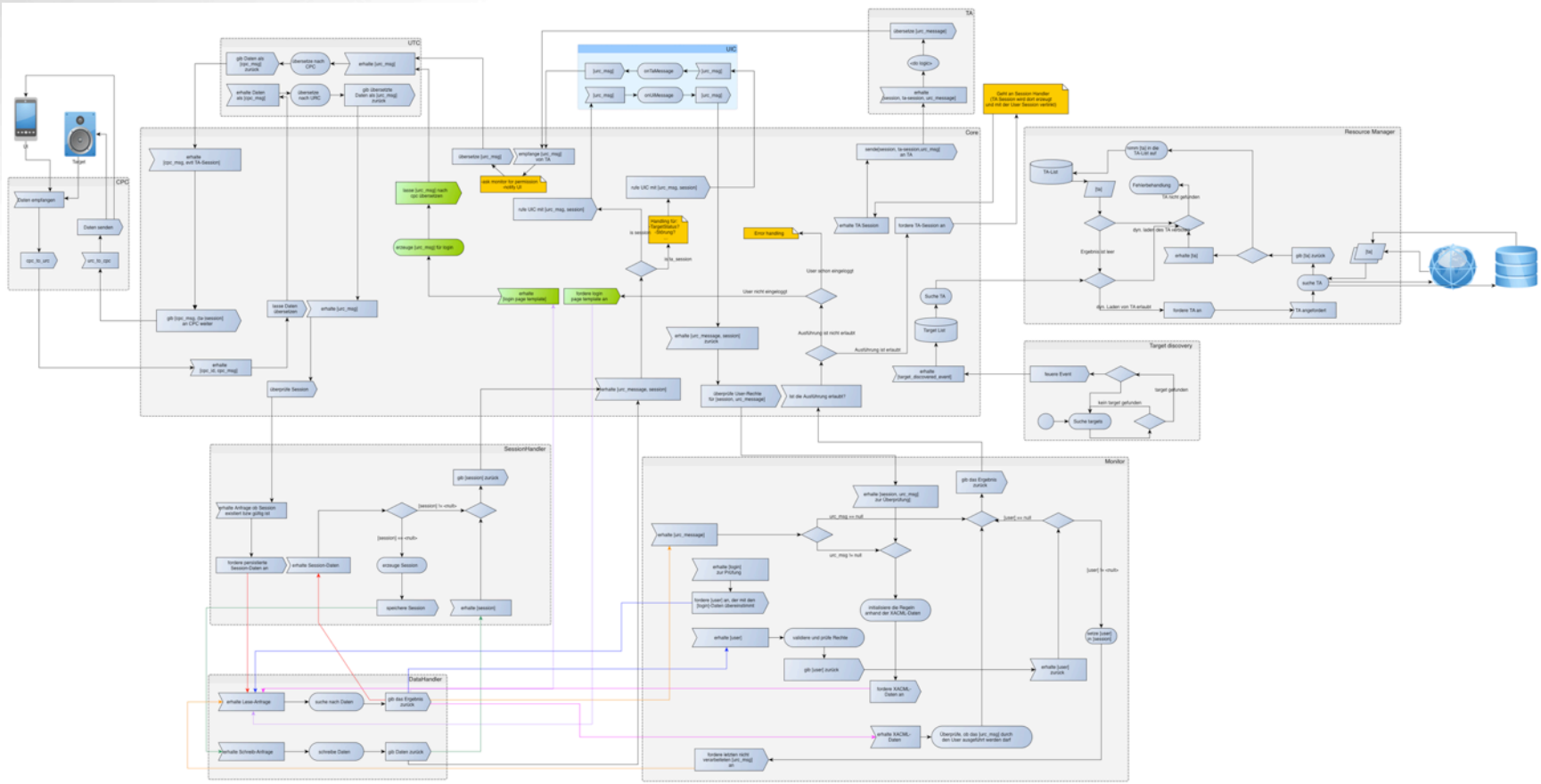


First steps

- **Assets**
  - stakeholders
  - relation to technical components
- **Threats** (to assets)
  - attacks, attackers
- **Security Objectives** (services)
  - counter attacks
  - instantiation of generic ones
  - like confidentiality: concealment of data and resources
- **Policy**: statement of what is allowed and what is not
- **Security mechanism**: method(s), tool(s), procedure(s) to enforce policies

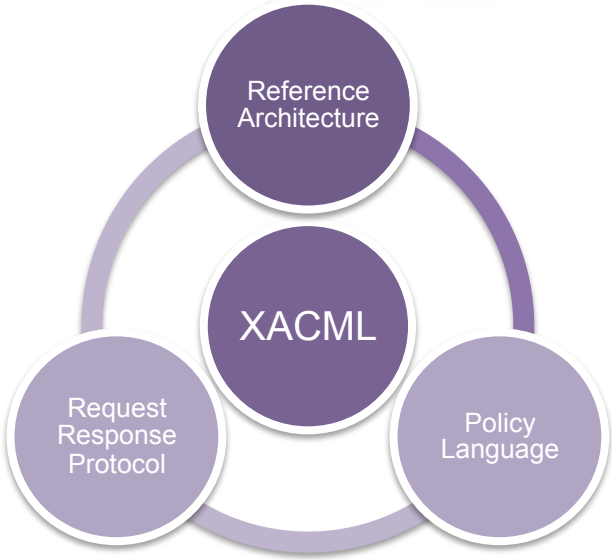


SUCH Architecture



Policy-Driven Interaction in SUCH

- **Subject**: Person, ...
- **Resource**: UI Socket, ...
- **Action**: Read, ...
- **Environment**: Time, Building, ...

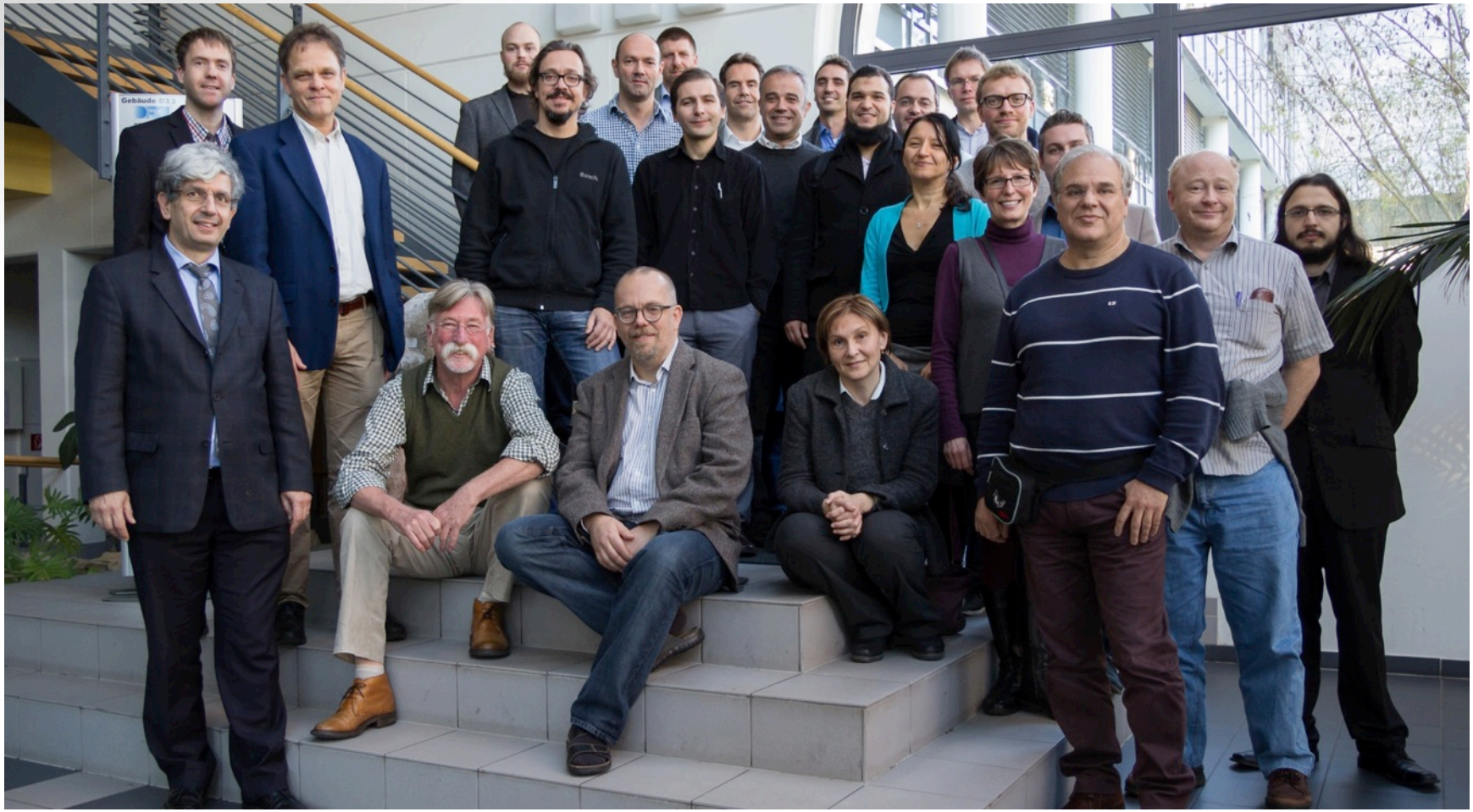


- Examples:
  - “Only Prof. Wahlster is allowed to take the DFKI building‘s main entrance lift to the fifth level”
  - “Only a certified Liftservice service employee is allowed to open the lift door (of the DFKI main entrance lift) between two floors”
  - “Any visitor is allowed to install his/her user interface resources onto the DFKI OpenURC Spot during office time” (in order for him/her to operate the lift in his/her preferred way)

The Gordian Knot(s)

Quelle: Wikipedia

The *metalogue* Project



Motivation

- Computer dialogue systems do not have the **rich experience and background knowledge** that humans have
- Humans can **process** and **perform several actions** (both task-related and communicative ones) **simultaneously** whereas dialogue systems largely can not. If it happens, it mostly happens by accident rather than by design
- Humans are able to monitor, assess and reason about their own and their partner's performance (**metacognitive abilities**) and systems are not.

Metalogue Vision

- Implement a multimodal Dialogue System with Metacognitive capabilities that
  - **adapt** its dialogue behaviour over time according to the interlocutor's knowledge, attitude, and competence
  - **predict** other people's knowledge and intentions and show proactive dialogue behaviour

→ Develop and integrate into the Metalogue System metacognitive models based on, e.g., game of nines, tragedy of the commons, …

Metalogue Scenarios

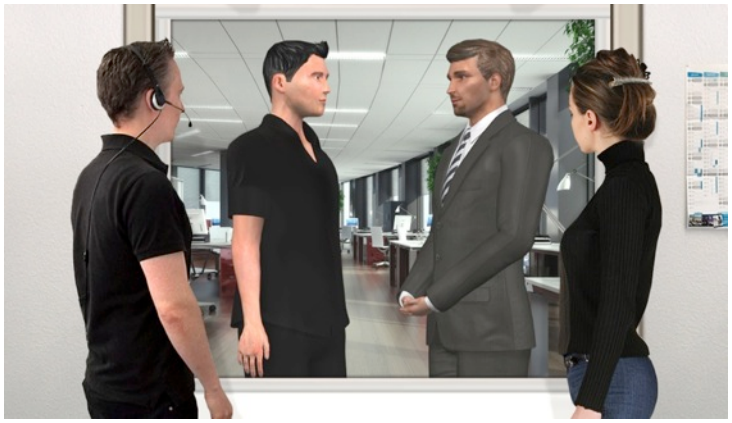
- The Metalogue System will be applied to train
  - **Young entrepreneurs in debating** over policy issues
    - Banning smoking in public spaces
    - Sex education in school
    - …
  - **Call centre employees** to train negotiations with customers
    - Governmental service providers
    - Deutsche Telekom?
    - …

Youth Parliament environment

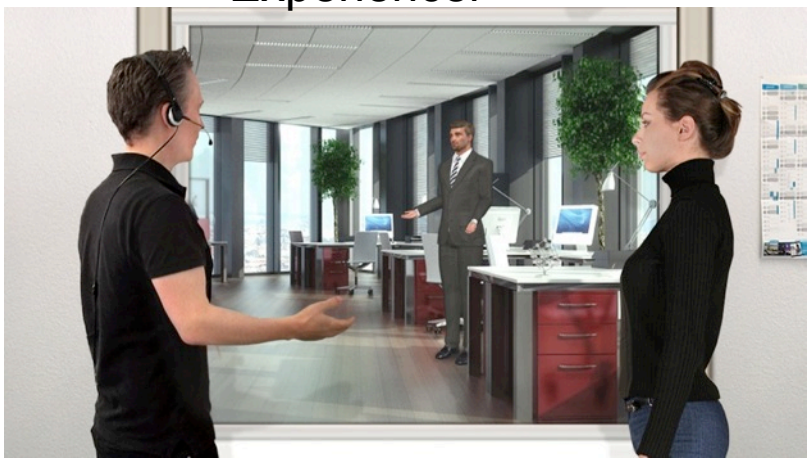
The Metalogue Project

Replay

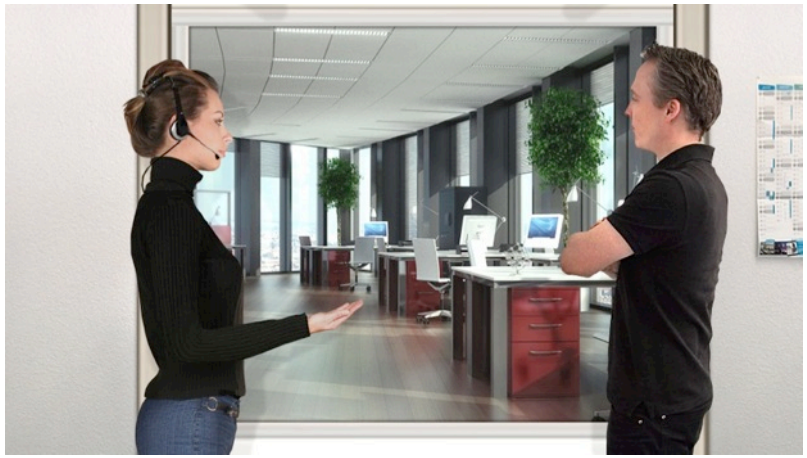
Tutor



Experiencer

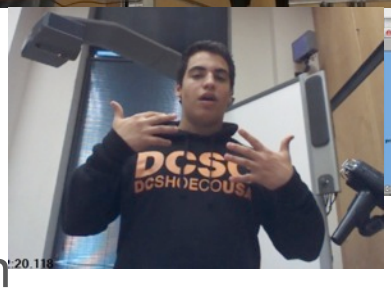


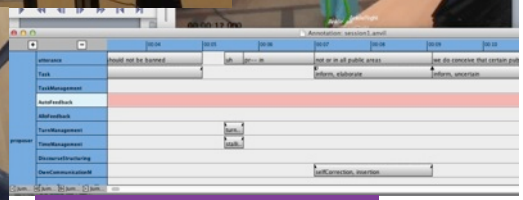
User Tutor

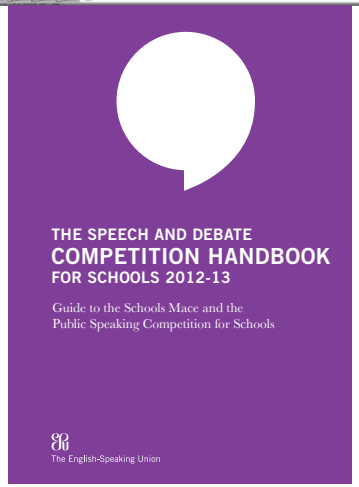


Research Questions

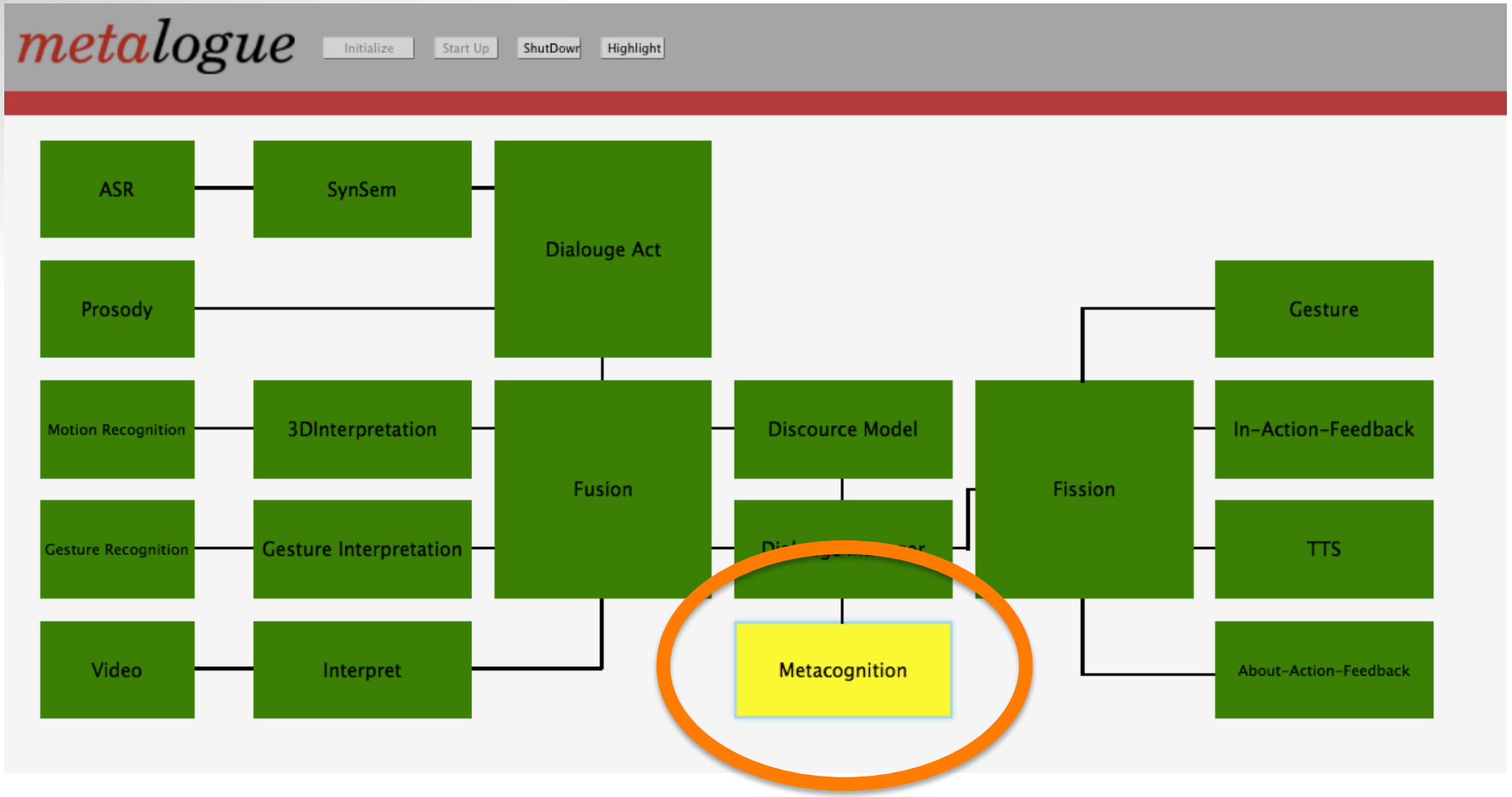
1. Understand
   - Similar to VerbMobil
   - Additional: multimodal contributions
     - Speech; Gestures; …
2. Additional: Evaluate performance and give feedback to the trainee
   - How “good” was a contribution in terms of content?
   - How well did a contribution fit the book?
     - E.g., good debate contributions consist of 1) statement; 2) motivation; 3) examples
     - Gaze behaviour; Gestures





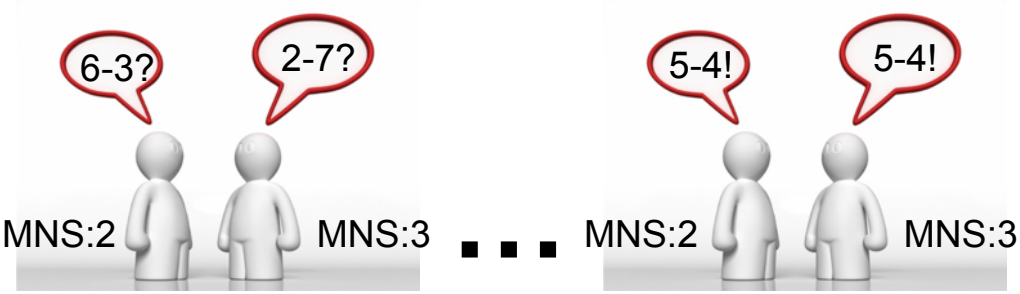


The Metalogue System



Some Initial Project Results*

- A metacognitive model of the “game of nines”
  - Negotiate the share of 9 points
- Prerequisites
  - Each negotiator has a secret Minimal Necessary Share – MNS [1,…,4]
- Basic Actions
  - Propose initial offer
  - Propose
  - Propose final offer
  - Accept
  - Abort



*University of Groningen, Niels Taatgen et al

Relation to the Real World

- Games of nines is a mixed-motive situation
- Motivation for themselves but also for the group
- Examples
  - Parliament ministers negotiate budget
    - As much as possible for his/her own department
    - Not run into a (costly) deadlock
  - Call-centre Agents
    - Keep the customer happy
    - Don’t loose (too) much money

Cognitive Model vs Agents

- Negotiation strategies in the literature
  - Aggressive (Fischer et at., 2001)
  - Cooperative (Huffmeier et al., 2014)
- Single-strategy agents
  - Fair ≈ distribute points as equal as possible
  - Unfair ≈ using exaggerated points rather than true MNS
- Agents implemented in ACT-R as strategies
  - Aggressive ≈ Unfair: High opening offer, higher minimum gain
  - Cooperative ≈ Fair: Moderate opening offer, moderate minimum gain

Results

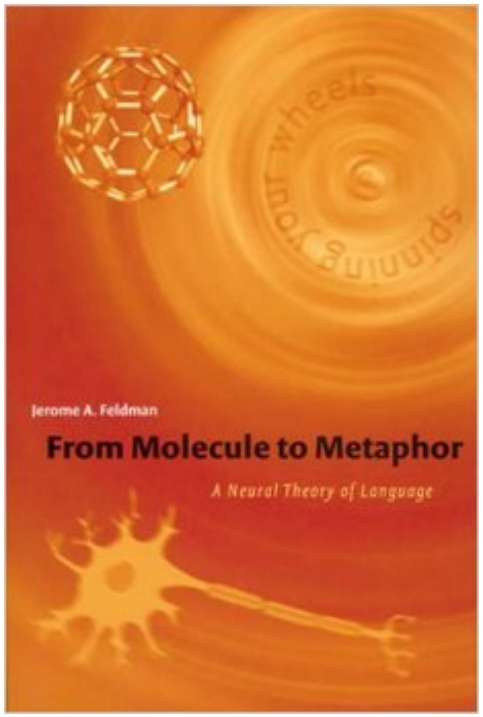
	Single-strategy Agent	
ACT-R Strategy	Fair	Unfair
Aggressive	**+**	**++**
Cooperative	**+**	**-**
Metacognitive	**++**	**++**

Scientific Question

- Is it possible to judge a debater's (or call-centre agents') performance?
- How can this be done?
- In theory, it is really simple:
  - With a model of a prototypical/ideal debate contributions, we may apply techniques similar to plan recognition.
- But what about multimodality?
- But what about metaphors?
- And what about the topics?

Metaphors

- Why do humans understand (most) metaphors but (most) computer-based systems don't?
  - Lack of embodied experiences?
  - Lack of appropriate and rich knowledge modelling!
  - Lack of overlay-like algorithms as fundamental processing?



Simulation

ster rushed

Metaphors

- How come that humans understand metaphor and (most) computer systems not?
- “Recession is developing in France“

vs.

- “France is sliding into recession“

PP attachment & simulation

- "I want to pick up the car *at the airport*"
  - PP attachment problem – to resolve this ambiguity, a machine translation system might generate a clarification question:
    - Are **you** going to be at the airport, or is the **car** at the airport?
  - However, when we simulate the incident, there is no ambiguity
  - Note that "pick up" is a metaphor!
- "I saw a man with a telescope"
  - PP attachment
  - Where are you and where is the man?
- "I saw a man with a dog"
  - Are there more than one readings? Dog → AIBO?

A Joke

- Ein Mann saß in einer Bar
- Plötzlich raste ein Elch hinein, stellte sich an die Theke und bestellte einen doppelten Whiskey
- Er bekam das Glas, kippte den Whiskey in den Blumentopf und fing an, an dem Glas zu knabbern
- Plötzlich stellte er das Glas auf die Theke und raste wieder hinaus
- Der Mann zum Bartender:
  - „Das war bei weitem das Merkwürdigste, dass ich je erlebt habe!“
- Bartender zum Mann:
  - „Ja genau, wieso lässt er den Fuß stehen? Das ist ja der leckerste Teil!“

Not that funny! But Why?

A Joke

- Ein Mann saß in einer Bar
- Plötzlich raste ein Elch hinein, stellte sich an die Theke und bestellte einen doppelten **Whiskey**
- Er bekam das **Glas**, kippte den Whiskey in den Blumentopf und fing an, an dem Glas zu knabbern
- Plötzlich stellte er das Glas auf die Theke und raste wieder hinaus
- Der Mann zum Barkeeper:
  - „Das war bei weitem das Merkwürdigste, dass ich je erlebt habe!“
- Bartender zum Mann:
  - „Ja genau, wieso lässt er den **Fuß** stehen? Das ist ja der leckerste Teil!“

Not that funny! But Why?

- Why?
- There is no clear interpretation of “foot”!
  - Common experience (simulation) of a whiskey glass does not contain a foot!
  - In order for us to understand the punch line, we have to morph the whiskey glass into a cognac glass (Schwenker)
- Let us give it another try by changing liquid to Cognac

A Joke

- Ein Mann saß in einer Bar
- Plötzlich raste ein Elch hinein, stellte sich an die Theke und bestellte einen großen Cognac
- Er bekam das Glas, kippte den Cognac in den Blumentopf und fing an an dem Schwenker zu knabbern
- Plötzlich stellte er das Glas an die Theke und raste wieder hinaus
- Der Mann zum Bartender:
  - „Das war bei weitem das Merkwürdigste, dass ich je erlebt habe!“
- Bartender zum Mann:
  - „Ja genau, wieso lässt er den Fuß stehen? Das ist ja der leckerste Teil!“

Funny? Why?

- This is somewhat more funny because our simulation is consistent → the punch line is immediately understood!

The Gordian Knot

- How are we going to able to explain this and similar phenomena with the Metalogue system?

Vielen Dank für Ihre Aufmerksamkeit!