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TECHNISCHE UNIVERSITÄT DRESDEN

MODEL-BASED UBIQUITOUS INTERACTION CONCEPTS AND CONTEXTS IN PUBLIC SYSTEMS

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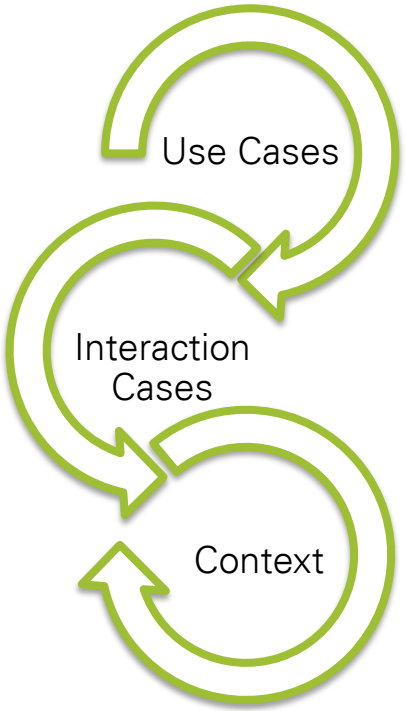
AGENDA

- What are ubiquitous systems?
- What are public systems and how are they special?
- Which are important dimensions of context in public systems?
- Model-based design of interaction in ubiquitous public systems: of Use Cases and Interaction-Cases
- Interaction-Cases as modeling technique allow:
  - Context-sensitive modeling of interaction
  - Iterative modeling process



SCENARIO: UBIQUITOUS PUBLIC TRANSPORT SYSTEM

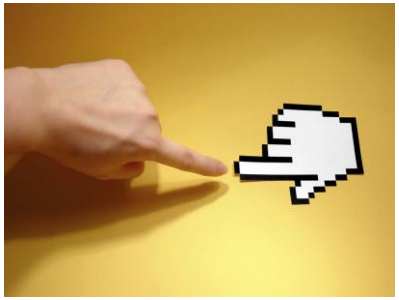
- Your train just arrived at Berlin Central Station late in the evening
- You have to catch a suburban train to get to your hotel
  - Where does it leave?
  - Where am I?
  - Interact using your cell phone and public displays
- You have to change in order to reach your destination
  - Small station
  - Some street lamps are broken
  - The Display on the station adjust its brightness

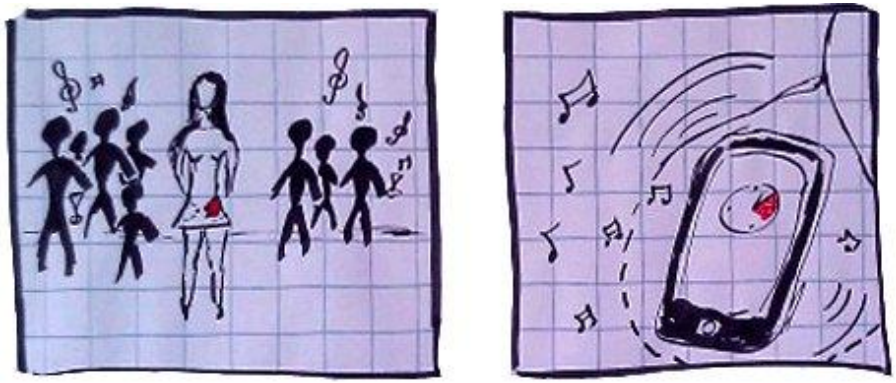
UBIQUITOUS SYSTEMS

- Ubiquitous systems:
  - Computing everywhere & anytime
  - Devices fade into the background
  - Focus on user's tasks
- Ubiquitous systems are context-aware systems:
  - Location-aware
  - Task-aware
  - …

INTERACTION IN UBIQUITOUS SYSTEMS

- New user interfaces are evolving rapidly
- Multimodal interaction: using and switching modalities as necessary
  - Speech
  - Gestures
  - (Multi-) Touch Surfaces
- Ubiquitous environments benefit from different interaction modalities
  - Interaction can adapt to the user's context





- Picture: part of a storyboard describing a context-adaptive cell phone application

UBIQUITOUS PUBLIC SYSTEMS

- Ubiquitous systems increasingly find their way into public settings:
  - Airports
  - Museums or Libraries
  - Public Transport
    - Considered in the course of our project „IP-KOM-ÖV“,
  - …

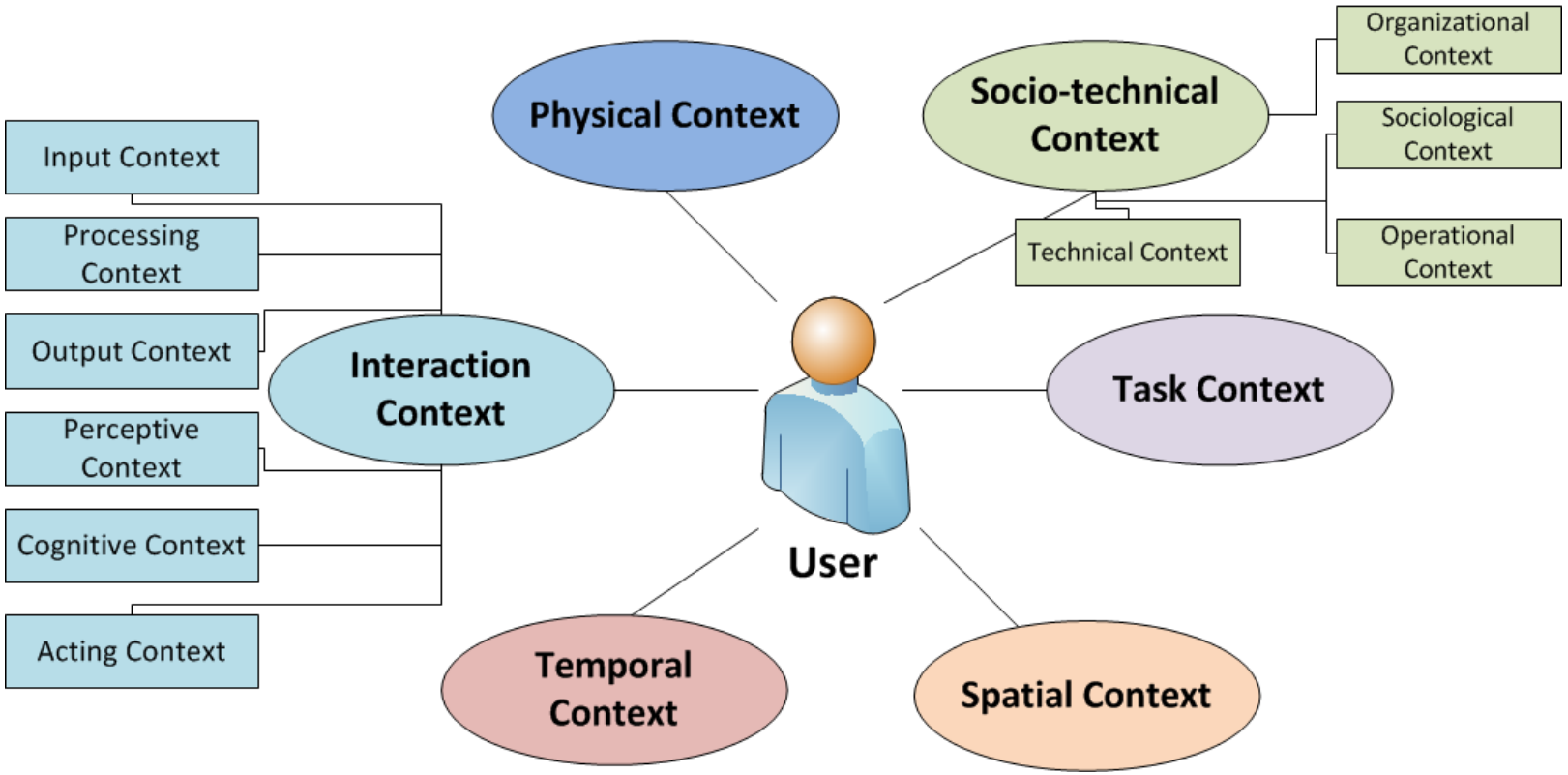
IP-KOM-ÖV

- „A public system is a system that performs in public spaces and does not target specific user groups but is available to all people, i.e. the public. “

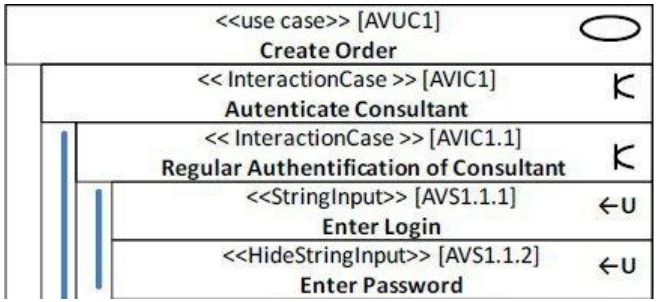
CHARACTERISTICS OF PUBLIC SYSTEMS

- Great variety of information needs and situations can occur
  - User is anonymous
  - Highly adaptive systems necessary
  - ➔ Context-awareness supports adaptivity
- Public systems are combined of many different components
  - High complexity, high flexibility
  - Heterogeneous devices must be integrated
  - System of Systems
  - ➔ Model-based design supports high adaptivity, complexity and flexibility

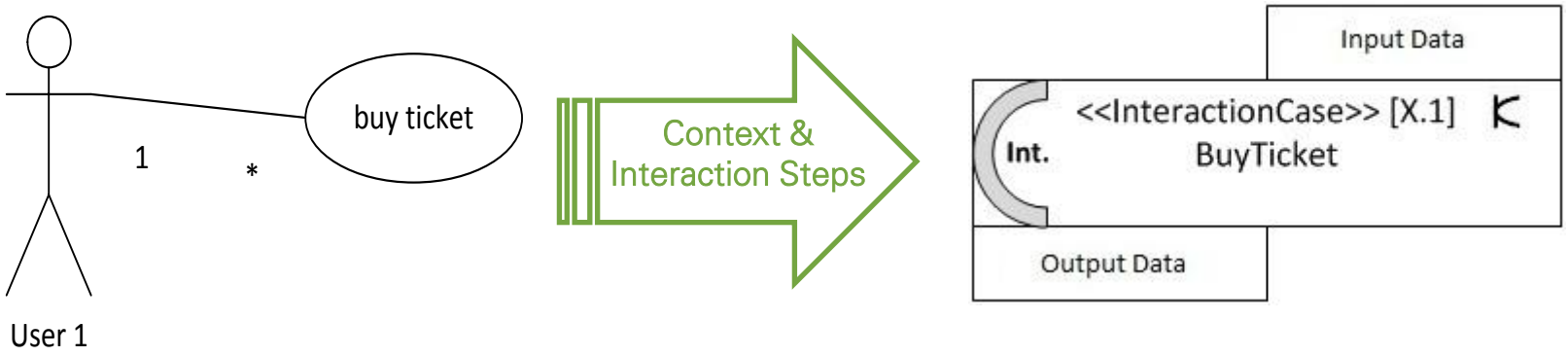
CONTEXT-DIMENSIONS IN UBIQUITOUS PUBLIC SYSTEMS



MODEL-BASED DESIGN OF UBIQUITOUS PUBLIC SYSTEMS



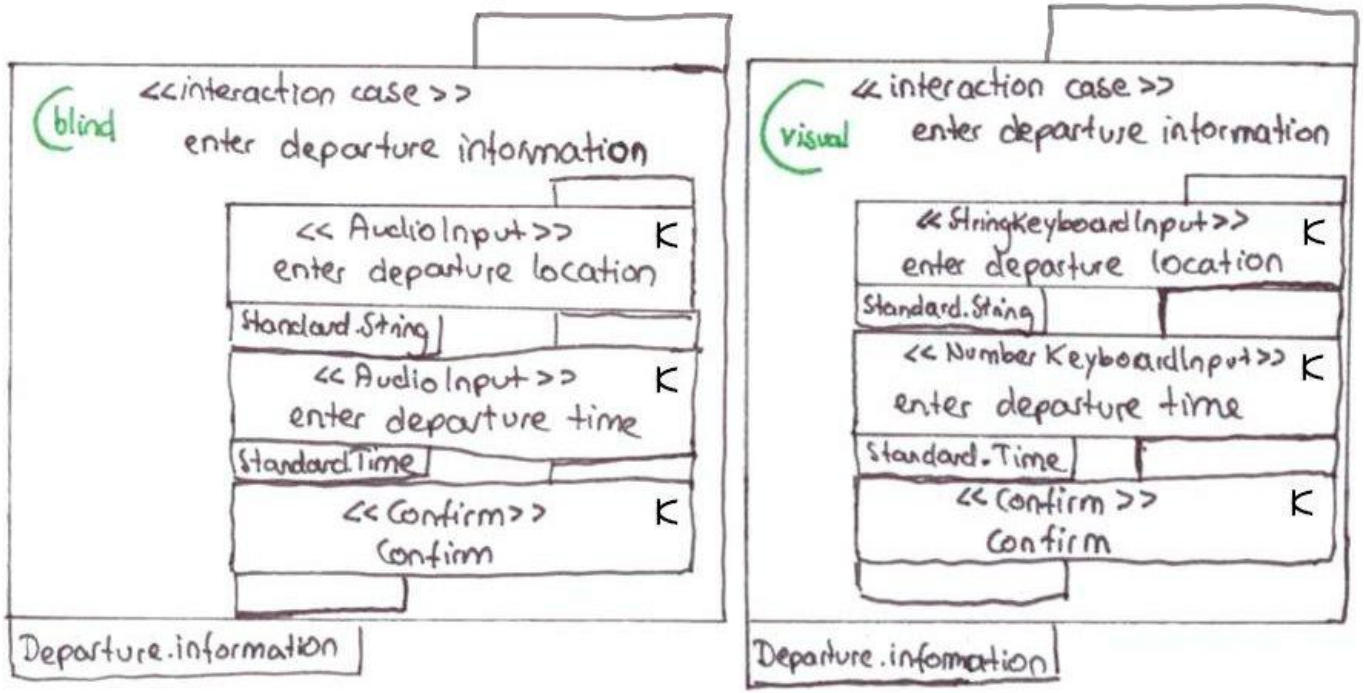
- Use Cases do not model
  - Context-adaptive interaction
  - Detailed interaction steps
- Interaction-Cases [1]
  - Derived from Use Cases – structure **interaction** between user and system
  - Context-Modifier show context-sensitivity
  - Composed of Interaction-Cases or atomic Interaction-Steps



[1] Schlegel, T. & Raschke, M.: Interaction-Cases: Model-Based Description of Complex Interactions in Use Cases *Proceedings of IADIS International Conference Interfaces and Human Computer Interaction,* 2010

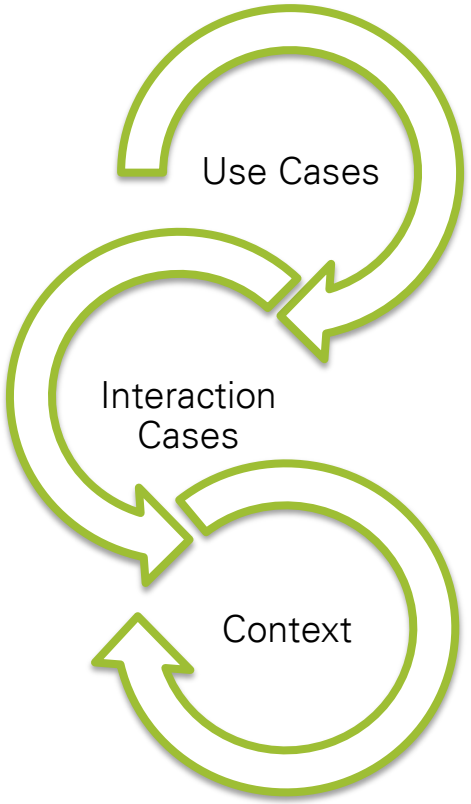
CONTEXT-SENSITIVE INTERACTION CASES

- Interaction-Cases can be modeled context-sensitive
- Context-Modifier shows adaptation of the Interaction-Case in the given context
- While defining the Interaction-Case: define different courses of interaction for different types of this specific context



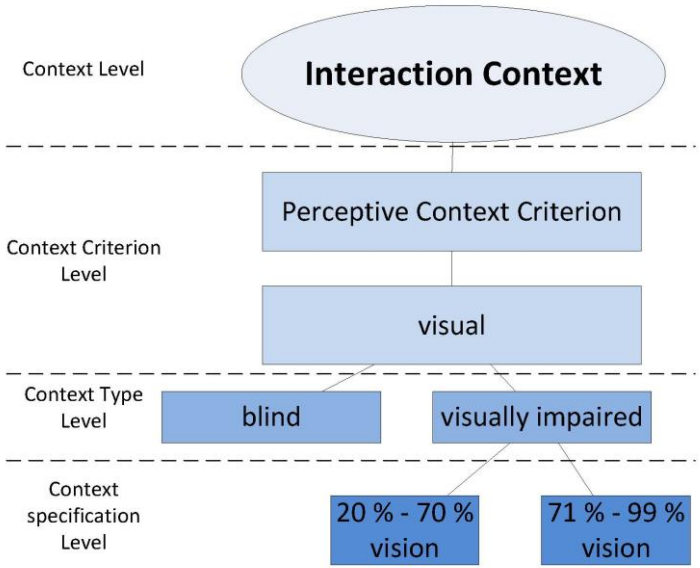
ITERATIVE MODELING OF CONTEXT-AWARE UBIQUITOUS SYSTEMS

- Iterative modeling method
  - Define initial Use Cases or Interaction-Cases
  - Define coarse-grained tailored version of context taxonomy
  - Define context-sensitive Interaction-Cases
  - Refine context
  - Refine Interaction-Cases up to single Interaction-Steps



FUTURE WORK

- Automatically generate Interaction-Case derivatives for different contexts
  - rule-based
- Embedding context-sensitive Interaction-Cases in a software engineering process for ubiquitous systems
- Further refining the context hierarchy
- Applying Interaction-Cases in our project „IP-KOM-ÖV“



THANK YOU.
ANY QUESTIONS?

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IP-KOM-ÖV

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