THESEUS
Neue Technologien für das Internet der Dienste

CTC-WP1 Usability in THESEUS

Prototyping Multimodal Dialogue Systems for Usecases

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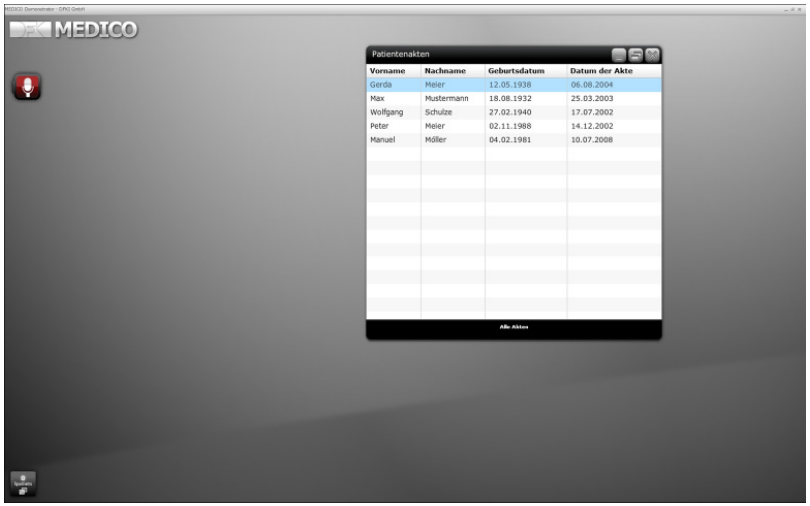

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Workshop ITG-Richtlinie "Usability"

Outline

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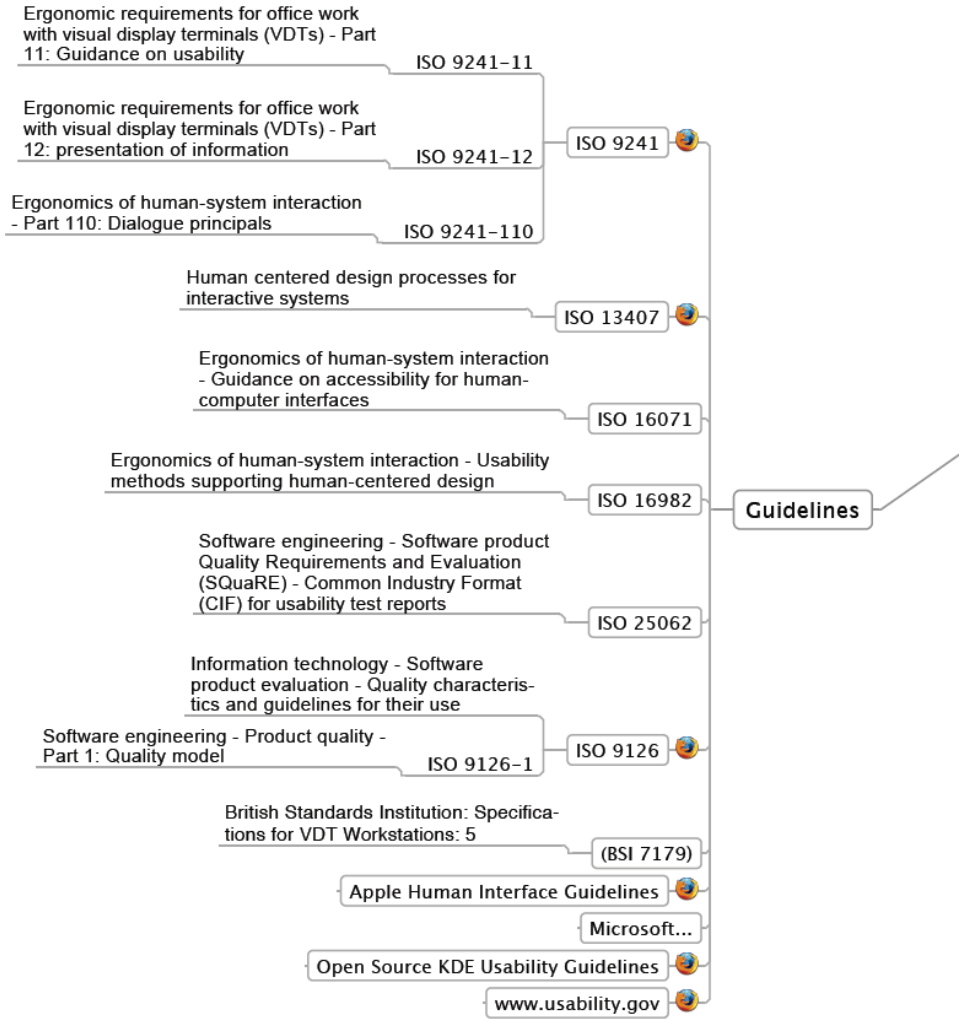
- Usability Testing in THESEUS
- Testing Scenarios
- Clinical Care Application Example (MEDICO/RadSpeech Prototype)
- Conclusions and Future Work

Usability Testing in THESEUS

Usability Testing in THESEUS

- Usability Guidelines for Use Case Applications serves as an introduction to the general topic of usability, i.e., how user-friendly and efficient a THESEUS prototype is.
- The goal of this document is to offer some guidelines for designing a usable interface and conducting usability studies:
  - an overview of engineering methods, standards, tools, and ways to build prototypes.
  - methods for usability evaluation and give an overview of needed resources, especially in the context of the THESEUS use cases.
  - We tried to specify the adequate usability testing scenarios for the project and give recommendations for designing and testing.
- In the last section, you will find recommendations for further reading and more detailed information on specific usability topics.

ISO Norms


Guidelines
ISO 9241
Ergonomic requirements for office work with visual display terminals (VDTs) - Part 11: Guidance on usability
ISO 9241-11
Ergonomic requirements for office work with visual display terminals (VDTs) - Part 12: presentation of information
ISO 9241-12
Ergonomics of human-system interaction - Part 110: Dialogue principals
ISO 9241-110
ISO 13407
Human centered design processes for interactive systems
ISO 16071
Ergonomics of human-system interaction - Guidance on accessibility for human-computer interfaces
ISO 16982
Ergonomics of human-system interaction - Usability methods supporting human-centered design
ISO 25062
Software engineering - Software product Quality Requirements and Evaluation (SQuaRE) - Common Industry Format (CIF) for usability test reports
ISO 9126
Information technology - Software product evaluation - Quality characteris-tics and guidelines for their use
Software engineering - Product quality - Part 1: Quality model
ISO 9126-1
(BSI 7179)
British Standards Institution: Specifica-tions for VDT Workstations: 5
Apple Human Interface Guidelines
Microsoft...
Open Source KDE Usability Guidelines
www.usability.gov

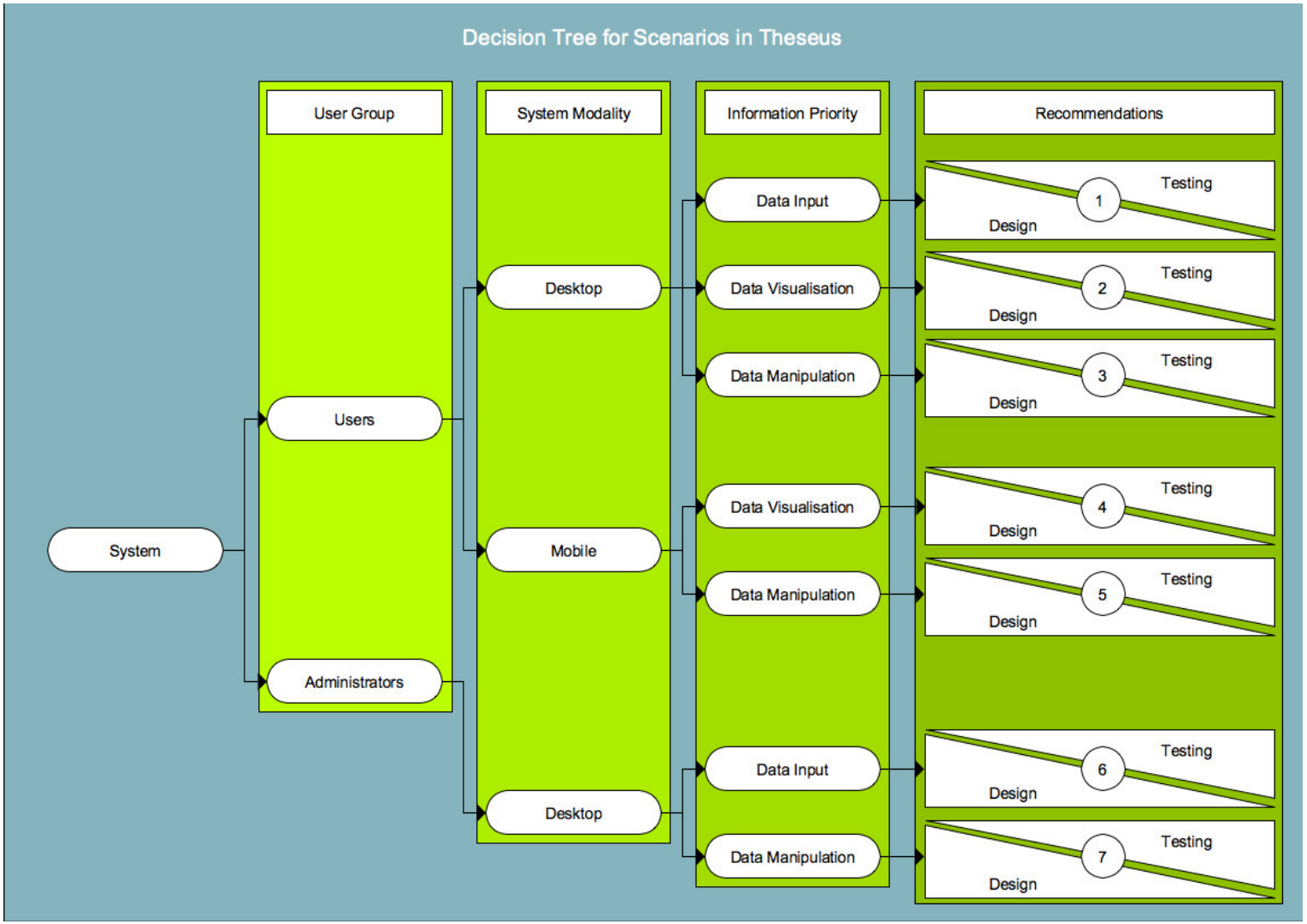
Test Plan for Usability Testing

A test plan should be written before the start of the test. The following issues should be addressed:

- The goal of the test: What do you want to achieve?
- Where and when will the test take place?
- How long is each test session expected to take?
- What equipment, e.g., hardware and software, will be needed for the test?
- What should the state of the system be at the start of the test?
- What should the system and network load and the response time be?
- Who will serve as experimenter for the test?
- Who will the test users be and how will you get a hold of them?
- How many test users are needed?
- What test tasks will the users be asked to perform?
- What criteria will be used to determine when the users have finished each of the test tasks correctly?
- What user aids (manuals, online help, etc.) will be made available to the test users?
- To what extent will the experimenter be allowed to help the users during the test?
- What data is going to be collected, and how will it be analyzed once it has been collected?
- What will the criteria be for declaring the interface a success?

Testing Scenarios

Decision Tree for IUI Scenarios



Texo Design / Surface Plane

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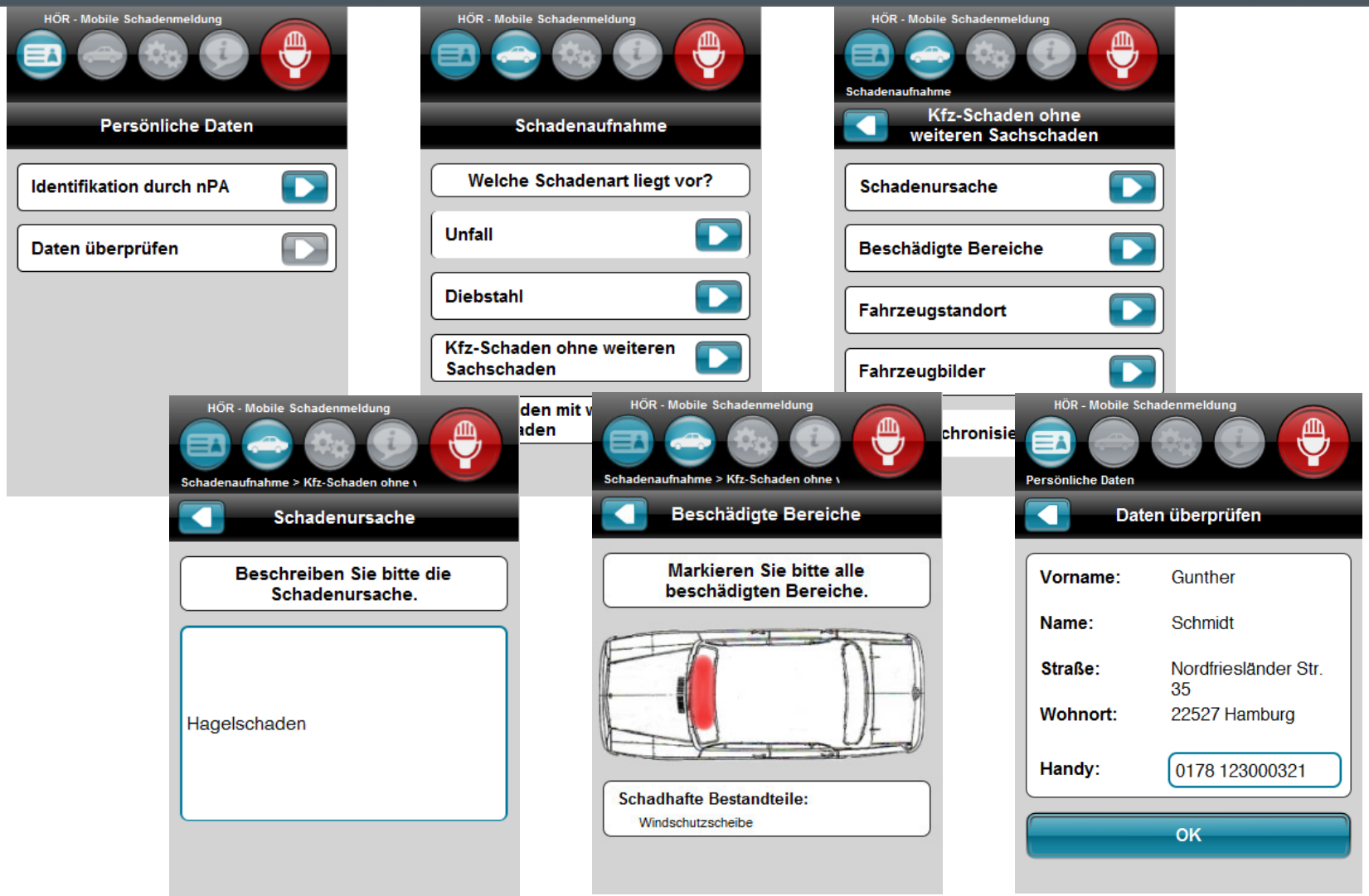

MEDICO Storyboard and Implementation

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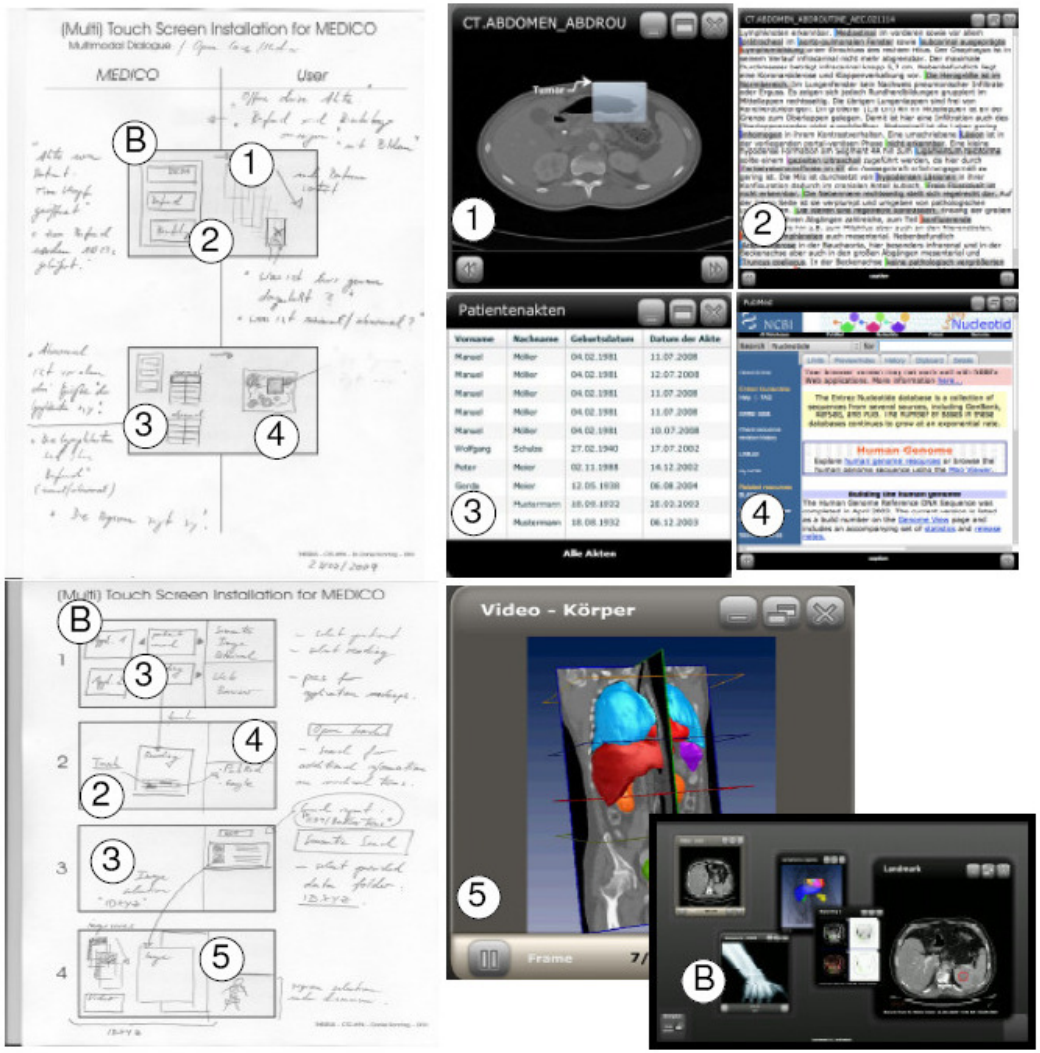
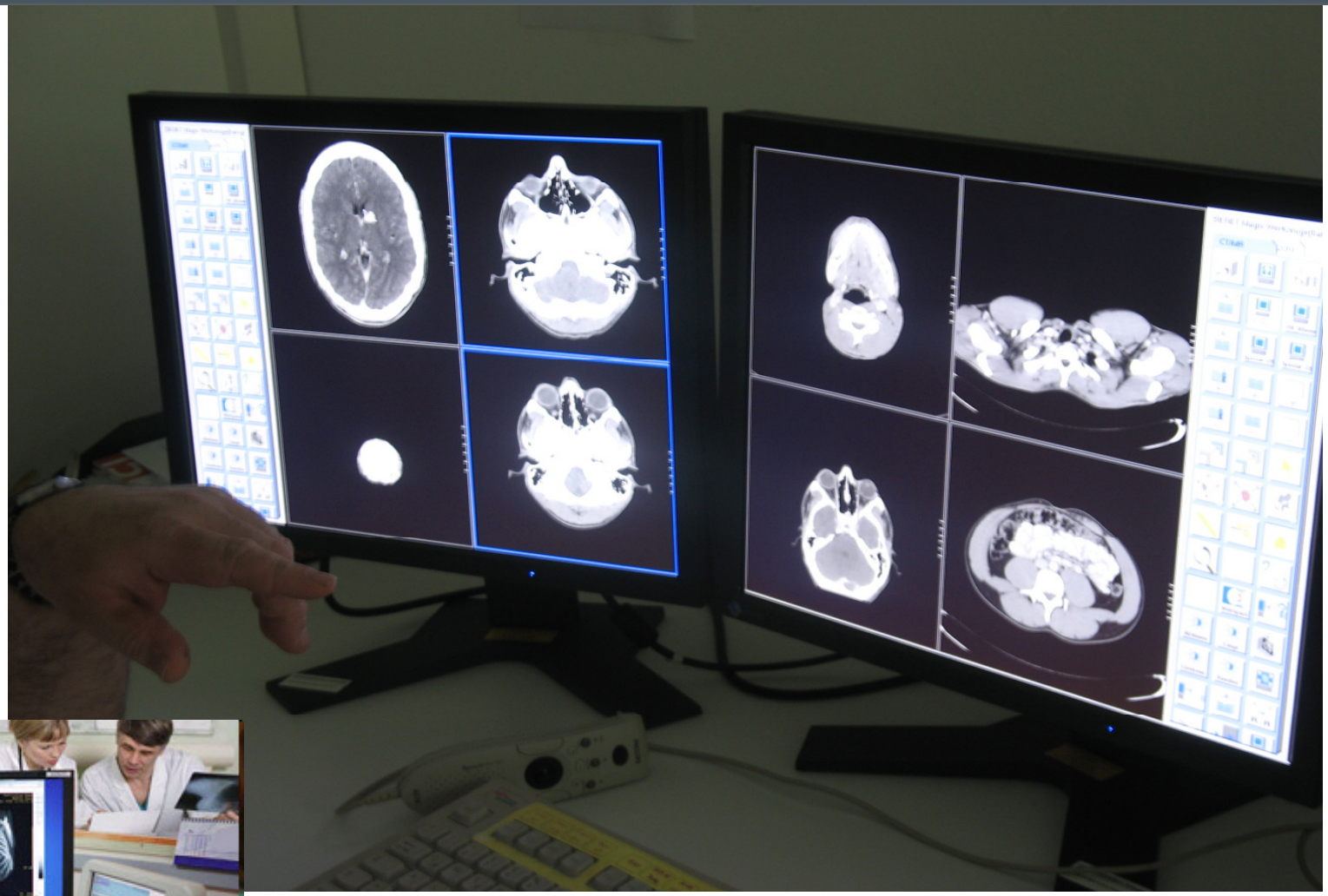
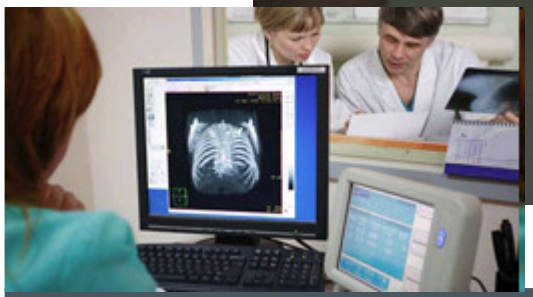


Clinical Care Application Example (MEDICO/RadSpeech Prototype)





Retrieval and examination of 2D picture series

Problems

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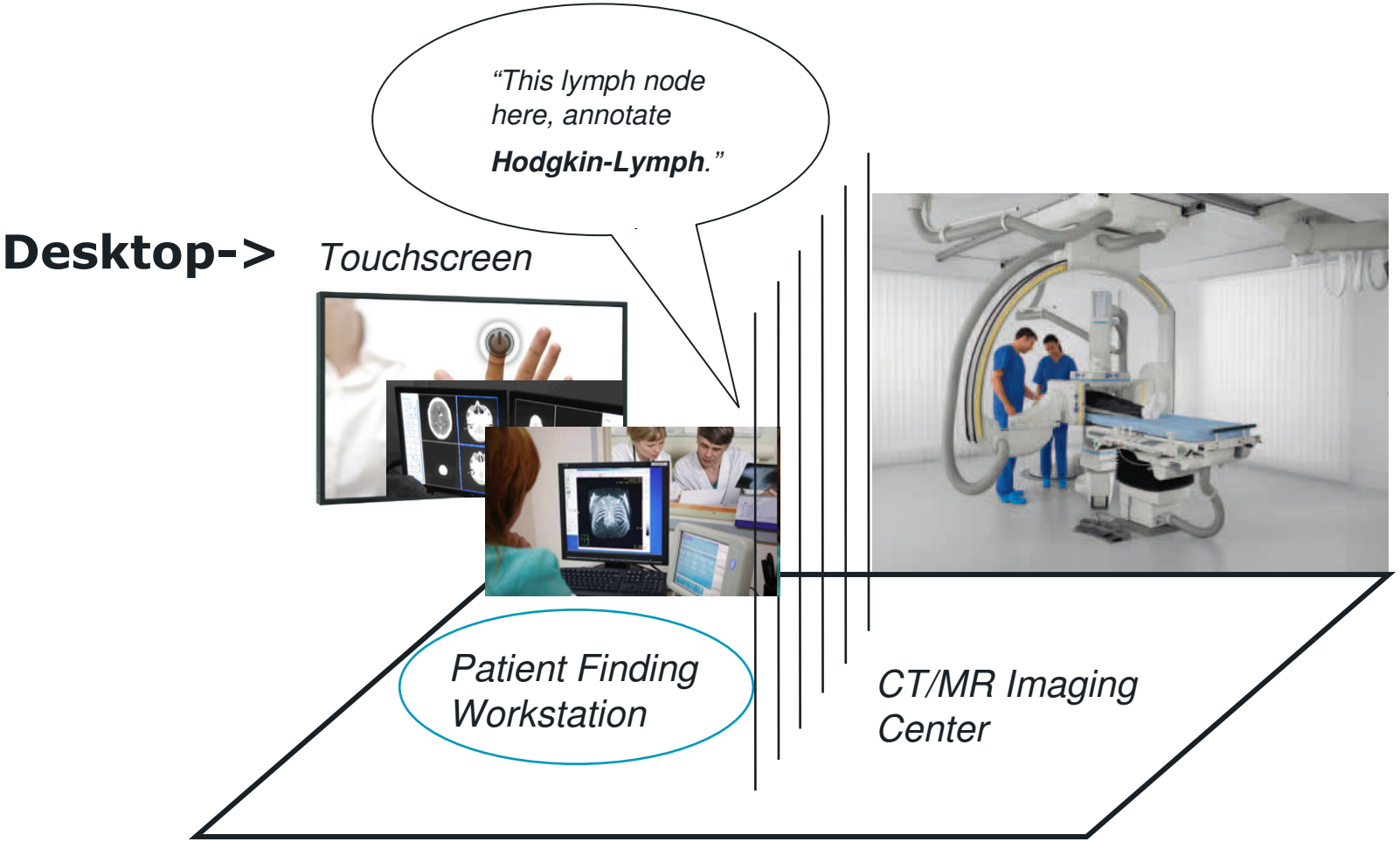
The process of *reading* the images is highly efficient when using a traditional desktop-based 2D/3D examination tool.

- The problem is that the radiologist cannot directly create a structured report while scanning the images.
- In this *eyes-busy* setting, he can only dictate the finding to a tape-recorder.
- After the reading process, he can replay the dictation to manually fill out a patient's finding form.
- Another possibility is to have a clinical assistant complete the form. But since the radiologist has to check the form again, this task delegation does not save much time which is spent on one report.

Radiology Environment



Usability Methods

- Usability guidelines for the prototype development and implementation stage consider **five different planes**. Every plane has its own issues that must be considered. From abstract to concrete, these are (1) the strategic plane, (2) the scope plane, (3) the structure plane, (4) the skeleton plane, and (5) the surface plane.
- A **cognitive walkthrough** starts with a task analysis that specifies the sequence of steps or actions a user requires to accomplish a task, and the system's responses to those actions.
- Simply **visiting the users to *observe them work*** is an extremely important usability method with benefits both for task analysis and for the collection of information about the true field usability of installed systems.
- **Hierarchical Task Analysis (HTA)** breaks down the steps of a radiologist's task as performed by a medical user and describes the task as seen at various levels of detail. Each step can be decomposed into lower-level sub-steps, thus forming a hierarchy of sub-tasks (this corresponds to the information retrieval and annotation stages already explained).

Evaluation

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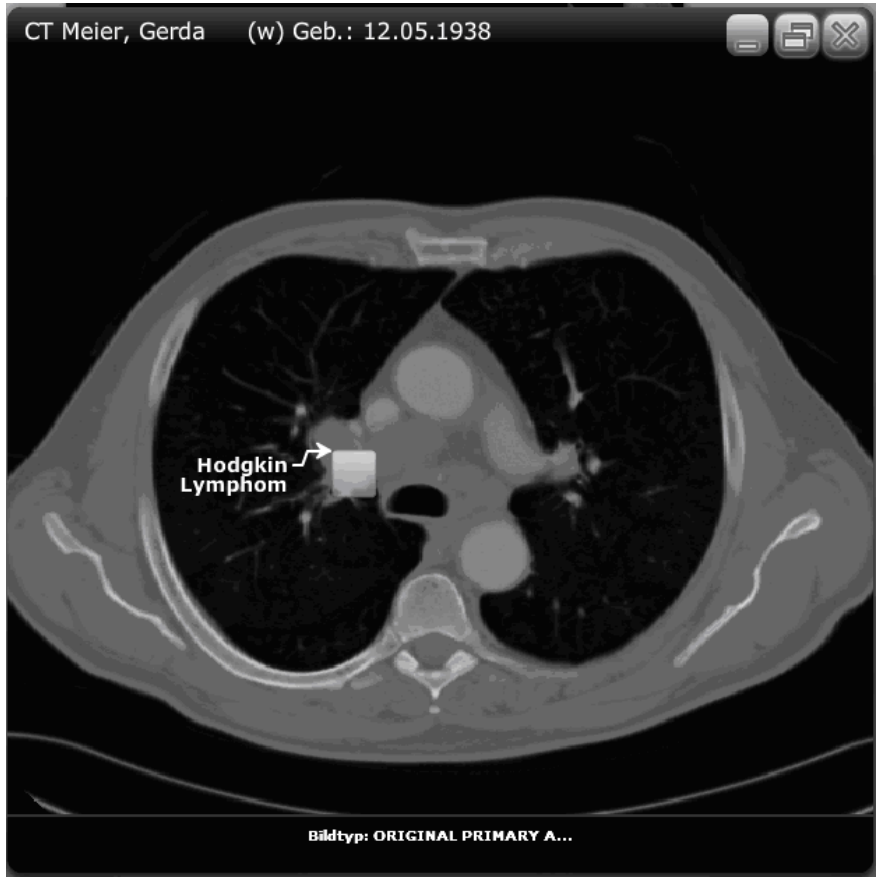
- The dialogue-based annotation can be done at a rate of approx. 6 annotations per minute (including the visual feedback phase) whereas the desktop-based annotation comes to a rate of approx. 3 annotations per minute.

- Most importantly, the prototype dialogue system delivers semantic annotations which are unavailable in the current clinical finding process at the partner hospitals and the radiologist can directly detect errors visually.



Conclusions

Conclusions and Future Work

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- New Research Topics needed! The Usability of Concrete Usability Guidelines: oftentimes, guideline descriptions and explanations are unsatisfactory, remaining vague and ambiguous in explanation.
- Towards real applications: RadSpeech
- Towards new research groups for mutlimodal interaction design and usability:
  - Digitale Veredelung Research Group
  - Usability Topic: We provide usability tests to measure how user-friendly Smart Design Objects or how efficient Intelligent User Interfaces are under realistic testing conditions. These measurements result in recommendations for future designs where growing diversity of usage contexts and increasing complexity of interactive (information) systems have to be faced. Where will interaction/product design and AI technology intersect over the course of the next 40 years?

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Thank you!

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