A VR application for planning processes for nursing homes

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JVRC 2011 workshop on
“Accessibility Engineering with User Models, Simulation and VR”

Problem

- Panning of nursing homes is a complex process
- Different actors / concerned parties
  - Operating organisation/company (operation, profit)
  - Building owner (real estate)
  - Architects and construction planners (construction, modification)
  - Municipality (administrative decisions)
  - Benefactors, nursing insurances (quality control)
  - Association for statutory accident insurance and prevention in the health and welfare services (BGW) (occupational safety, consultancy)
  - Employees (care)
  - Residents (beneficiaries)
- Limited involvement of residents' interests representatives
- Primary actors have limited knowledge about the residents' needs
- Better understanding of »user needs« and media for their communication needed

Concept

- Communicate by providing an experience from the beneficiary‘s perspective
- Virtual Reality (immersive technology)
  - Realtime graphics
  - Stereoscopic
  - 3D interaction
- 1st and 3rd person perspective
- Focus on visually relevant aspects
  - Realistic navigable visualisation from the residents’ perspective
  - Adapted eye positioning (restricted navigation speed, wheel chair height)
  - Impaired vision simulation through filters
- Build on an established construction visualisation workflow

System architecture

Computers

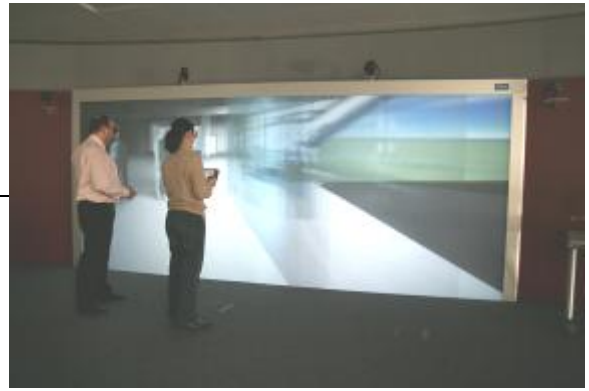
Runtime and rapid development framework

Architecture visualisation

Specific application with impairment and process simulation

3D Interaction Device (Gyromouse™ with tracking targets)

Polar glasses with tracking targets



Powerwall with tracking cameras

The application

Variants management

Impairment simulation

Process simulation

Select design variants 1-3

Perspective (wheelchair)

Visual impairment (cataract)

Process simulation (nursing bed navigation)

Session management

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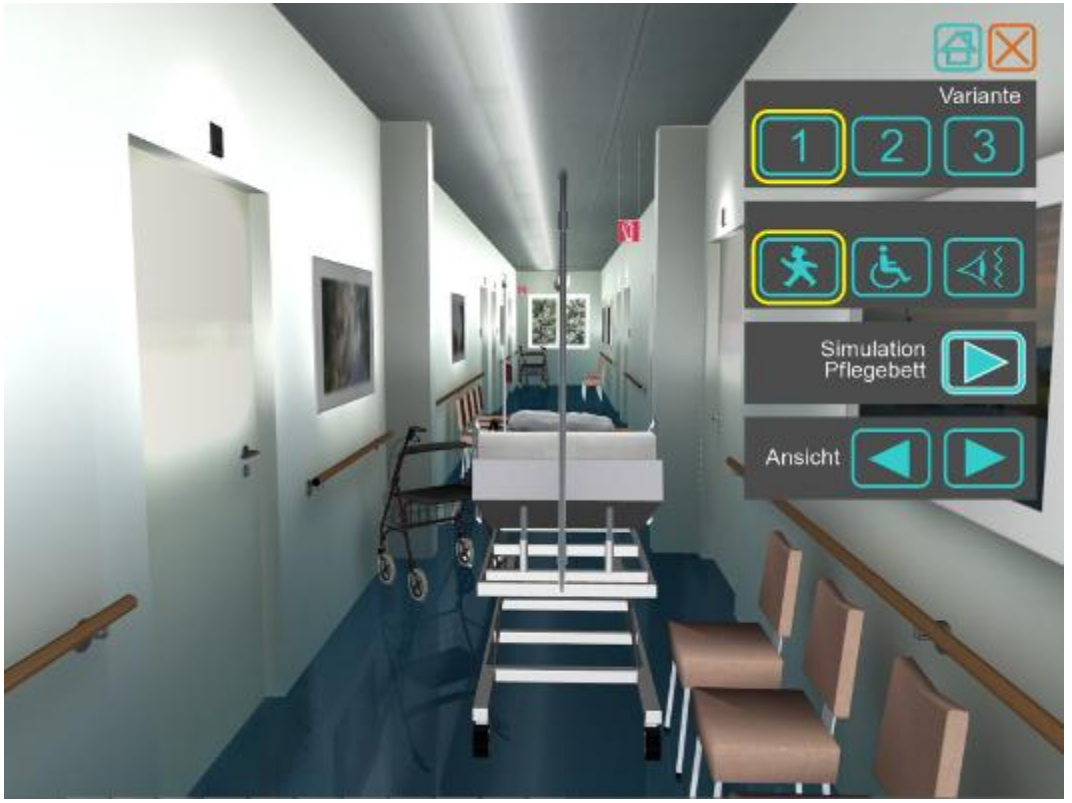
Examplary use case

- Building modification project
- Long and narrow corridors
  - Redesign the space
  - Impact of colors and textures on dementia patients
  - Contrast design for visual impairments
  - Structuring for acceptable perception and walking distance
- Three variants modelled and visualised

Results Variant 1

- Unmodified corridor
- Cold and uncomfortable appearance
- Messy situation and lack of space
- Problems in manoeuvring nursing beds
- Long distances
- Dementia patients perceive blue specular floor as water
- Unfavourable contrasts and dazzle



Results Variant 2

- Corridor expansion areas
  - Less uniformity
  - Space for manoeuvring and storage
- »Water floor« perception replaced by »solid ground«
- Contasts optimised by appropriate lighting and signage design

Results Variant 3

- Visually shortened corridor sections
- Care islands for tidiness and optimised care processes
  - Place to leave rollators
  - Storage for care products
  - Place for electronic documentation

Conclusions

- Positive use case results supported by VR as a communication medium
- Use case results not exclusively due to VR application
- Positive feedback from demonstration at BGW conference
- The application is only a demonstrator
- Generalisation and more functions needed
- More developments in FP 7 possible
- VERITAS will further develop the approach

Thank you

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