Collaborative Software Exploration with Virtual Reality in ExplorViz

Bachelor’s Project Presentation

Daniel König & Malte Hansen

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Outline

• Motivation
• Concept
• Live Demo
• Evaluation
• Conclusions / Future Work
Motivation

- Goal: VR mode of ExplorViz [Fittkau et al. 2017] to be collaboratively usable

- Alternative to working as a team in front of a screen

- Analog approach to 3D printed models (but better)

- Geographical independence
General Concept

• Users should use the same virtual space

• Synchronization of the users’ worlds

• Any user can manipulate landscape and applications

• Users should be able to highlight components for others
Concept - Components

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[Zirkelbach et al. 2018]
Concept - Architecture

- Star topology
- Backend saves latest state of landscape and applications
- Connection via WebSockets
- JSON as data interchange format
Concept Visualization

Concept Drawing [Häsemeyer 2017]
Concept - Menu

• Add additional functionalities

• Make available via menu

• Menu attached to left controller

• Interact using right controller
Concept – Text Overlays

• Inform users about connection updates
• Add hints for improved usability
Live Demo
Evaluation – Procedure

• Gather personal data

• Give introduction to ExplorViz and controls

• Training phase with small landscape

• Read them tasks

• Probands rate the user experience
Evaluation – Experimental Setup

• 3 computers in same room connected via LAN
  • 1 running ExplorViz backend
  • 2 running ExplorViz frontend with VR

• Oculus Rift with 3 sensors, 2 controllers

• HTC Vive with 2 base stations, 2 controllers
Evaluation – Participants (preliminary)

• 20 participants (10 groups of two)

• Average participant:
  • 25 years old, male
  • Studies computer science
  • Experienced with object-oriented programming
  • No experience with ExplorViz or VR
  • Knew the other participant in their group
Evaluation – Results & Discussion (preliminary)

• Very positively rated:
  • Impression to be in the same virtual room
  • Movement of application
  • Absence of nausea during non-spectating phase
  • Intuitive movement
  • Amount of text overlays
Evaluation – Results & Discussion (preliminary)

• Very positively rated:

  • Movement synchronization (without delay)
  • Highlighting
  • Menu structure
  • VR extension suitable for teamwork
Evaluation – Results & Discussion (preliminary)

• Mixed rating of spectating feature

  • 6 probands felt nausea or alike, all of which are afraid of heights

• Bigger study needed for more significant correlations
Conclusions

• VR mode now supports collaborative software exploration

• Usability improvements by adding overlays and customizations

• Usability validated through conducted evaluation
Future Work

• Further usability improvements (e.g. options to switch left/right controls)

• Tutorial for beginners

• Further studies with more participants

• Augmented reality

Thank you for your attention!
References

