

# Semester Thesis: "A Virtual Touchscreen in blue-c"

Marcel Germann

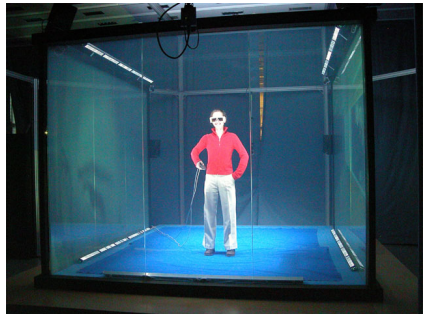
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- 1 Introduction
- 2 Virtual Touchscreen
  - Idea
  - Concept
  - Implementation
- 3 Results
- 4 Conclusions
  - Conclusions
  - Future Work



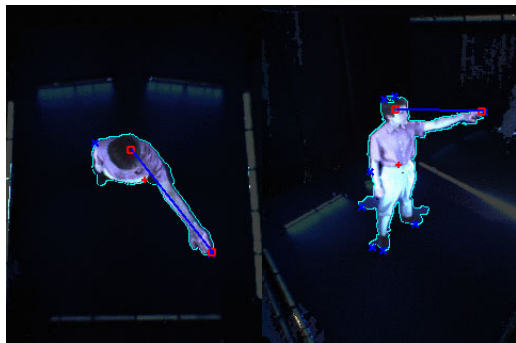
# Interaction in blue-c

Tracking Device "Flock of Birds" by Ascension:



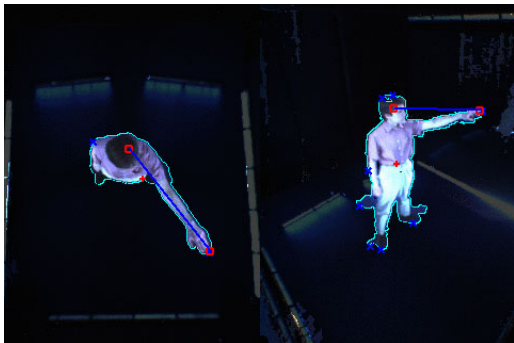
## Interaction in blue-c

"Real-Time Pointing Gesture Recognition for an Immersive Environment" by Kehl, R., Van Gool, L., 2004



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So far just a test application for moving a flashlight by a pointing gesture.

# Virtual Touchscreen

- "Touch event" detected by the cameras and not physically

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- Moving inside a predefined touchscreen area



# Virtual Touchscreen

- "Touch event" detected by the cameras and not physically
- Moving inside a predefined touchscreen area
- Use of the pointing gesture recognition algorithm or the Ascension tracking device

# Why a Virtual Touchscreen

- Similar actions like those of a mouse on desktop computers

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- Similar actions like those of a mouse on desktop computers
- Therefore, similar interaction modes and switching with a menu is possible
- "Simple" haptic feedback
- Freedom outside the touchscreen area (possibility for other interaction).

# Concept

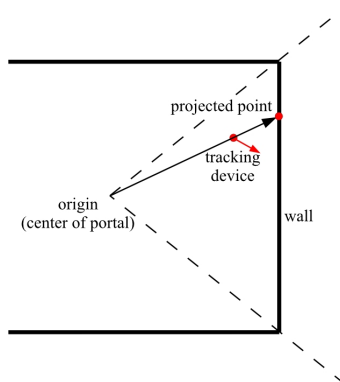
Steps:

1. Get position of tracking device and check for touchscreen event

# Concept

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1. Get position of tracking device and check for touchscreen event
2. Project position onto the touched wall



# Concept

Steps cont'd:

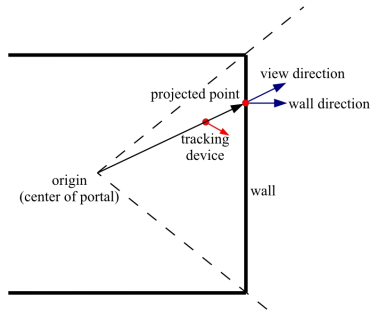
3. Tracking device dependent corrections



# Concept

Steps cont'd:

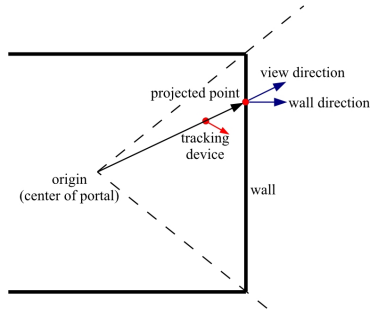
3. Tracking device dependent corrections
4. Calculate directions



# Concept

Steps cont'd:

3. Tracking device dependent corrections
4. Calculate directions



5. Deliver position and directions to the application

# Implementation

Implementation inside the blue-c API with new messages for the three events: enter, move, leave.

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Touchscreen Handler:

- Provides a menu (double-click)
- Handles the messages

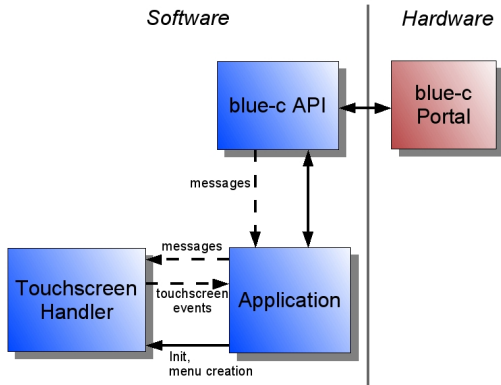
# Implementation

Implementation inside the blue-c API with new messages for the three events: enter, move, leave.

Touchscreen Handler:

- Provides a menu (double-click)
- Handles the messages
- Simple callbacks for the user application

# Implementation



# Results

Demo application:

- Menu usage



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- Picking and moving objects

# Results

Demo application:

- Menu usage
- Switching between different modes
- Pointing
- Creating objects in the virtual world
- Picking and moving objects
- Stop&Go fly mode

Video ...

# Conclusions

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For the Ascension tracking device:

- New interaction methods, e.g. picking (touch not point), drawing, etc.
- Switching between interaction modes
- Easy to learn for users

# Conclusions

For the pointing gesture recognition:

- Not accurate enough for a virtual touchscreen

# Conclusions

For the pointing gesture recognition:

- Not accurate enough for a virtual touchscreen
- Cameras and lights focus on the middle of the portal

# Conclusions

For the pointing gesture recognition:

- Not accurate enough for a virtual touchscreen
- Cameras and lights focus on the middle of the portal
- Prove of concept

# Future Work

- Full inclusion into the blue-c API and its configuration files

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- Full inclusion into the blue-c API and its configuration files
- Combination with space mouse or laser pointer
- Pointing gesture recognition based on point clouds

End

Thank you!