Cinematic virtual reality: The editing and display of panoramic media

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Overview

- Background
- Projects:
  - Object removal in panoramic media
  - Evaluating the effect of display type on the viewing experience
  - Transitions in multi-view 360° media
- Future of the field

Background: 360° media

GoPro rig
360cameraonline.com

Project 1: object removal in panoramic images

- Investigated how object removal algorithms can be adapted to work in panoramic images

Object removal in panoramic media - MacQuarrie & Steed, CVMP 2015

Project 2: evaluating the effects of display type on the viewing experience

Explore the potential advantages and disadvantages of cinematic virtual reality (CVR), compared to more traditional viewing formats.

- 360° videos viewed in HMDs are immersive
- But lack directorial control

Evaluation of passive experiences

Philips Ambilight (Seuntiens et al., *PRESENCE*, 2007)

Image: philips.co.uk/c-m-so/televisions/p/ambilight

Fulldomes

(Schnall et al., *International Journal of Human-Computer Studies*, 2012)

Image: en.fulldomefilm.org

Study design

- Three display conditions
- Between groups
- 63 participants (27 male, 36 female; mean age 27.78 σ = 9.27)

Three display conditions

Head-mounted display (HMD)

SurroundVideo+ (SV+)

TV

Music video

youtu.be/LByJ9Q6Lddo

Documentary (edited)
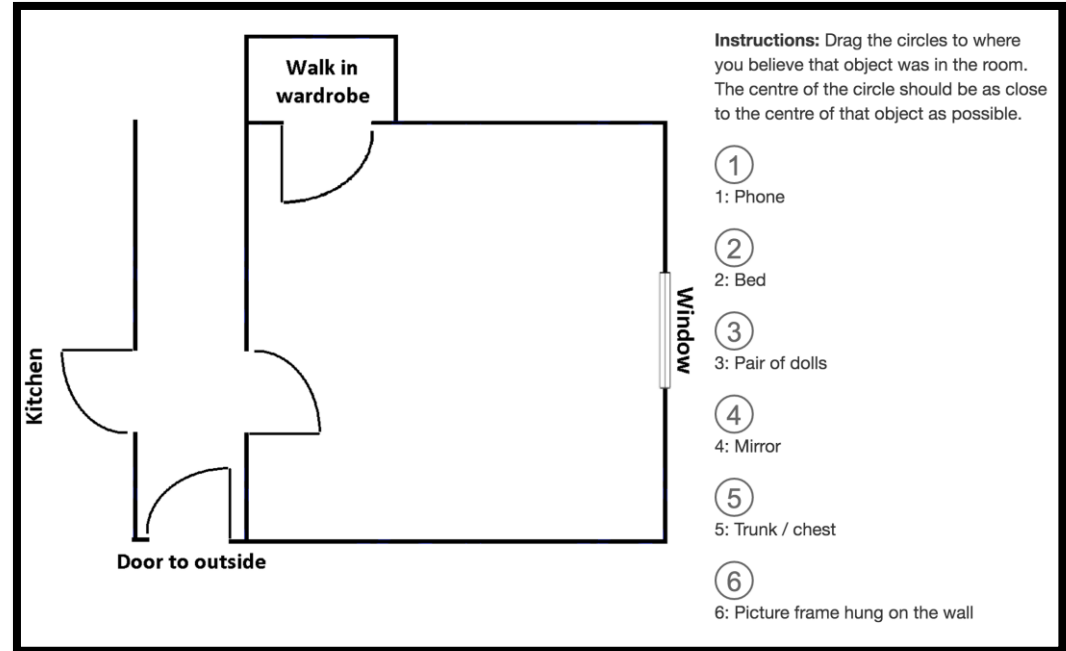
youtu.be/t6u3opMTCV4

Horror

youtu.be/ePf7mQJ3IvE

Narrative

youtu.be/2Je97Zdr1kA

Metrics

- Spatial awareness

Spatial awareness task

Metrics

- Spatial awareness
- **Memory**

10 questions like:

Audio: "On this frame there's a couple of microphones. I like to record stereo in the hive."

Corresponding question: "How many microphones were on the honeycomb?"

Memory question example

Metrics

- Spatial awareness
- Incidental memory
- **Narrative engagement**

12 questions like:

"At times during the program, the story world was closer to me than the real world"

"I found my mind wandering while the program was on"

Measuring narrative engagement questionnaire examples
(Busselle & Bilandzic, 2009)

Metrics

- Spatial awareness
- Incidental memory
- Narrative engagement
- **Enjoyment**

"Considering the display and the video separately, I enjoyed watching this video"

"Considering the display and the video separately, I enjoyed using this display"

Enjoyment questions

Metrics

- Spatial awareness
- Incidental memory
- Narrative engagement
- Enjoyment
- **Attention guided**

4 questions like:

"What was the murder weapon? Describe it as specifically as you can (colour, shape, material)"

Example attention question

Metrics

- Spatial awareness
- Incidental memory
- Narrative engagement
- Enjoyment
- Attention guided
- **Concern about missing something**

"At times, I was worried I was missing something"

"My concern about missing something impacted my enjoyment of the video"

Concern about missing something questions

Metrics

- Spatial awareness
- Incidental memory
- Narrative engagement
- Enjoyment
- Attention guided
- Concern about missing something
- **Fear during horror**

"I felt afraid while watching this video"

"I felt nervous while watching this video"

Fear questions

Results

- Some results were significant
  - HMD best for spatial awareness and enjoyment
  - Enjoyment was better in SV+ than TV for horror stimuli

- Some results may require more specific content (narrative engagement, fear)

- Fixed chair may introduce soft limit on field of regard
  - May impact drawing attention and concern about missing something

- Memory didn't reproduce previous study (display didn't produce significant difference)

Future work

Investigating impact of fixed chair on:
- exploration
- spatial awareness
- concern about missing something

- HMD with eye tracking
- 3 chairs that restrict movement in different ways

Project 3: transitions in multi-view 360° media

Explore the effect that transitions have on a user in multi-view 360° media. Aspects measured are likely to be:
- Spatial awareness (pointing task)
- Transition understanding (disorientation on arrival)
- Preference, enjoyment, naturalness, …

Transition types

Three are being considered:
- Teleportation
- 3D model of the scene
- Mobius "zoom"

Content

Several static scenes with multi-view 360 images and 3D model

Pilot

About to pilot this study, let me know if you want to have a go!

Future of the field (in my opinion)

- Evolutions:
  - Resolution, cameras, stereo, visual grammar
- 6 DoF

Thanks!