Web-Powered Virtual Site Exploration Based on Augmented 360 Degree Video via Gesture-Based Interaction

Maarten Wijnants Gustavo Rovelo Ruiz Donald Degraen Peter Quax Kris Luyten Wim Lamotte

Motivation

Physically attending an event or visiting a venue might not always be practically feasible (e.g., due to travel overhead). This poster presents a system that enables users to remotely navigate in and interact with a real-world site using 360° video as primary content format. The player component of the system is completely Web-compliant and therefore highly portable. Solutions that allow for cyber presence at physically distant sites hold value for heterogeneous application domains, including tourism, entertainment and education.

Use case

Virtual exploration of **Museum about industry, labour and textile** (http://www.miat.gent.be) in Ghent, Belgium

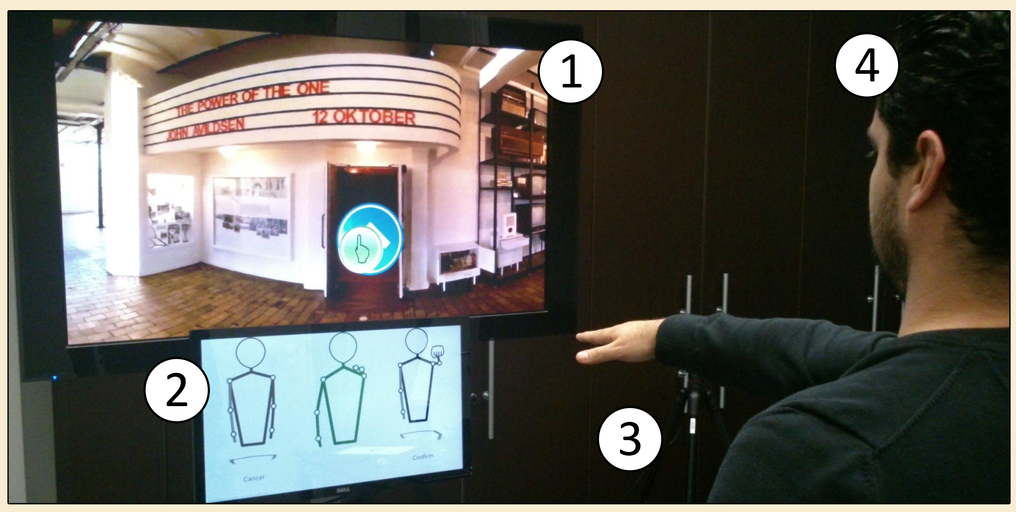
Methodology

Users can move along **pre-defined paths** that have been video captured in the museum in **360 degrees** using 7 GoPro Hero3+ Black cameras mounted in a 360Heros rig

Gives rise to a **Non-Linear Video** (NLV) scenario in which users can decide on their traveling direction at the end of each path

Support for both **mouse-based** and **gestural interaction**

① Use case visualization on large display (i.e., smart TV)
② Gesture guidance system
③ Kinect (concealed by extended arm)
④ User performing a gesture

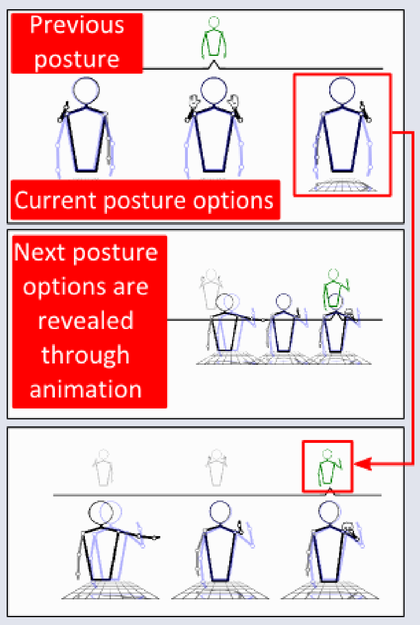


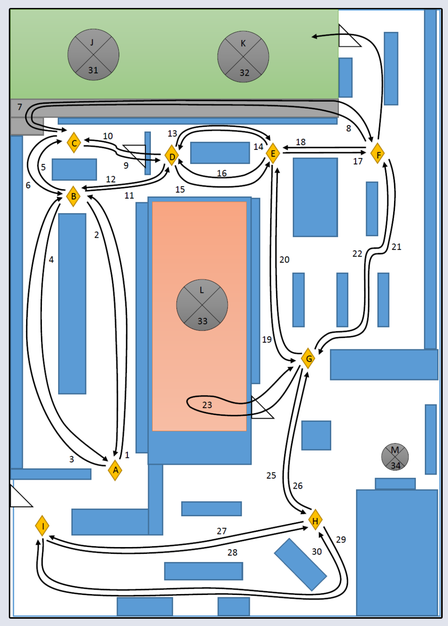
Gestural interaction

Composite gesture set (gesture = sequence of consecutive postures) organized in **tree-like topology**

Mid-air gesture recognizer (Kinect 2.0 for skeleton tracking)

Hierarchical gesture guidance system unlocks **walk-up-and-use design** [1]





Content streaming

MPEG-DASH adaptive HTTP delivery

W3C Media Source Extensions to enable HTML5-powered decoding and rendering of media segments

Initial media segments of follow-up routes (as derived from NLV graph) are **pre-fetched** to **minimize startup delay** when switching paths

Augmented Video Viewing (AVV)

Transform video consumption from passive to **lean-forward experience** by superimposing **interactive overlays on top of 360 degree video** [2]

Three AVV applications in the demonstrator:

⟶ Encode **navigation options** in NLV playback
⟶ Implement **treasure hunt gameplay**
⟶ **Visual feedback** of the current pointing location

[1] Rovelo, G., Degraen, D., Vanacken, D., Luyten, K., and Coninx, K. Gestu-Wan - An Intelligible Mid-Air Gesture Guidance System for Walk-up-and-Use Displays. In *Proceedings of the 15th IFIP TC13 International Conference on Human-Computer Interaction*, INTERACT 2015, September 2015, to appear.

[2] Wijnants, M., Van Erum, K., Quax, P., and Lamotte, W. Web-Mediated Augmentation and Interactivity Enhancement of Omni-Directional Video in Both 2D and 3D. In *Proceedings of the 11th International Conference on Web Information Systems and Technologies*, WEBIST 2015, May 2015.

universiteit hasselt | EDM | iMinds