ICS-FORTH develops and deploys innovative human-centred Ambient Intelligence technologies for Smart Environments, capable of understanding and catering for personalized requirements.

The development of such systems is carried out in the context of the ICS-FORTH Ambient Intelligence Programme, which constitutes a platform for interdisciplinary and cross-thematic RTD.

Application domains include: Arts and Culture, Commerce and Marketing, Learning and Education, Leisure and Entertainment, Healthcare, Home, Office.

AmI Programme
by FORTH-ICS

Ambient Intelligence Environments

AmiSim: Facilitating a Virtual Reality Tour

Institute of Computer Science

Foundation for Research and Technology - Hellas (FORTH)

N. Plastira 100, Vassilika Vouton
GR-700 13, Heraklion, Crete, Greece

Contact details
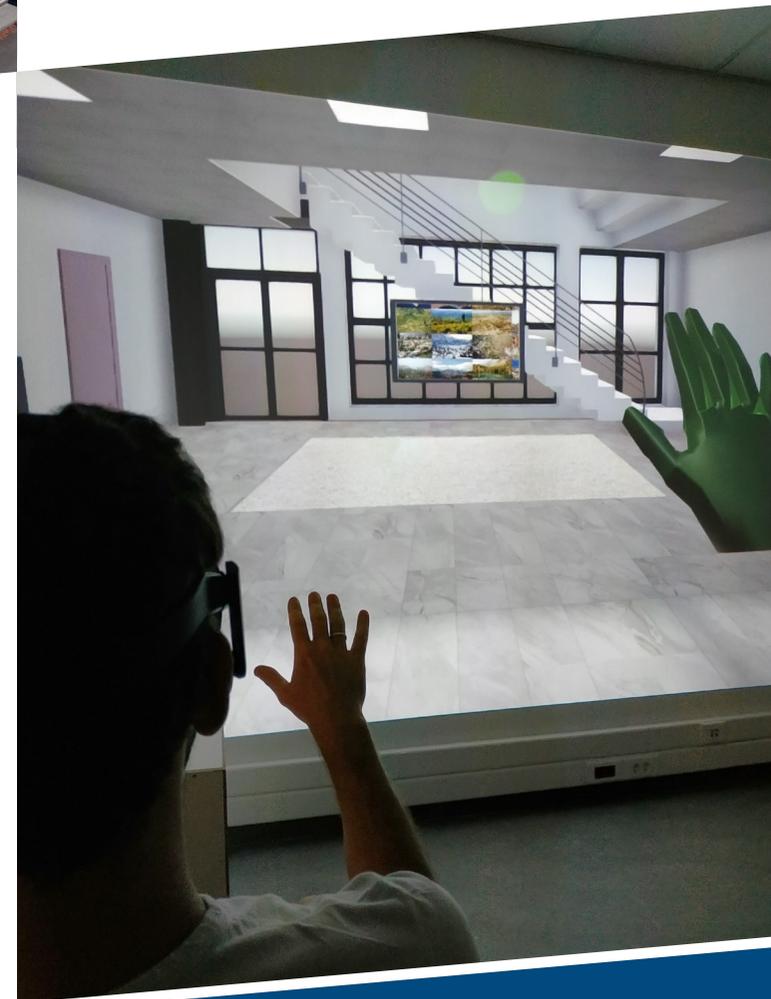Tel.: +30 2810 391741
Fax: +30 2810 391799
email: cs@ics.forth.gr
www.ics.forth.gr/ami

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Virtual Reality Tour

AmiSim is a framework that can be used to create multilingual virtual tours in environments simulating existing physical spaces. Users can navigate in the virtual world and discover the information embedded, by using hand gestures. The overall user experience is achieved via a VR headset, as well as by employing sensors for body and hand tracking.

VR Application

ICS-FORTH's Ambient Intelligence (AmI) Facility has been used as a case study for the creation of a virtual reality tour with AmiSim. The virtual environment is enriched with interactive systems which operate in the same manner as the corresponding physical installations, creating a realistic immersive user experience. Currently, the AmI Facility tour includes two interactive systems, *MediaGallery* and *BeThereNow*, integrated in the virtual environment in accordance with their physical location in the AmI Facility. The integrated applications are fully functional, allowing users to get a hands-on experience as if they were in the AmI Facility.

In addition to the interactive virtual applications, the AmI Facility tour includes digital exhibits of all the physical installations of the Facility, through high resolution 3D models, which are reconstructed in an exact representation of the artefacts' physical scale. These exhibits are augmented with textual description and multimedia information illustrating the functionalities offered in real world. The operation of the exhibits is simulated through video playback of prerecorded interaction, offering an immersive user experience.

The information presented for each exhibit can be customized to the user's preferences both a priori and at runtime, creating a personalized user experience. Personalization is not limited to visualization preferences such as language, but also includes content adaptation to match users' interests.

Finally, users are able to capture screenshots at any time during their interaction and send them via email at the end of their tour.

Interaction

Interaction is implemented with two approaches: (a) via free-hand gesturing accomplished through camera-based hand tracking, thus enhancing user experience and immersion and (b) using Oculus Touch sensors, which facilitate more precise interaction, yet require a physical controller. Navigation in the virtual world as well as selection and manipulation of UI elements (e.g. menus) and exhibited content (images, videos etc.) is achieved using the aforementioned modes of interaction.

Setup

The system employs a head mounted VR headset (Oculus Rift) for rendering virtual worlds stereoscopically.

In addition, a small-weight camera capable of full hand articulation tracking (LeapMotion) is included. Alternatively, motion controllers (Oculus Touch) can be used as an additional means of interaction, providing a more precise albeit more obtrusive medium. Finally, a Kinect One sensor is a complementary camera employed for embedding users' figures in the virtual environment via user tracking and background subtraction.