What Will ATLANTIS Develop?

ATLANTIS Public Report Nr. 1	
Project:	ATLANTIS – AuThoring tooL for indoor Augmented and dimiNished realiTy experIenceS
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Abstract:	This report provides an overview of the ATLANTIS project goals and presents the four key characteristics of the solution to be developed: ● Authoring solution tailored for non-expert users ● Practical indoor scene reconstruction based on spherical panoramas ● Holistic indoor scene understanding ● Integrated Diminished Reality into Augmented Reality experiences

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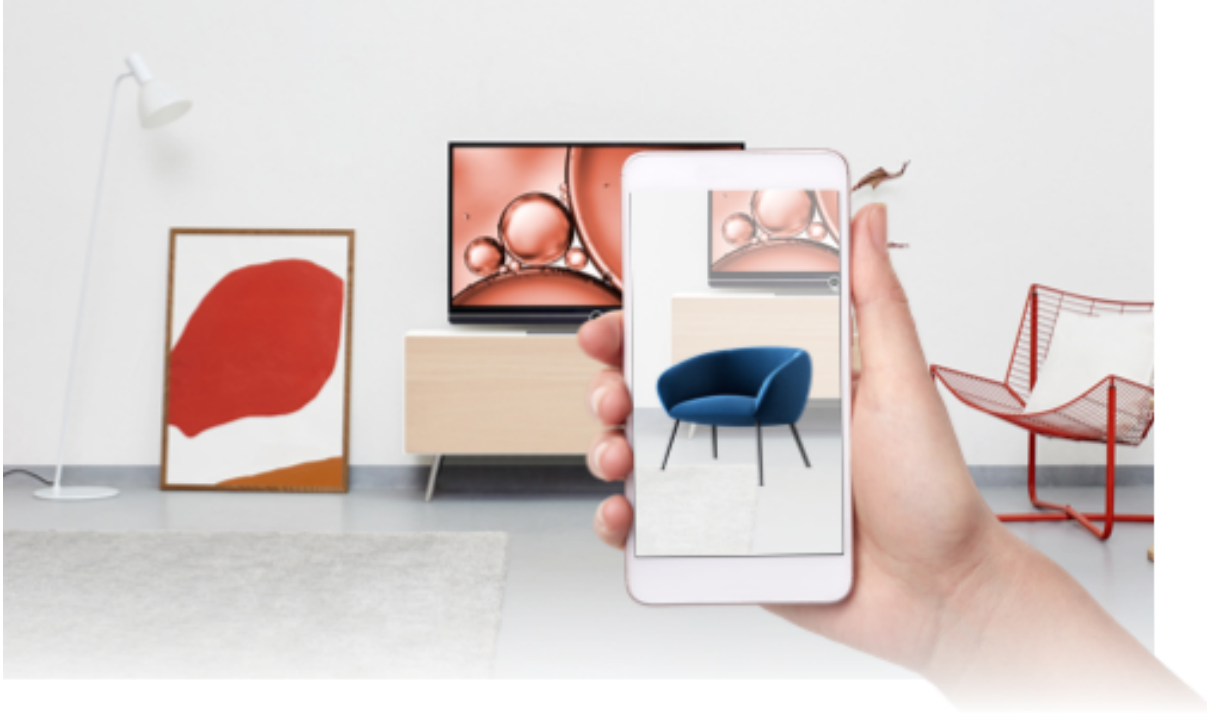
Project Goals

In many application areas (e.g. interior design, furniture retailing or renovation), communication with a customer or future user during the planning and design phase is crucial to select the right products and configurations. Making this communication process effective saves costs, avoids later modifications, and results in providing tailored solutions and higher customer satisfaction. AR has the potential to make these communication processes highly effective and provide a better experience for the customer. However, this content needs to be created by experts from the respective domains, who often lack IT and media skills, and shall provide a lightweight AR experience for the customer. Current AR authoring solutions are quite complex and require manually creating scenes or rely on objects prepared with even more complex applications (e.g. CAD).

ATLANTIS will enable the authoring of AR experiences directly within real-world scenes, where content authors will pre-define placement options for computer-generated (CG) 3D elements within the real-world, allowing their users to experience the authored AR content and interact with it. With the ATLANTIS authoring tool the fusion of 3D CG elements with real scenes will be accomplished in a guided manner that will utilise artificial intelligence (AI) to facilitate more productive and effortless content creation. In addition, ATLANTIS will innovate beyond traditional AR authoring by adding Diminished Reality (DR) authoring capabilities in order to offer unique visual experiences.

ATLANTIS will demonstrate its AR authoring tool in the domain of ***interior design*** **–** that will truly benefit from pre-authored content creation as well as the reality removal possibilities offered by DR. For this domain the authored AR experiences are very beneficial as they effectively convey the designers' concepts to their clients, as well as efficiently obtaining high-quality feedback from the clients, overall providing a more cost-effective and fruitful information exchange mechanism for this domain.



Key characteristics

The following 4 key characteristics have been identified in respect to the targeted authoring tool.

An authoring solution tailored for non-expert users, integrated with existing XR content creation and presentation workflows

- An authoring tool that will offer true authoring of AR experiences while abstracting and hiding the underlying complexity, including novel functionalities like indoor perception and DR authoring, powered by a set of integrated AI services.

- A lightweight authoring tool usable on mobile devices, offering a straightforward and easy to use authoring workflow for non-experts.

- A tool that enables interaction with individual, real objects captured from the scene as well as added CG elements, i.e. to be able to move, change or remove them. This will be driven by a 3D perception capability that will provide a natural authoring experience on real-world scenes relying on 3D navigation and manipulation.

Practical indoor scene reconstruction based on spherical panoramas

- Data-driven generation of high-fidelity, digital 3D replicas of indoor scenes utilizing current state-of-the-art research in omnidirectional depth estimation.

- An improved and easy to deploy 3D reconstruction service based on spherical panoramas, which offer holistic indoor scene information. This technology will be fully automated and will drive authoring natural AR experiences of real scenes, as it will allow for pure 3D navigation and visualisation while authoring.

Holistic indoor scene understanding

- By identifying and segmenting specific objects in the scenes, the authored environment will be automatically annotated with important metadata.

- Generative models for scene layout based on data from user interactions (e.g., removing certain types of captured objects, correcting the position of inserted objects).

- These data-driven Spatial AI technologies will enable features like snapping digital elements to real objects, automatic object and/or scene layout recommendations, easily annotating parts of the scene via automatic masking and filling.

Integrated Diminished Reality into Augmented Reality experiences

- AR complemented with DR will provide increased realism of digital overlays that will not only enhance and augment the real-world, but also replace and alter it. In this way, increased immersion will be achieved, as well as more effective digital to real embeddings.

- Offline and real-time algorithms will enable the effortless removal of real objects to create diminished versions of captured environments (where the content to be removed is inpainted), ATLANTIS will utilise both offline and real-time algorithms.

- Overlaying of additional elements will be possible in real-time.

More information

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