Towards In-situ Authoring of AR Visualizations with Mobile Devices

Marc Satkowski*, Weizhou Luo*, and Raimund Dachselt*

** [msatkowski, weizhouluo, dachselt]@acm.org*

TECHNISCHE UNIVERSITÄT DRESDEN

INTERACTIVE MEDIA LAB DRESDEN

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Motivation and Basic Idea

Authoring AR visualizations still heavily relies on stationary desktop setups, which inevitably separates users from the actual working space.

We aim to better support the authoring process in immersive environments by ...

Combining Augmented Reality (AR) with spatially-aware mobile devices

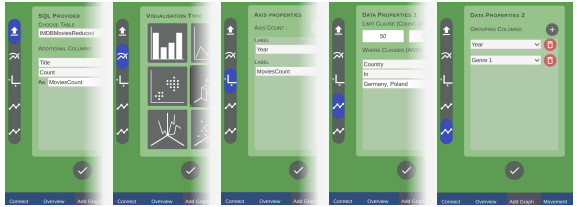
AR Immersive Space		***Mobile Devices***
Supporting immersive data exploration in a real-world context	⟷	An In-situ controller with precise touch interaction

Contributions

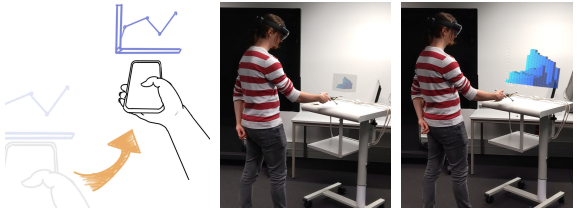
- A preliminary set of concepts which make use of this device combination for authoring AR visualizations.
- Presentation and Insights of an early prototype, which enable the configuration of visualization directly in real-world environments.

Envisioning AR Authoring and Current Prototype

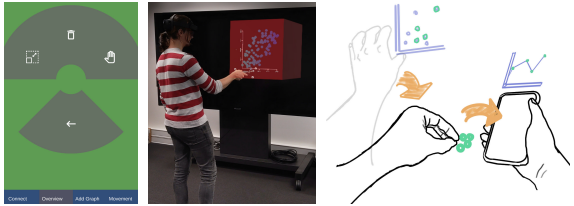
We implemented an early prototype consisting of a ***HoloLens 2***, a ***Smartphone***, an ***OptiTrack motion tracking system***, and a ***Server***. We implemented our core techniques in ***Unity***, utilizing the ***u2Vis framework*** and a ***server-client architecture*** based on JSON-RPC and WebSockets. Data was provided via ***SQL database*** requests, which enables arbitrary filtering of the data.



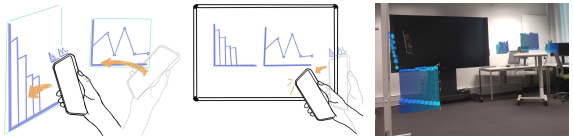
▲ **Creating Visualization:** With the menu available on the mobile device, it is possible to create and configure visualizations.



▲ **Placement:** Those created visualizations can than be directly placed in the real-world environment.



▲ **Mobile Input Device:** The mobile device can be used as a context and proximity based input device, which enables interactions, like the deletion of visualizations (middle), or applying selection as filters to other visualizations (right).



▲ **Layouting:** The visualization can be picked up again to create meaningfull layouts, which can be combined with available furniture in the room the system is used in.

Future Work

- Providing an in-depth ***design space*** that focuses on interaction, content distribution/layouting, and visualization storytelling, which will be enabled by the ***three availabe input modalities*** of free hand gestures, device movement, and touch interaction.
- Developing a ***full-fledged application*** supporting the general authoring and data analysis process, which also includes both extending available and adding new visualization types.