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Virtual environments as memory training devices for navigational tasks as we age: A design perspective

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Getting lost can be frustrating. Not knowing which route to follow, and being unable to recall important information that can lead back to a familiar environment, is a challenge most people experience while navigating. The difficulties each individual faces, however, can vary significantly. Factors such as spatial abilities, memory abilities, and age may interfere with route recall performance, and thus make some people experience more difficulties than others do. Our central question is if we can optimize the visualization designs of virtual environments (VEs) to create effective training devices for people of varying abilities to memorize their route for a predefined path. In other words, how can we improve people's recall accuracy through visualization design?

Specifically, we aim at creating memorable visualizations for VEs, which we can use to train people to memorize their route. VEs have been broadly used for navigation simulation. The amount and type of information presented in them however, depends highly on the studied task. We take a realism-abstraction perspective and investigate which level of realism (LOR) might best facilitate recall of relevant information on a simulated path. We want to understand how much realism a visualization should contain to effectively assist the user to recall visual and spatial information. We identify three key factors in the LOR relevant for recalling a route: quality (type), amount, and location of this realistic information.

We designed a controlled lab experiment and measured the recall accuracies of younger and older people with different visualization designs with spatial and memory abilities as exploratory variables. Preliminary results indicate that some design guidelines can be drawn which are applicable to all groups.

A full-paper developed from this abstract is published here:

Lokka, I-E., **Çöltekin, A.** (2017). [Towards optimizing the design of virtual environments for route learning: An empirical study of memorability with changing levels of realism.](http://dx.doi.org/10.1080/17538947.2017.1349842) *International Journal of Digital Earth*. (DOI: <http://dx.doi.org/10.1080/17538947.2017.1349842>)