Abstract Title:
Spatial and Temporal Cognition with a Mobile Augmented Reality Application in an Urban Geography Fieldwork Setting

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Abstract:
The dimensions of space and time are fundamental frames for human's perception of a physical area. In a real world setting, human's spatial and temporal cognitive processes could be facilitated and expedited by exploring visible physical spatial objects whilst viewing related invisible temporal virtual information concurrently. Augmented reality (AR), which extends perceptions of real space with additional contextual visual and non-visual information, promises to be a compelling and applicable technology to leverage the spatial and temporal cognition. However, it is still an open question to what extent (mobile) AR enhances spatial and temporal cognition. To investigate this question, a field experiment is conducted in an urban setting in the city of Enschede (in the Netherlands), involving participants who are using a mobile AR application with additional cartographic visualizations to explore and learn about both the past and present of the geography of an urban area. Questionnaire, interview, think-aloud and mobile eye-tracking data will be collected. This research will report on an assessment of the change of participants' geographic knowledge of the field area as well as on an analysis of participants' performances when interacting with the mobile AR application. The research results will shed some light on the usability of the mobile AR application in terms of contributing to an increase of spatial and temporal cognition.

Keywords:
Spatial cognition, Augmented reality, Visualization, Usability, Eye-tracking