Design Recommendations for Map-based Storytelling in Augmented Reality: A Preliminary Study

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Research on new and efficient techniques for map-based storytelling has become essential in cartography as maps move onto interactive and mobile media (Bucher 2018). Specifically, new Augmented Reality (AR) technologies could benefit map-based storytelling by providing meaningful links between virtual content and the physical environment, effectively extending the story beyond the dimensions of the maps (Azuma 2015). In this presentation, I evaluate how different visual elements have been employed for displaying location-based stories in various media and outline some recommendations for improving the design space and user experience of cartographic stories using augmented reality (AR).

My research objectives are threefold: (1) investigate the visualization technique of location-based storytelling using various visual and multimedia elements in different forms of media (print, web and AR) through a comparative study, (2) create a conceptual design for a location-based story for mobile devices using augmented reality based on the comparative study and then evaluate the effectiveness of the proposed design, and (3) derive further recommendations for enhancing the design and user experience.

I addressed my research objectives using a systematic, three-stage research approach. First, I conducted a comparative study with 38 selected samples from the print, web and AR/VR media to review and compare the design elements used to visualize points of interests (POIs), narrative, and route direction. I then designed a case study mobile AR app based on the findings of the comparative study, using interactive mockups as the basis of the prototype design. Finally, I assessed the usability of the mockup design through online semi-structured interviews that included participation observation and think aloud sections with 22 people from a variety of backgrounds.

Figure 1 summarizes the design patterns observed in the comparative study. It lists all the visual and multimedia elements used for indicating points of interest, the story/narrative and additional information found in the selected map samples along with their relative occurrences. Since the pattern of using visual elements and interactivity varies greatly depending on the medium, I picked the most used and most logical elements from this list while developing the conceptual design for the case study later.

Figure 2 provides screenshots of the mockup design of an AR mobile app prototype that provides visitors with a tour of the Technical University of Munich's (TUM) main campus by combining visual elements for route visualization and storytelling.

Based on user requirements and feedback from the usability evaluation, I developed general recommendations for building a mobile AR app for location-based storytelling to assist with the future application development in the early stages of designing:

● combine storytelling and route visualization elements;
● design a simple and intuitive user-interface with clear instructions;
● follow a mixture of author-driven and reader-driven approaches for storytelling;
● use a variety of visual storytelling genres and tropes when necessary and give careful consideration to integrate them to create a clean, logical, and captivating narrative framework;
● use a marker-based tracking method for congested areas and similar looking spots to assure high positional accuracy.
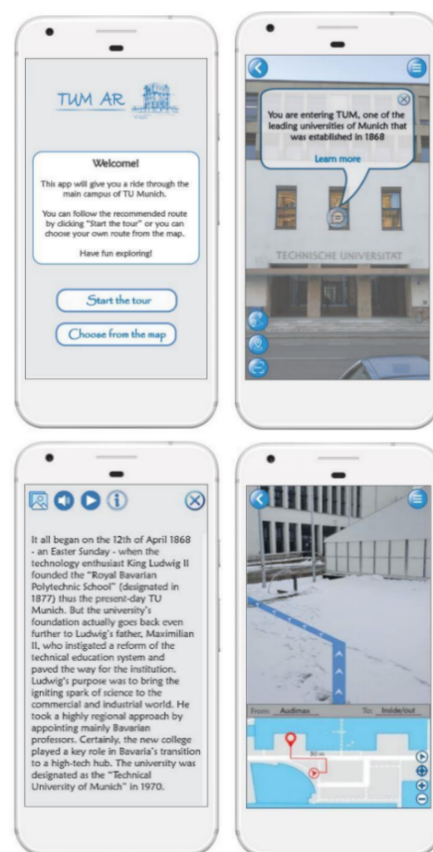
Figure 1: List of visual elements used for POIs, story/narrative and additional information and their occurrences in the selected maps

Figure 2: Selected pages from the mobile prototype (mockup) design

In this presentation, I provide an overview of the existing design patterns in cartographic storytelling and offer some design recommendations for the early phases of design. To make the most of the technology and to provide the audience with the best possible experience, the design of a location-based storytelling application in AR needs careful attention. This research can be furthered in the future by: (1) looking deeper into the existing design principles, (2) building fully functional mobile AR app prototypes with cutting-edge interactive features and/or alternate experiences such as locative-audio AR, and (3) undertaking various case studies for various story genres and user groups to examine the effectiveness and memorability of the stories.

References

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