Leveraging Augmented Reality to Preserve Community History

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Abstract:
As gentrification continues to rapidly transform many communities, the intangible heritage of a community's memories and lived experiences are at risk of being lost, leading to the gradual erosion of a community's history and cultural heritage. In this context, Augmented Reality (AR) has emerged as a powerful medium for integrating physical and digital realms, offering novel possibilities for preserving community history. This paper explores the following questions:

1. How can AR be effectively utilized to preserve community history?
2. What are the key UI/UX design considerations for developing a community-centered AR application?

This study details a case study focused on Harlem, New York where we conducted formative studies to inform our design process and prototyped Community AR, an interactive AR platform designed to preserve community history while enhancing civic engagement. We concluded by conducting a pilot study, through which we gained key insight into AR's potential as a tool to bridge the gap between physical spaces with their historical narratives.

Methods:
We decided to focus our research on Harlem to leverage our team's existing relationship with the NSF Center for Smart Streetscapes (CS3) and the 125 St Business Improvement District. Our research methodology comprised several phases: first, we conducted comprehensive field studies, archival research, and literature reviews to understand Harlem's historical context and current challenges. We then engaged with Harlem residents through CS3 to ensure that our study aligned with community needs. Based on community input, we designed wireframes on Adobe Illustrator, Balsamiq, and Figma; created 3D models of historic buildings using Blender; and developed prototypes of AR features in Unity. This process culminated in a beta mobile application with which we conducted a pilot study with 10 people to gather preliminary feedback and inform future iterations.

System:
Our formative studies revealed a deep appreciation and desire among Harlem residents to preserve their cultural heritage through AR. We aim to empower communities to capture and preserve their rich history through AR, revitalize their local heritage, and mitigate the loss of history in the face of urbanization.

Figure 1. Wireframes of AR features visualizing how buildings have changed over time. When users hold up their phone camera toward a building, the app prompts an AR feature that shares that building's history.

Results:

(a) (b)

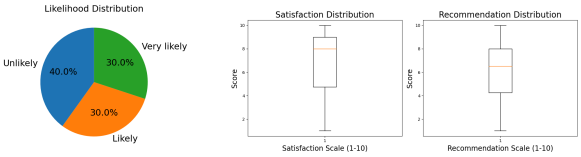

Figure 2. Pilot study results. (a) Pie chart showing likelihood to continue using the app. (b) Box plot showing satisfaction and recommendation rates.

Conclusion:
Participants generally expressed excitement about AR's potential to provide more intuitive access to their community's historical narratives yet stressed the need for refinements in UI/UX design to ensure the application is user-friendly. These observations were anticipated, given that the pilot study was conducted with a rudimentary, beta prototype of Community AR.

Future Work:
Moving forward, we plan to refine our AR features by optimizing existing functionalities to enhance the user experience, addressing any technical challenges encountered during the pilot study, and developing new AR features that align with the evolving needs and preferences of our users. With these improvements, we plan to conduct formal user studies with Harlem residents and seek active feedback to ensure their opinions are fully incorporated and further answer our research questions.

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