



# 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 research 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.

## Research 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?

## Methods

### Formative Study

Field studies, archival research & literature review with CS3

### Prototyping

Design wireframes on Adobe Illustrator, Figma & Balsamiq & create 3D models of historic buildings on Blender

### App Development

Develop prototypes of AR features & beta mobile app on Unity

### Pilot Study

Gather preliminary feedback to inform future iterations

### Data Analysis

Implement NLP & ML techniques to analyze results

## System

Figure 1.1

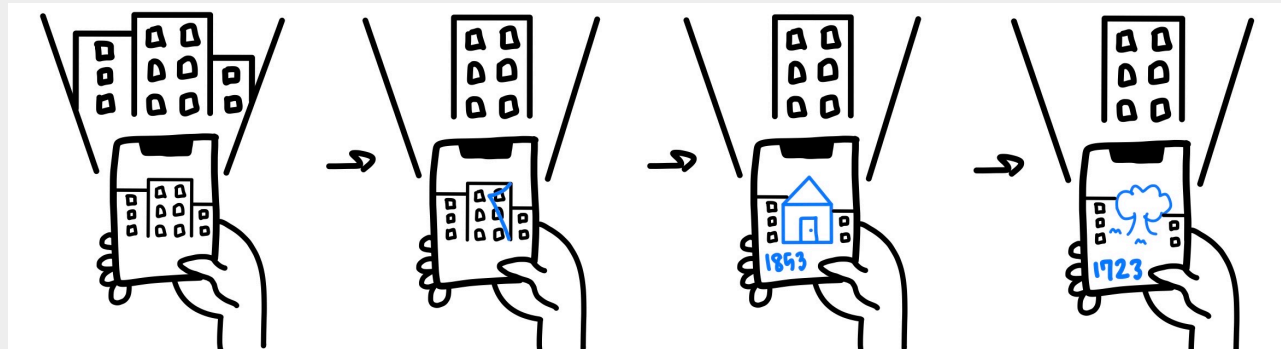


Figure 1.2



Figure 1.3

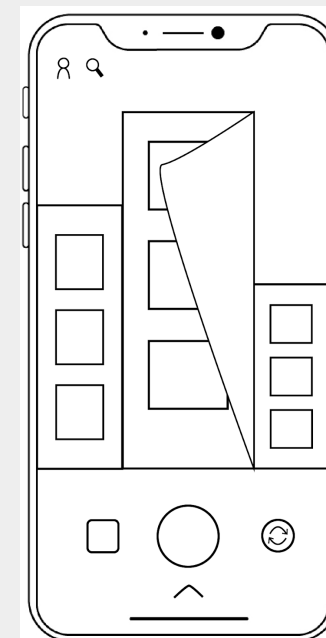
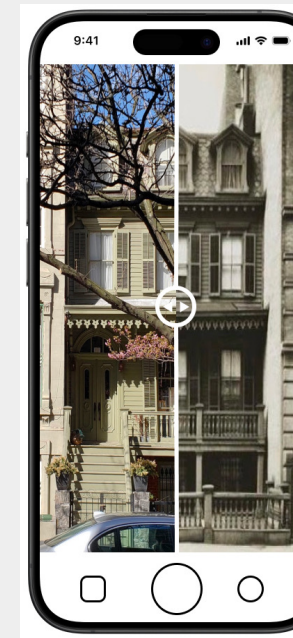


Figure 1.4



**Figure 1** Wireframes of AR features. When users hold up their phone camera toward a building, the application prompts an AR feature that chronicles that building's history. **Figure 1.1** are drawings illustrating how the AR features would work. **Figure 1.2** allows users to see what a building looks like in a specific time frame. **Figure 1.3** is a page-flip effect which allows users to visualize how buildings changed over time. **Figure 1.4** is a slider that enables users to see the before-and-after transformation of a building.

## Results

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

Figure 2.1

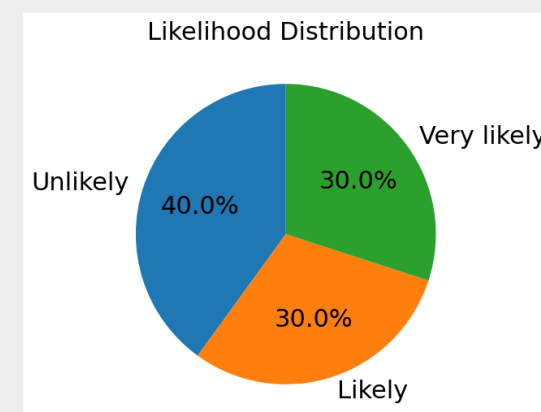
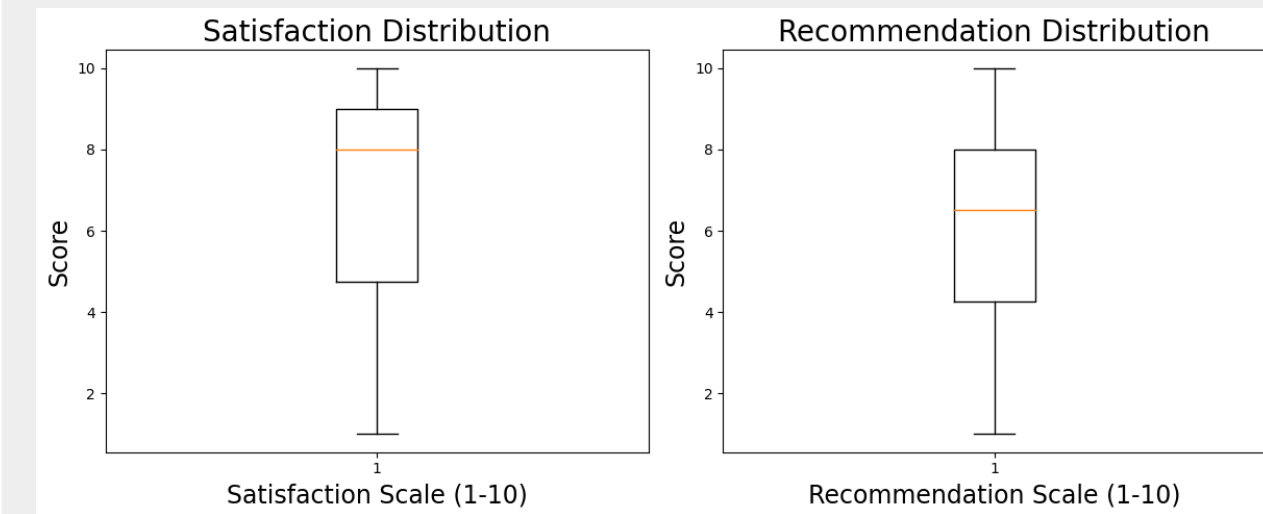


Figure 2.2



## Results

Figure 2.3



**Figure 2** Pilot study results. **Figure 2.1** is a pie chart showing the likelihood of users to continue using the application. **Figure 2.2** is a word cloud of the most common words users used to describe their experience with Community AR. **Figure 2.3** is a box plot showing the user satisfaction and recommendation rates on a scale of 1 to 10.

## 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 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 heard.

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