1 Problem Statement

As part of its mission to preserve the past and safeguard access to it today and long into the future, the Yale Institute for the Preservation of Cultural Heritage (YPCH) is partnering with ICOMOS (International Council on Monuments and Sites) and CyArk (A prototype project to test the concept of a digital archive of 3D survey information of endangered world heritage sites) in the Project Anqa initiative.

Project Anqa is an emergency program for recording high risk physical cultural heritage, such as historic buildings and artifacts, in the Middle East and North Africa regions. Named after the Arabic word for phoenix, Project Anqa deploys teams of international professionals and pairs them with local experts to digitally document at-risk sites into 3D models before they are destroyed or altered.

Project Anqa aims to make the resulting data available online for both scholars and the general public.

This senior project aims to build a prototype for an interactive platform through which the user can best engage and learn from this valuable data.
2 High Level Goals

- Creation of a 2D interactive experience for traditional in-browser visualization and exploration of the 3D model data. The experience will both leverage the great level of detail and diversity of sites and objects captured by Project Anqa. Ideally, the creation process will be easily reproducible and easily translated to past and future cultural heritage data from Project Anqa.

- Creation of a VR-enabled interactive experiences:
  - Insertion of Virtual Reality (VR) interaction into the experience for users with access to headsets.

- Exploration of gamification and dissemination incentives to grab the interest of users while exposing them to cultural heritage information.

3 Tools, Software, and Languages for Development

- C Sharp and the Unity development platform for developing the 3D environments

- Google VR SDK for Unity for developing VR, handling head tracking, 3D calibration, user input, etc.

- WebVR and A-Frame and JavaScript frameworks for integrating VR experiences directly into the browser.

4 Milestones:

- Setting up tutorial apps for Unity and A-frame apps, learning how to deploy them to the Cardboard platform.

- Deploy a web platform for interactive visualization of 3D content handling little user input. This will be similar or building on existing viewers.
• Deploy a web platform for interactive visualization of 3D content in Google Cardboard VR handling little user input. This will enable basic exploration of the 3D content in first person point of view.

• Add user interaction to 2D platform. This will go beyond the traditional static viewers, enhanced to integrate more data and optimized for intuitive user manipulation.

• Add user interaction to VR platform. Initially the interaction will emphasize the point and click input type due to its lower barrier to entry using Google Cardboard.

• Build an example "narrative" or mini-game into the platform that incentivizes the user to return to the platform. For example, users may be rewarded after completing a series of puzzles or activities with access to a an exclusive download page of content derived from the cultural heritage data (.stl models for 3D printing, photobook, wallpapers).

• Consolidate an experience creation pipeline. In order to make best of use of the wealth of data Cyark and Project Anqa are collecting, the built-experience should be easily translatable and useful for other 3D models.

• Add a social component to the experience. In order to reach as many users as possible, the platform should incentivize users to share their experience with their contacts.

5 Deliverables:

• 2D interactive visualization web platform for digitally archived cultural heritage data.

• 3D, VR-enabled, experience for interacting with 3D cultural heritage models.

• Prototype of a gamified experience leveraging the above.

• Consolidated pipeline.