AR-MAPS | Mixed Reality Tour of OntarioTechU

Group 3

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Problem Statement 01

- University applicants and parents frequently travel large distances to visit potential University campuses.
- This problem is especially bothersome for international student applicants.

Users

- Prospective Students
  - University applications can be a tedious process.
- Informed Parents
  - Parents
- Informed Visitors
  - Visitors to OnTechU can tour the campus and all it has to offer remotely.
- Informed Staff
  - Often times, new staff is unable to find the location of certain rooms or the easiest route to that location on the map.

AR-MAPS

Your tour made easy

AR-MAPS

AR Maps is an interactive way of exploring the North Campus and its facilities.

It will add an enhanced visual element to the information already accessible to the public

- A 3D representation of the campus is intuitive and free from the constraints of traditional imagery.
- Highlight the locations of various campus resources such as health services, the campus gym, campus bookstore, etc.
- 360 degree images of interior campus spaces for an immediate representation of life at OnTechU

This capstone project implements both augmented reality (AR) and mixed reality (XR) to remotely explore Ontario Tech's facilities and surrounding areas.

AR-MAPS Objectives

The 3 main goals that we hope to accomplish using our platform

01

The main intent of this project is to provide a more detailed exploration of the campus classrooms, laboratories, and study spaces, all without needing to be physically present

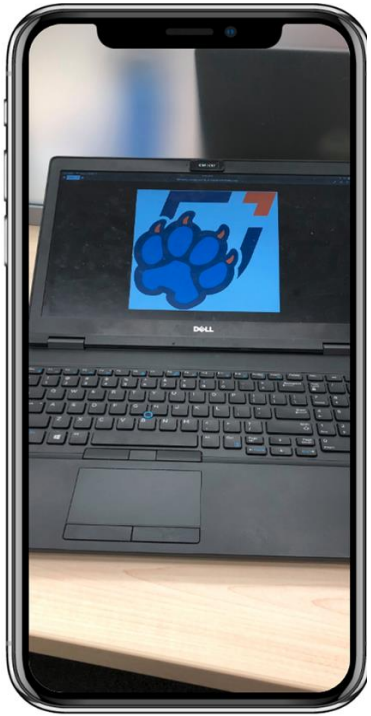
02

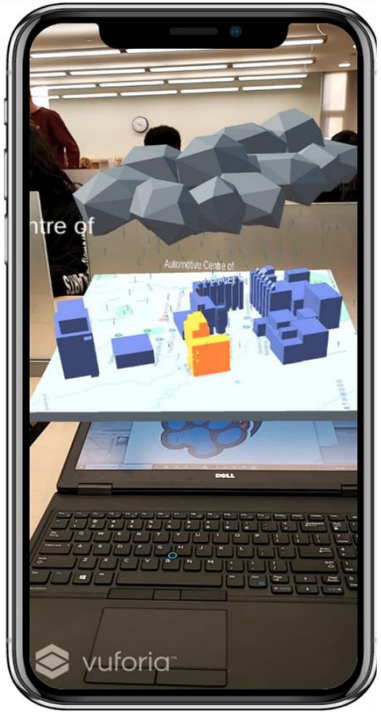
To enhance OnTechU's image as a Technology based Institution.

03

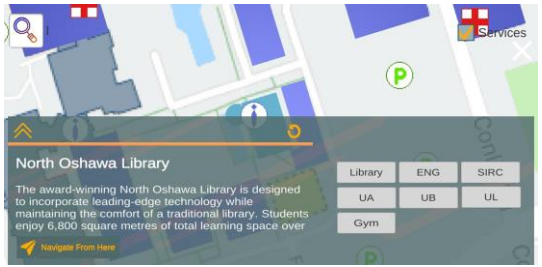
Help aid international students/staff by providing an inexpensive and simple way to visualize locations they might not otherwise.

Application Design

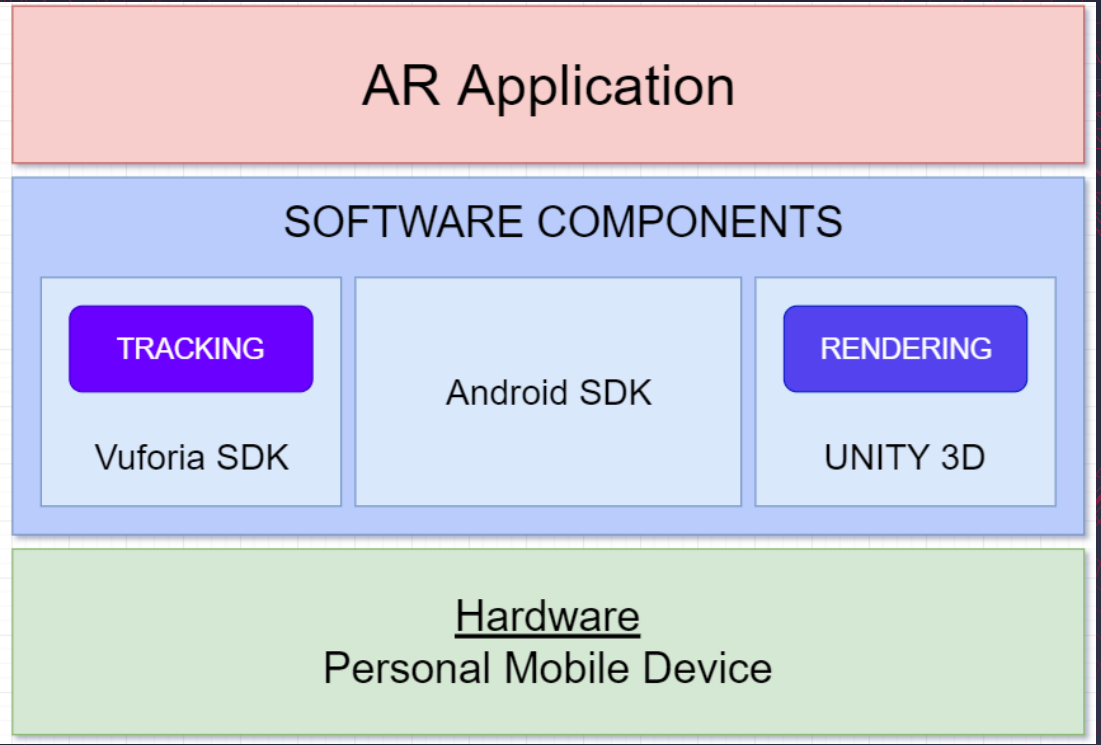




Upon Clicking “Flat Campus Map”



Component Overview



Team Member Role Analysis

3D Modeling and Photography

Blender

Tasked with:

Building 3D model assets for the AR Map

UV Texture Mapping images to the models

Material Creation and special effects.

Team:

Zeerak Siddiqui

Scene Building and Feature Programming

Unity

Tasked with:

Writing C# scripts to implement various the various features in our project.

UI development in conjunction with the created features.

Placing objects in the world, resizing/shaping/translating 3D models to fit Campus layout.

Team:

Ryuji Komai

Sachin Teckchandani

Back-End Data Management

Google Firebase, Node.js

Tasked with:

The design, creation, and updating of our SQL tables.

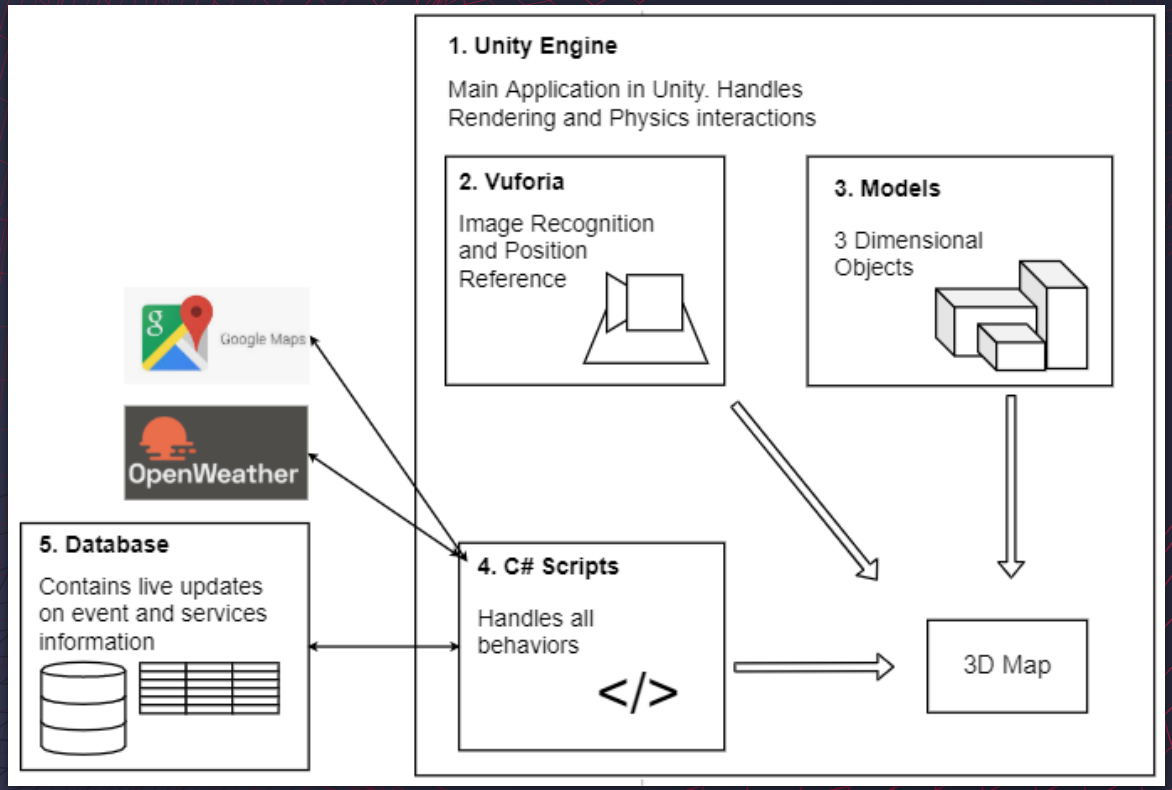
The creation of the API used to retrieve the OnTchU event information

Team:

Thomas Jansz

Arda Celik

Build Components



1. The project is built in the Unity Engine

2. Image Recognition and Augmented Reality Camera Overlay is handled with Vuforia

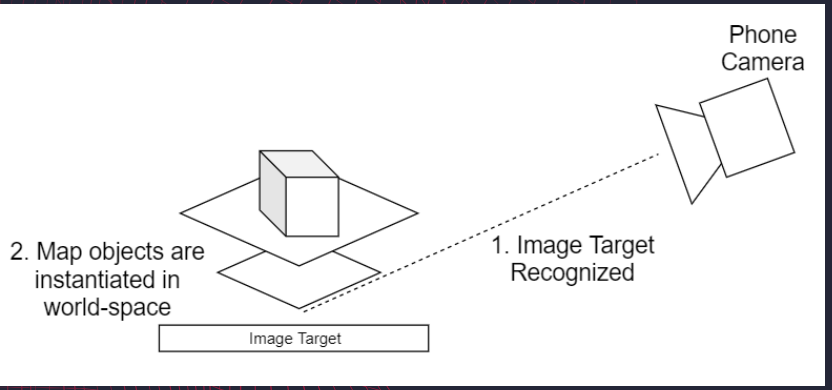
3. Models are created using Blender and exported to Unity

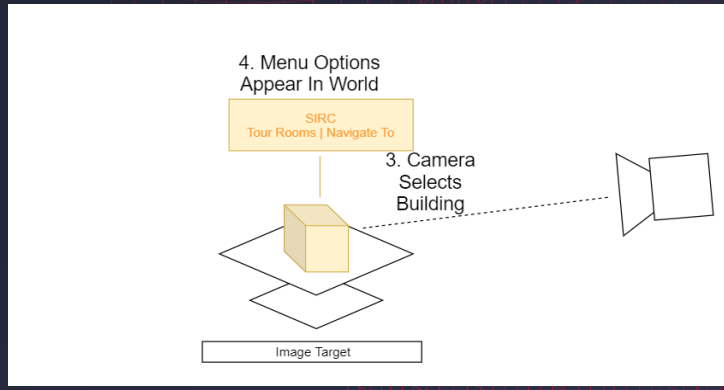
4. Behavior is programmed in C#

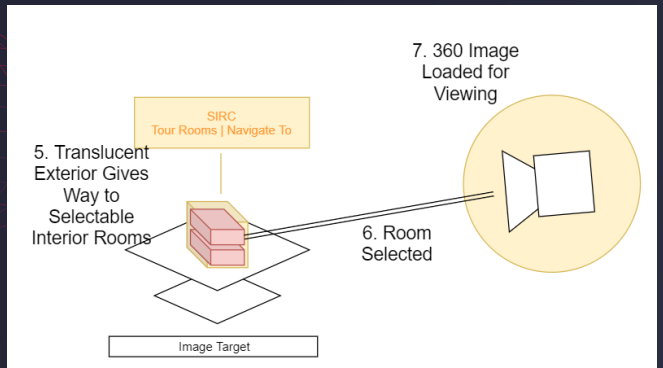
5. University information relevant to our application is held in an external cloud database

AR Maps Demonstration of Building Selection

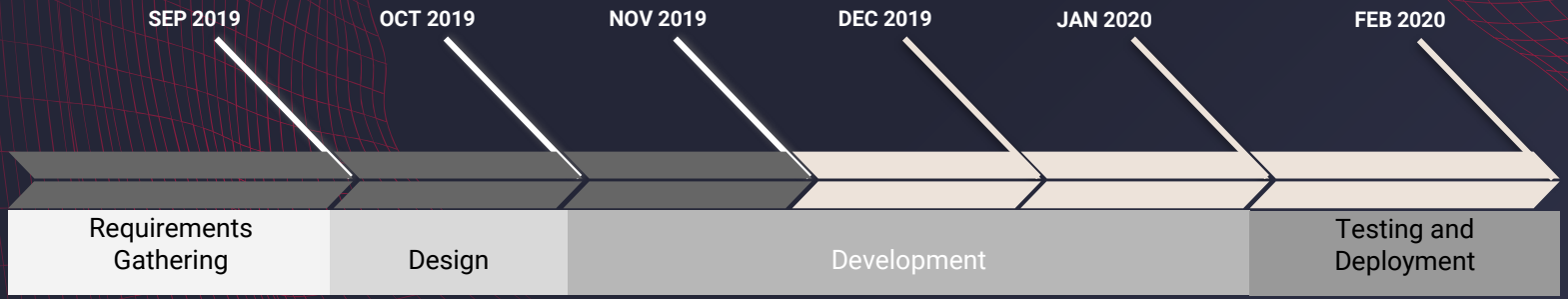
for AR Campus Map View







Project Timeline



Define Project Scope, Background Research and Related Work.

Implementation of the Application Interface and Architecture.

AR Map Visualisation (3D Map Rendering)

3D VR 360 Videos for rooms/hall ways

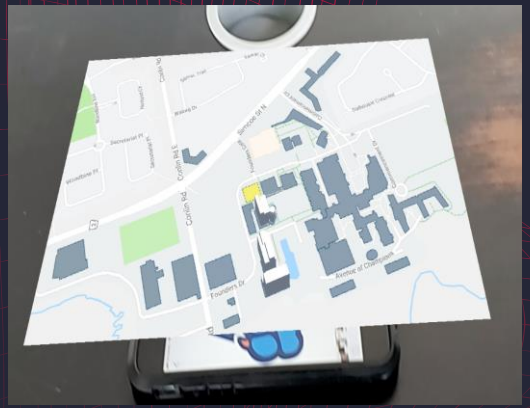
Implement Map Navigation Functionality

Implement Cross Platform Compatibility

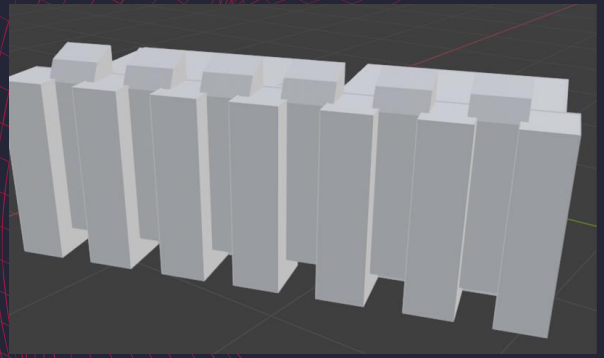
Acceptance Testing of System

Workflow (build versions)

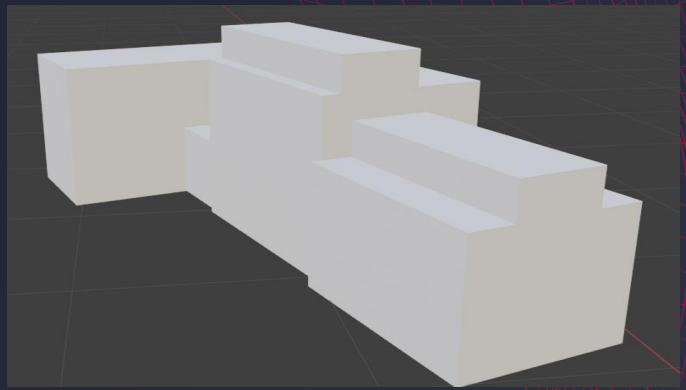
- Iterative development process
- Components are sequentially added to the main build as they are completed



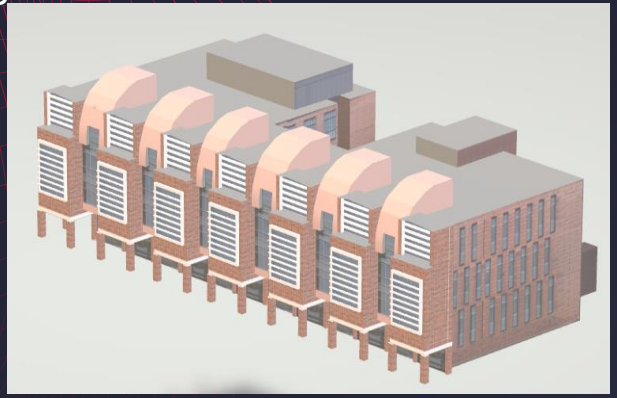
Workflow (3D Asset Creation)



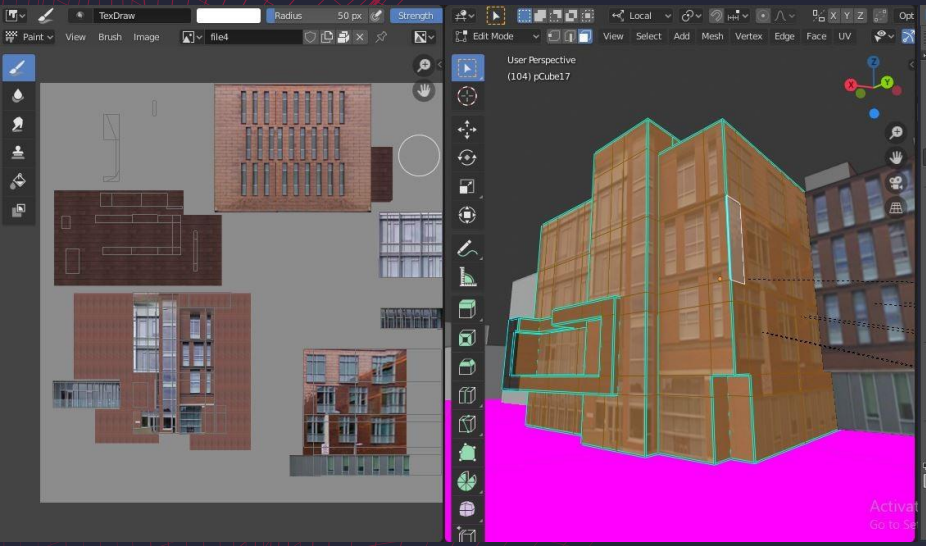
UB Building



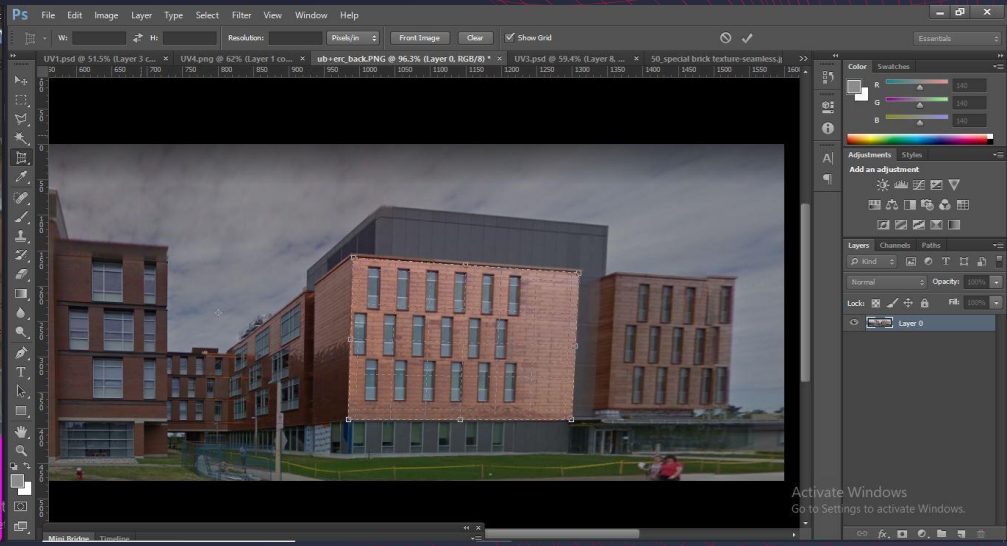
ENG Building



Asset Creation (Steps of Change)



Step 1



Step 2

Project cost

Component	Specifications	Cost
360 Camera	Insta 360 one x	CAD $677

Backend

- The creation of the API used to feed Ontario Tech University event information
- Create Admin Interface to allow administrator to modify/create new entries

- Google Firebase as Backend
  - Firestore Database
  - Security Rules
  - Authentication (Google Account)
- REST API Controller
  - Python & Flask
- Front End
  - Datatables JS, Bootstrap, jQuery
- Deployment
  - AWS EC2

Demo