Hololens Hackathon Wiki

Last updated by | Eugene Greene | May 2, 2022 at 4:26 PM EDT

- 2022-05-03 to 2022-05-10
- 3 teams with 4 students, 1 team with 5 students
- Rocscience team (Luca, Sarah)
- 4 Guides (Michael, Jessica, Luke, Eugene)

Contents

Suggested Projects

Scene Viewer

- Preview a set of scenes
- The user can select a scene to view it in detail
  - The initial view of the scene should place it in front of the user, scaled so that everything is visible
  - The user can translate, rotate, and scale the scene with their hands
- The user can switch to a different scene
  - by interacting by hand with a UI widget
  - by looking at a scene in the list and issuing a voice command

QR Code Scene Viewer

- There is a set of scenes, each scene associated with one QR code
- The user can place the printed QR codes in their physical environment
- The user can show or hide a scene at the location of its corresponding QR code
  - by interacting by hand with the QR code
  - by looking at a QR code and issuing a voice command

- The initial view of each scene should place it at the QR code, scaled so that everything is localized to the area around the QR code
- The user can translate, rotate, and scale each scene with their hands

RS3 Results Viewer

- Display a scene consisting of a set of underground volumes
  - Example scene: S:\Eugene\hololens_hackathon\models\raul\rs3.Modelo Numérico Pedro Valenzuela.underground.rooms
  - The initial view of the scene should place it in front of the user, scaled so that everything is visible
  - The user can translate, rotate, and scale the scene with their hands
- The user can change the view of any given volume from geometry, results, or hidden
  - by interacting through a persistent UI widget that lists the volumes
  - by interacting by hand with the volumes
  - by looking at a volume and issuing a voice command

Slide3 Results Viewer

- Display a scene consisting of a surface model
  - Example scene: S:\Eugene\hololens_hackathon\models\riana\dam
  - The initial view of the scene should place it in front of the user, scaled so that everything is visible
  - The user can translate, rotate, and scale the scene with their hands
- The user can switch among the following entities
  - the failure volume geometry
  - the contoured failure volume
  - the safety map
  - an elevation map
- If the failure volume is visible, the user can drag the failure volume up or down
  - by interacting through a persistent UI widget
  - by interacting by hand with the volume
  - by looking at the volume and issuing a voice command

Rock Dropper

- Display a scene with a slope or pit
  - Example scene: S:\Eugene\hololens_hackathon\models\textured_topography\processed.Cumba_M3_191111_crop2_obj_25k_exported.image_filled
  - The initial view of the scene should place it in front of the user, scaled so that everything is visible
  - The user can translate, rotate, and scale the scene with their hands
- Display a container of "rocks"
  - The rocks have randomized shapes, masses, and sizes
- The user can pick up a rock, and either
  - let it go
  - throw it

- The rock will then realistically fall and interact with the slope and the other rocks
  - If the rock falls out of the slope, it appears back in the container
  - Otherwise, the rock remains where it is on the slope, until interacted with by the user or another rock
- The user can place a rock back into the container
  - by interacting by hand with the rock
  - by looking at a rock and issuing a voice command

Evaluation Criteria

There will be two opportunities for teams to win some prize money (one team can win both). One prize will be awarded by a small panel of impartial judges, and the other will be selected by a Rocscience wide vote. Teams will have the chance to explain their projects to the judges, and walk them through the experience they created. For the "crowd favorite" round of judging we will be leaving the HoloLens' out for a day or so and let anyone who wants come by and try them out. Teams will be allowed a one page write up to explain their project, but otherwise cannot provide input during the crowd favorite judging.

In general the criteria used in judging will be based on the following:

- ease of use
  - target audience likely has no experience using AR and limited time to learn
  - in general how easy is it for a novice user to interact with the application
  - how well can you guide a user through the experience
- wow factor
  - we want to draw people in with a really cool experience
  - how well can you leverage the hololens' capabilities to create an engaging experience
- tie in with existing products/features
  - we want this to be a segue into our other products features
  - how well can you demonstrate the capabilities of our other products

Models

NOTE: Please keep these inside Rocscience.

- Simple pit geometry: S:\Eugene\hololens_hackathon\models\raul\slide3.Slide-3-21102021-Julio_Atuesta.pit.surfaces
- Dam with results: S:\Eugene\hololens_hackathon\models\riana\dam
- Pit with results: S:\Eugene\hololens_hackathon\models\riana\sections
- Simple underground excavations with results: S:\Eugene\hololens_hackathon\models\raul\rs3.Modelo Numérico Pedro Valenzuela.underground.rooms
- Complicated underground excavation with results: S:\Eugene\hololens_hackathon\models\reginald\rs3.underground.stopes.tunnels
- Textured quarry: S:\Eugene\hololens_hackathon\models\textured_topography\processed.BoyaQuarry_crop_obj_75k.translat

ed.exported.image_filled_smoothed

- Textured pit: S:\Eugene\hololens_hackathon\models\textured_topography\processed.Cumba_M3_191111_crop2_obj_25k_exported.image_filled

You can open the RS3 and Slide3 projects using the builds at

- S:\Eugene\hololens_hackathon\rs3.hackathon_build
- S:\Eugene\hololens_hackathon\slide3.hackathon_build

To export geometry, go to the Geometry menu > Import / Export > Export Geometry.

To export results, go to the Interpret menu > Export Contour Surface, and select the OBJ file format.

Setup

- Visual Studio installation configuration file: S:\Eugene\hololens_hackathon\unreal_dev\install_config.unreal.vsconfig
  - Tested with Visual Studio 2019
- Install the Tools: https://docs.microsoft.com/en-us/windows/mixed-reality/develop/install-the-tools
- Connect via USB / Wifi: https://docs.microsoft.com/en-us/windows/mixed-reality/develop/advanced-concepts/using-the-windows-device-portal

Unreal

- Unreal Engine Download (through Epic Games Launcher): https://docs.unrealengine.com/4.27/en-US/Basics/InstallingUnrealEngine/
  - Tested with Unreal Engine version 4.27.2
- Setting up Unreal Engine: https://docs.microsoft.com/en-us/windows/mixed-reality/develop/unreal/unreal-project-setup
- Unreal Engine Mixed Reality Tutorial: https://docs.microsoft.com/en-us/windows/mixed-reality/develop/unreal/tutorials/unreal-uxt-ch1

Unity

- https://docs.microsoft.com/en-us/learn/modules/learn-mrtk-tutorials/1-1-introduction?ns-enrollment-type=learningpath&ns-enrollment-id=learn.azure.beginner-hololens-2-tutorials
- https://docs.microsoft.com/en-us/learn/modules/learn-mrtk-tutorials/1-3-exercise-configure-unity-for-windows-mixed-reality
- https://docs.microsoft.com/en-us/learn/modules/learn-mrtk-tutorials/1-5-exercise-configure-resources
- https://www.youtube.com/watch?v=mSSVcT2PpKk

Link to download MRTK: https://github.com/microsoft/MixedRealityToolkit-Unity/releases
Link to download Unity: https://unity.com/download#how-get-started

Web

In order to view any webXR content on the Hololens, first ensure that windows on the Hololens (and thus the Edge browser) is up to date.
Here is a good overview of WebXR development on the Hololens:

- https://docs.microsoft.com/en-us/windows/mixed-reality/develop/javascript/webxr-overview

A sample of a Hololens WebXR experience can be found here: S:\Eugene\hololens_hackathon\WebXRSample. To run the sample, simply copy the unzipped root folder to the Hololens (connecting the Hololens to a pc by USB is the easiest way), and open the index file with edge.