Using Augmented Reality to Engage People with Atmospheric Science News

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Augmented Reality

- Technology which enables interactive experiences in the real world, using computer -generated graphics
- AR on smartphones grew in popularity after the release of Pokemon GO
- Applied to education, science, productivity, games, and more

Measure by Apple[1]

Sky Guide by Fifth Star Labs[2]

[1] https://apps.apple.com/us/app/measure/id1383426740
[2] https://apps.apple.com/us/app/sky-guide/id576588894

AR in Education

- "The Effect of AR Applications in the Learning Processes: A Meta-Analysis Study" details how AR can be useful in education
- Visualizing objects and concepts scaled to reality helps with retention of information
- Providing an attractive environment for learning increases engagement
- 95% of American teens own a smartphone[2], so extra tools rarely necessary

Meteo AR by NCAR[1]

[1] https://play.google.com/store/apps/details?id=edu.NCAR.CISL.VETS.MeteoAR&hl=en_US
[2] https://www.pewinternet.org/fact-sheet/mobile/

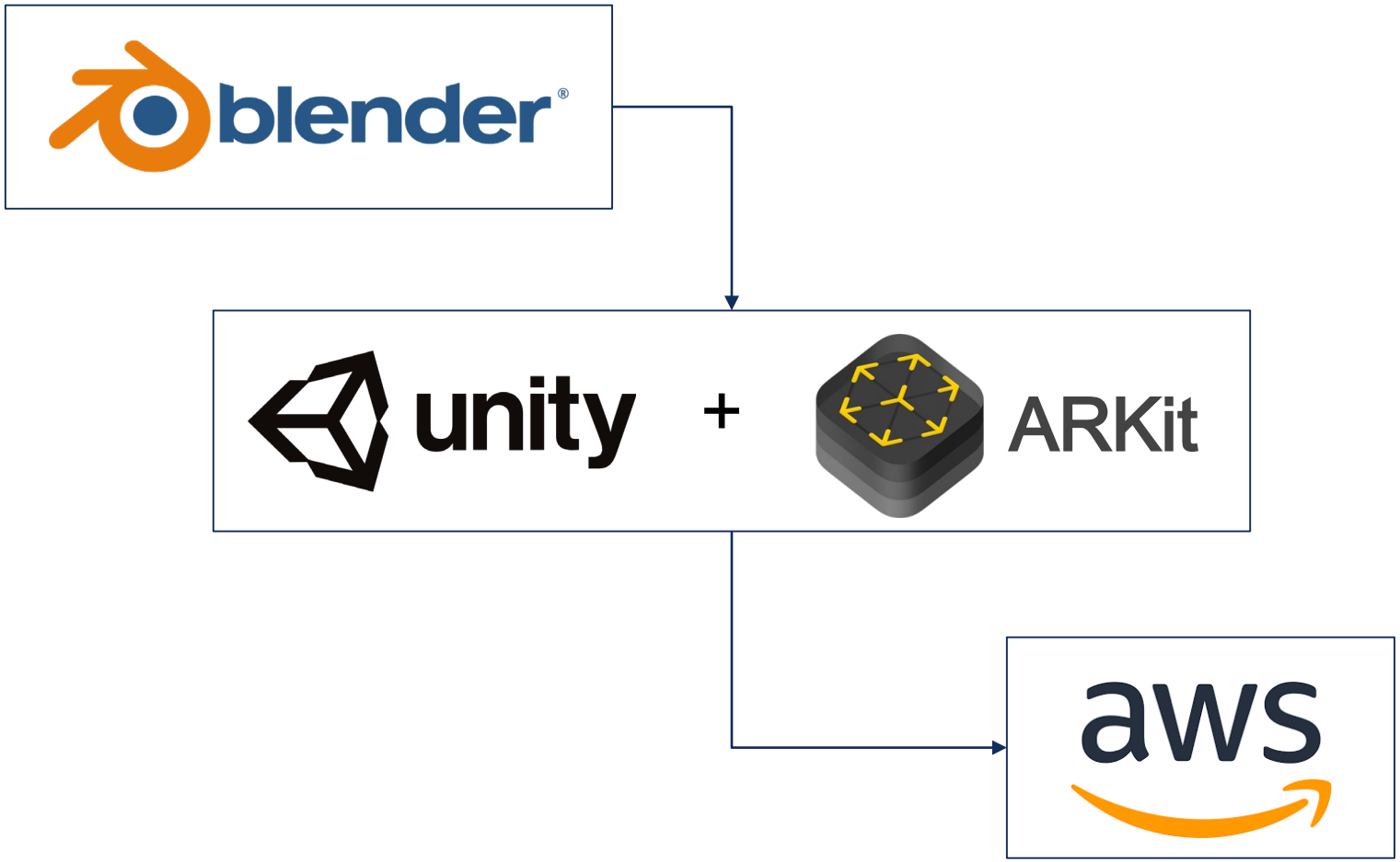
Project Goal

- Design and develop an AR application to present science articles and news features
- Make science articles more engaging to reach a wider audience

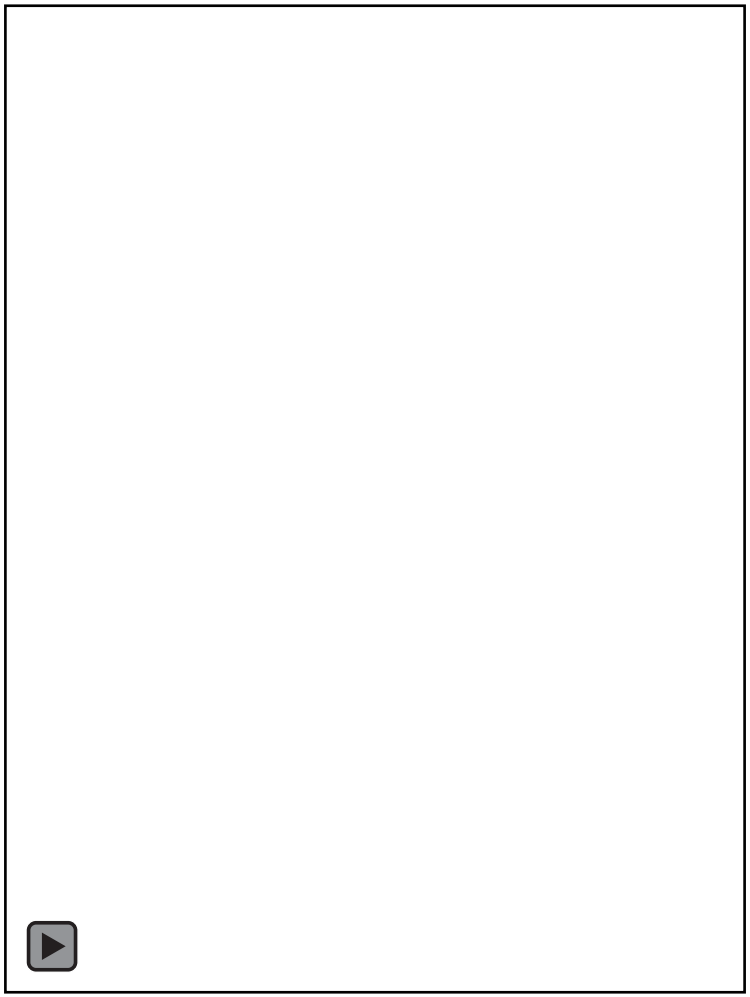
- NCAR's Strategic Goals for Education and Outreach
  - Strategic Goal 1: Inspire, Engage, and Inform the Nation

- 2 main deliverables:
  - iOS application to display AR content – user application
  - desktop application to create AR content – content creator application

Tools & Frameworks



The Application

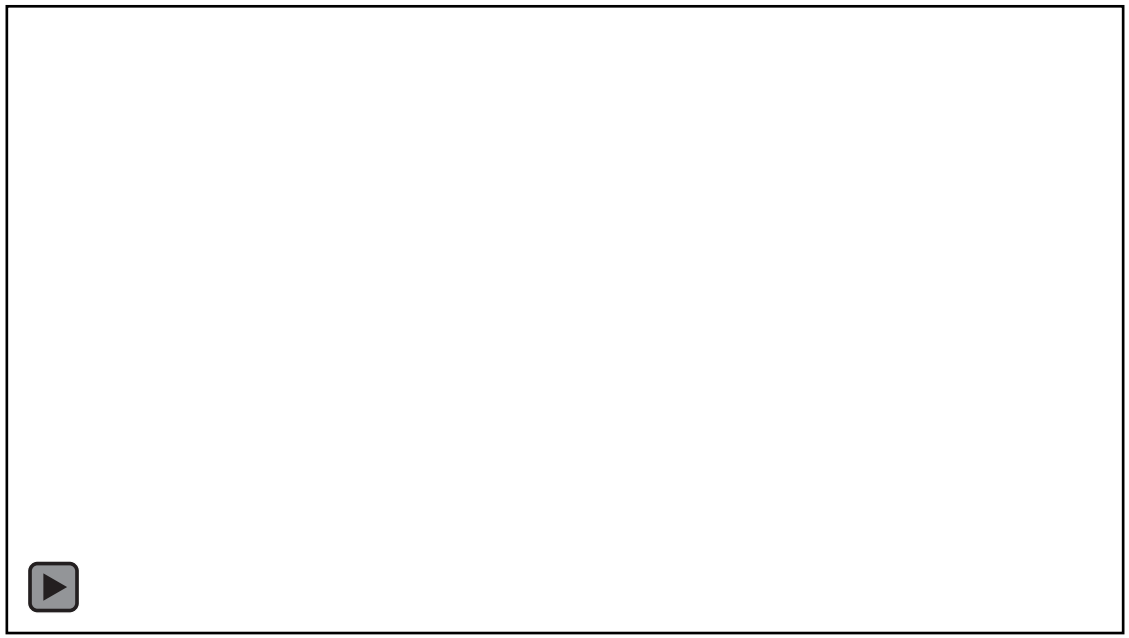


https://www.youtube.com/watch?v=joUqVvM9uc4

SLAM

simultaneous localization and mapping

- an technology which allows an agent to incrementally build a map of its environment while simultaneously determining its location within the map
- used for self-driving cars, drones, planetary rovers, and even Roombas



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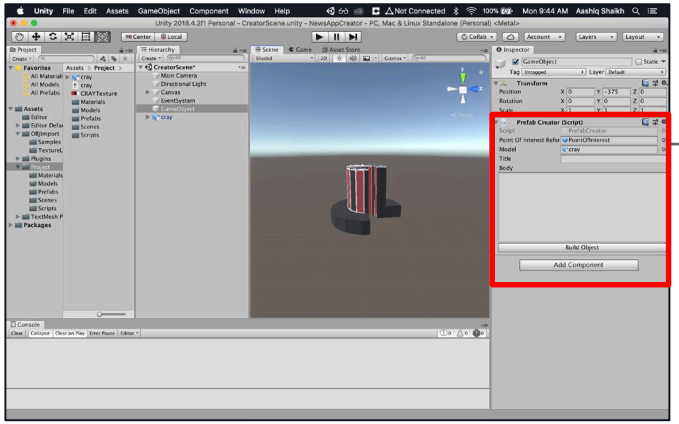
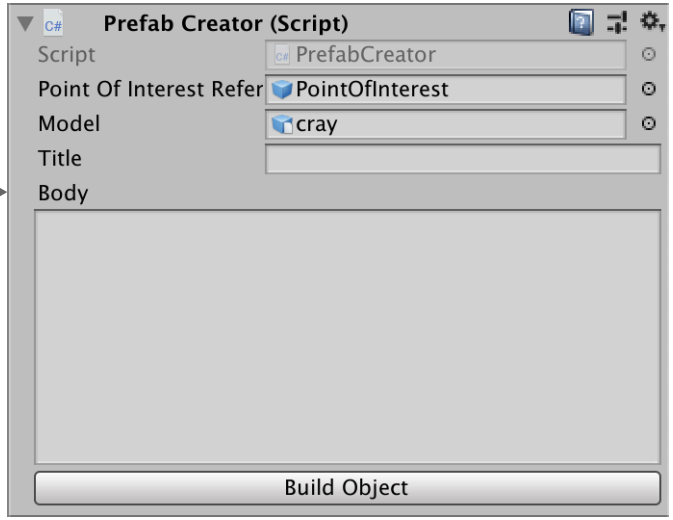
The Extension





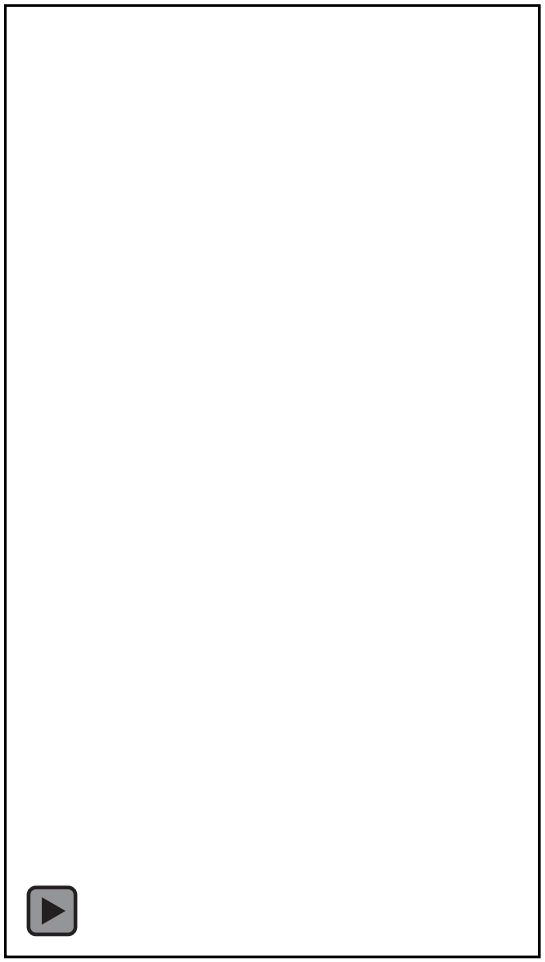
- The content creation desktop application became an extension to the Unity editor

- Easier to maintain, works for multiple operating systems, 3D viewing capabilities already exist

AR Features

- The AR News App is built to accommodate a variety of AR experiences, such as 3D models, simulations, and animations.

- Points of Interest: caption specific parts of a 3D model or animation



User Experience in AR

- Aside from touch input, augmented reality adds the extra dimension of phone movement as an input
- The key to immersive augmented reality experiences is to take advantage of camera movement and rotation and complement with touch gestures

https://www.youtube.com/watch?v=hUTkWxzYmno

AR Quick Look

- On iOS, native apps can view .usdz files without any additional software
- Embedding these files in news articles creates quickly accessible AR content
- Can be used to examine objects at a close view, and see their scale in the real world

https://www.youtube.com/watch?v=3QAY6Pc_3bE

Results

- iOS augmented reality application
  - Designed for users
  - Displays news articles and AR content
  - Allows user to interact with AR content by moving and rotating smartphone, and using touch gestures
  - Dynamically downloads assets from a server
- Unity extension
  - Designed for content creators
  - Previews 3D models
  - Allows content creator to add Points of Interest and simple animation to assets
  - Exports AssetBundles

Future Work

- Publishing user application on the app store
- Finalize end to end workflow for content creators

Possible Future Improvements

- Dynamic Database
- Article Creator application with CRUD functionality
- More accessibility options
- Android version