Professional Certificate in AR-VR Development and 3D Graphics

Summary

Week 10: AR Development: Object Tracking

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Week Overview

Explore the world of Augmented Reality tools

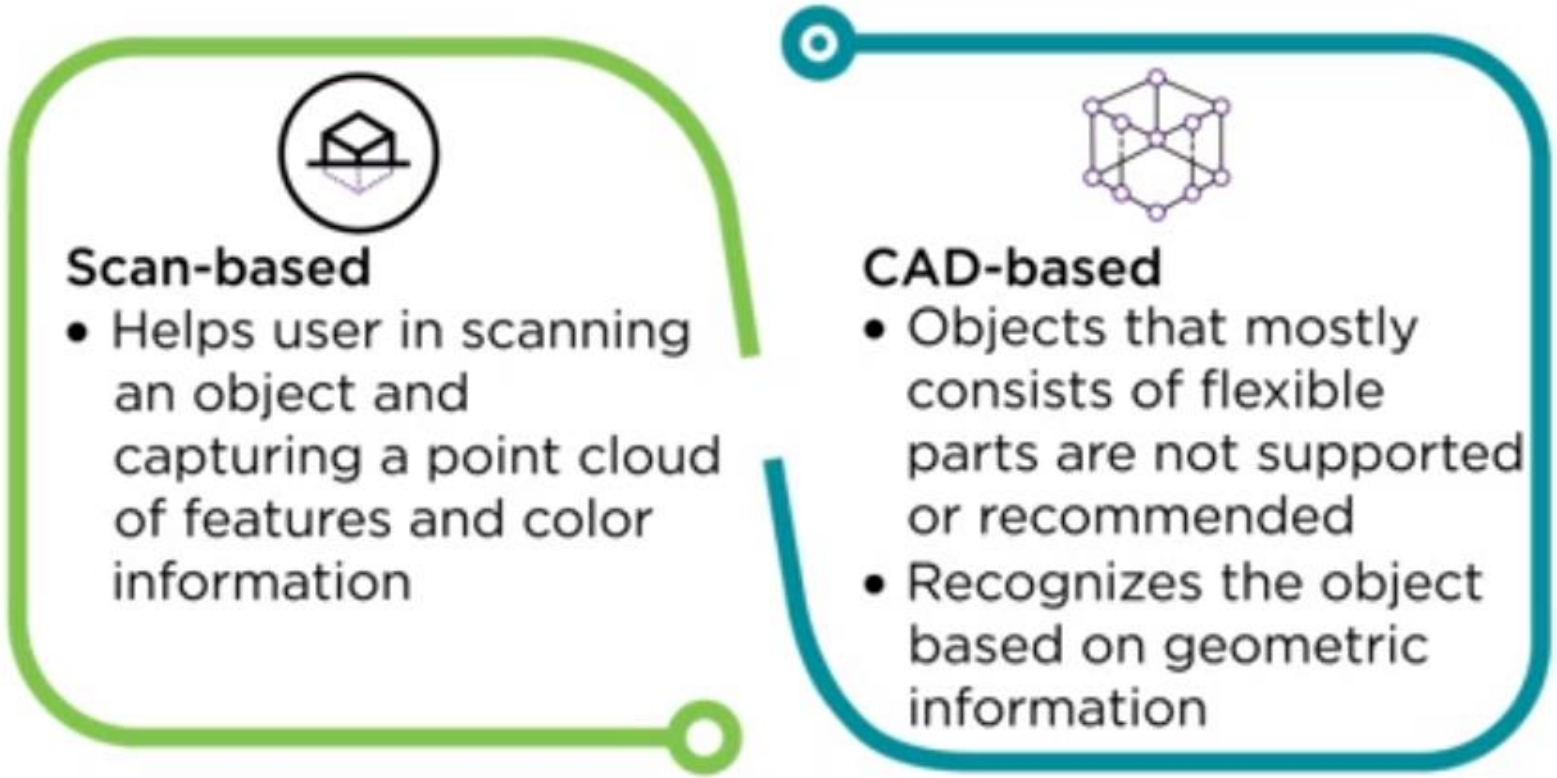
Learn how to use objects as targets

Review the two main methods for object detection in Augmented Reality

Focus on one of the most recent methods to develop an AR experience

Leverage CAD-based model targets to create an augmented object

Technologies for 3D Object Tracking



Scan-based

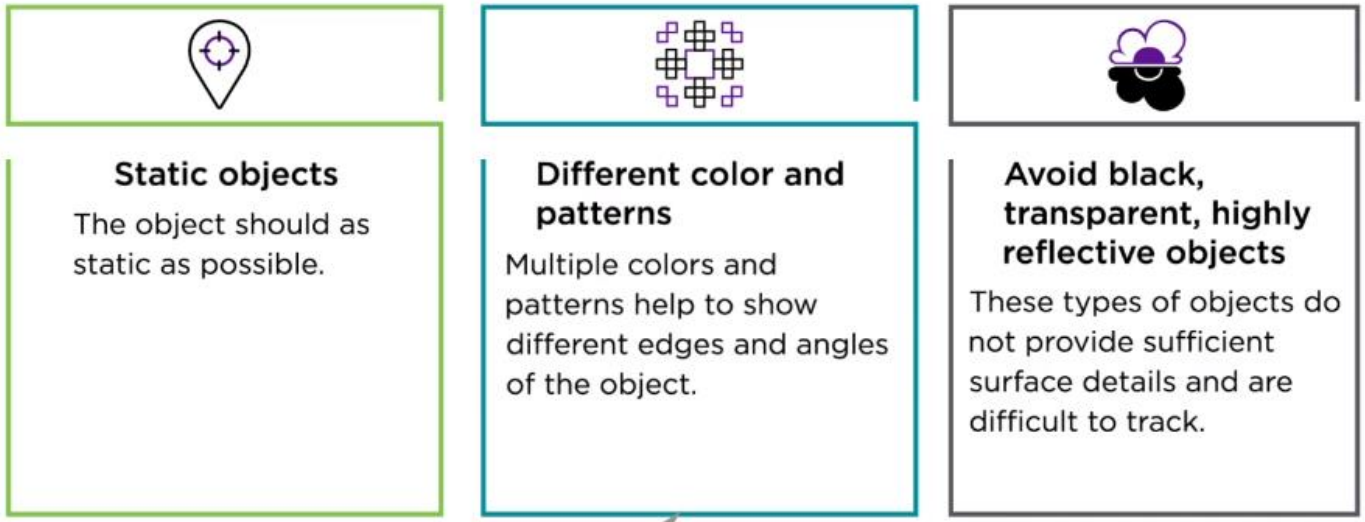
- Helps user in scanning an object and capturing a point cloud of features and color information

CAD-based

- Objects that mostly consists of flexible parts are not supported or recommended
- Recognizes the object based on geometric information

Properties of Physical Objects

For accurate tracking, the physical object should possess the following properties:



Properties of Physical Objects

For accurate tracking, the physical object should possess the following properties:

Sufficient geometric detail

The object should have sufficient sharp edges and bulges.

Asymmetric

Symmetry and repetition can make the object difficult to track.

Rigid and non-flexible

Objects that mostly consist of flexible parts are not supported or recommended.

Matching CAD model

The object should have the exact same shape and size as the 3D CAD model used for target generation.

Best Practices for Tracking 3D Models

Have a maximum of 400,000 polygons or triangles, contain a maximum of ten parts, contain a maximum of five textures, and use a right-hand coordinate system

As like the real object as possible

Compare the loaded CAD model and the real object visually to ensure that there are no missing parts

Have the correct normals on the 3D model, as the incorrect normals will render incorrectly, resulting in bad tracking performance

AR Experience Using a Model Target

- Unity 3D and Vuforia
- Physical object
- 3D digital version of the same object
  - Sufficient geometric detail
  - Rigid and non-flexible
  - Reduce 3D model parts visible to camera
  - Colorize 3D model

AR Experience Using a Model Target

- Use Vuforia's model target generator to create the model target for your astronaut.
- When preparing your own model target, you would need to make sure the model has adequate qualities such as low complexity.

Key Takeaways

1. Techniques used for object detection in AR
2. Determining the best technique for a use case
3. AR technology's affordances and constraints and the perspective of its application in the industry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