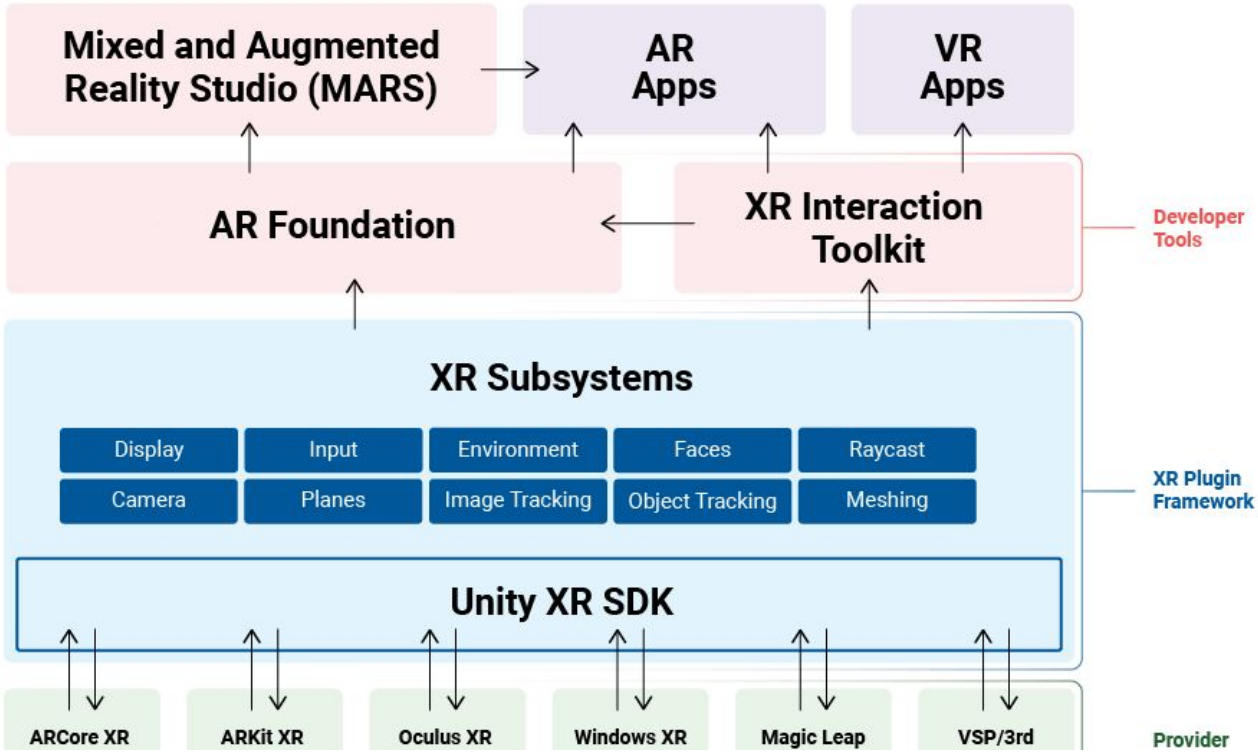
AR Indoor Navigation for SKKU Suwon campus

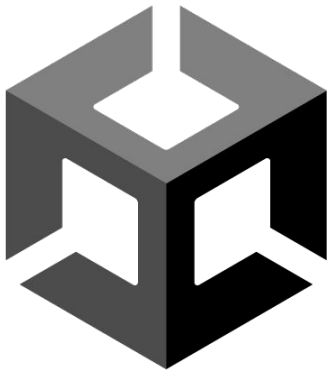
team E: 김현호 마준서 안정민 조민구

AR Environment

AR Environment



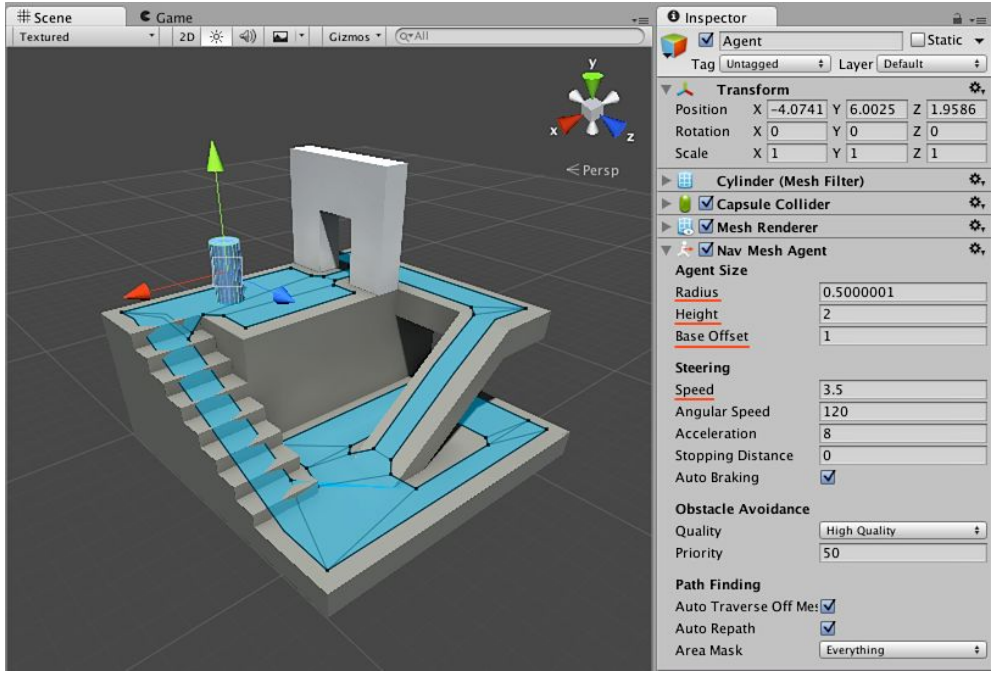
AR Environment



Unity's AR Foundation
Supported Features

Functionality	ARCore	ARKit	Magic Leap	HoloLens
Device tracking	✓	✓	✓	✓
Plane tracking	✓	✓	✓	
Point clouds	✓	✓		
Anchors	✓	✓	✓	✓
Light estimation	✓	✓		
Environment probes	✓	✓		
Face tracking	✓	✓		
Meshing			✓	✓
2D Image tracking	✓	✓		
Raycast	✓	✓	✓	
Pass-through video	✓	✓		
Session management	✓	✓	✓	✓

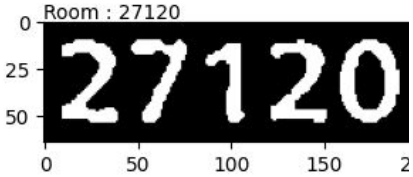
AR Environment



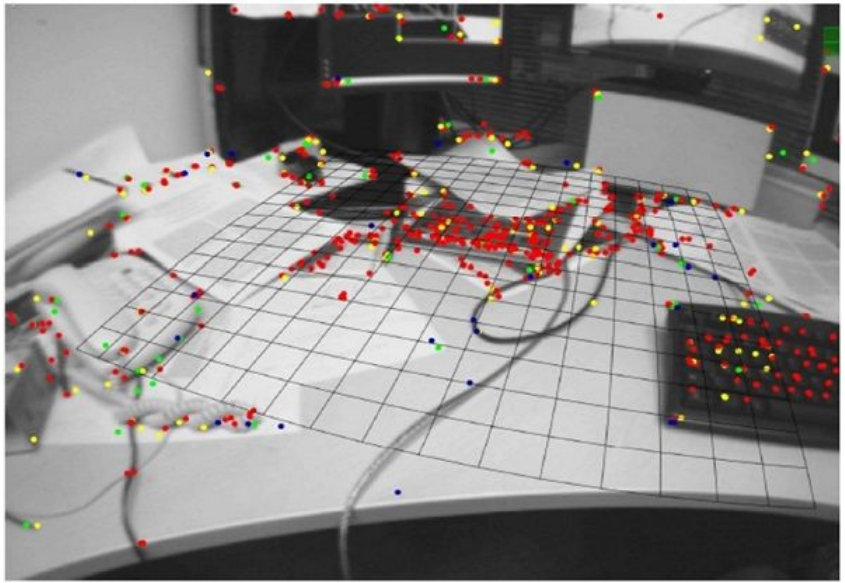
OpenCV × unity

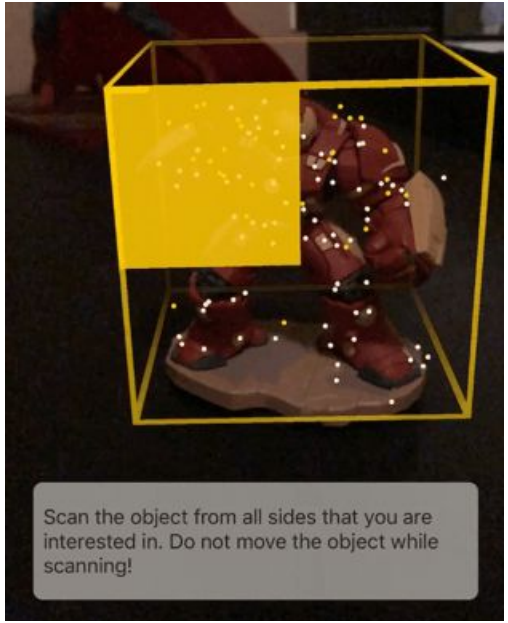
AR Marker Recognition

AR Marker Recognition



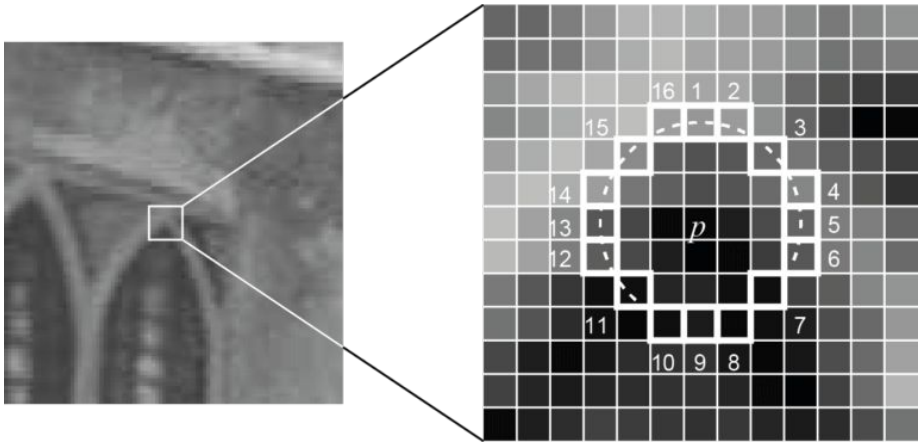
AR Anchor



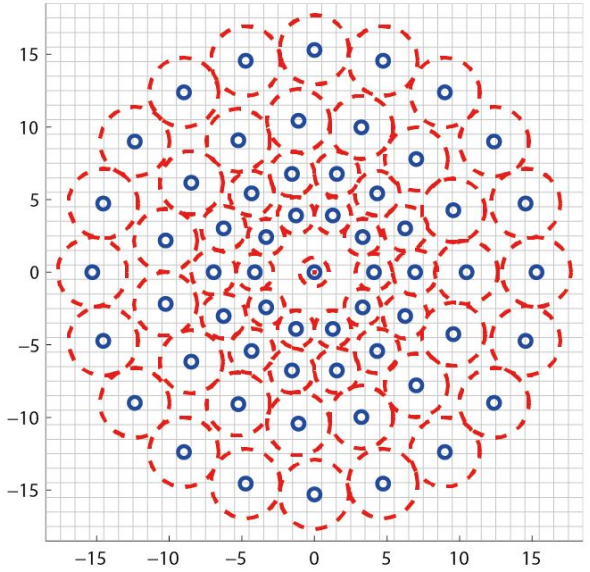


Trends of VR/AR Game Technology(2016)

AR Anchor

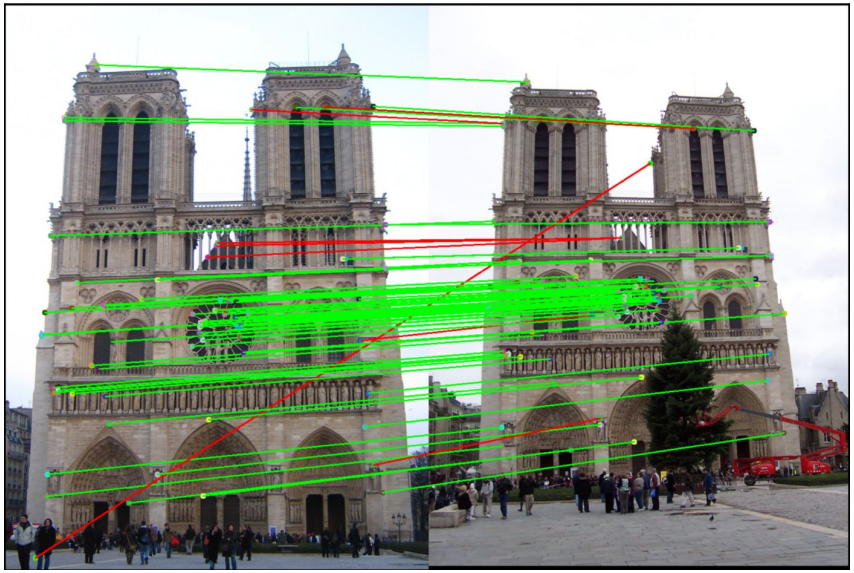


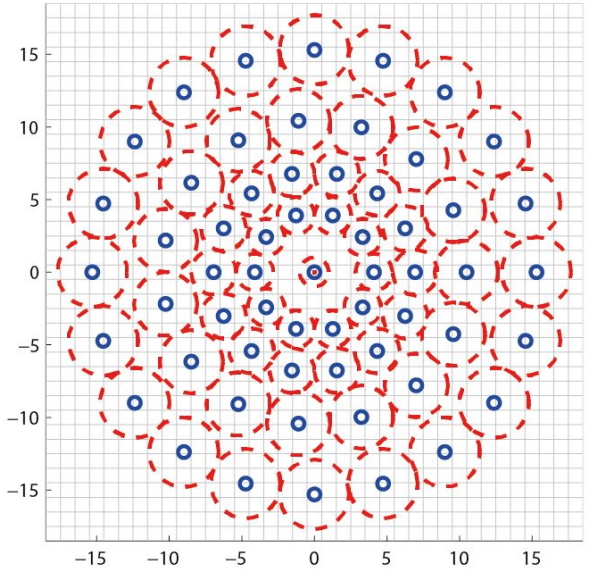
Machine Learning for High-Speed Corner Detection(2006)



BRISK: Binary Robust invariant scalable keypoints(2011)

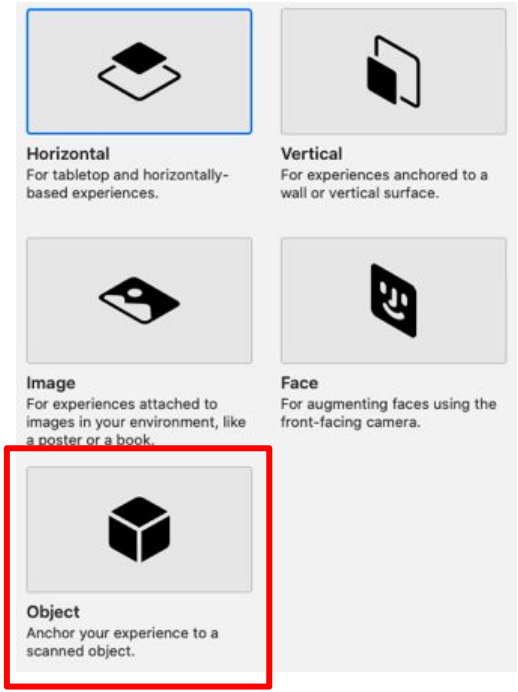
AR Anchor

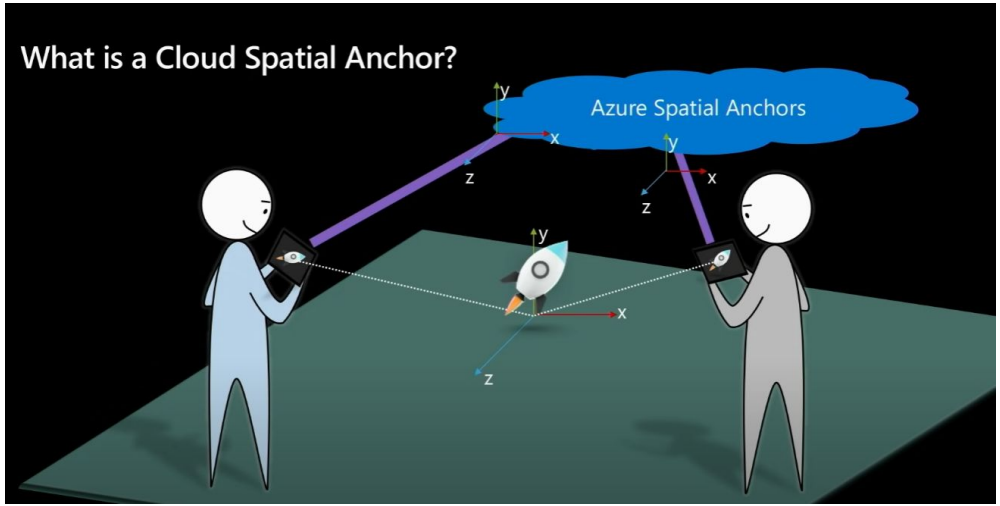




BRISK: Binary Robust invariant scalable keypoints(2011)

AR Anchor


Horizontal
For tabletop and horizontally-based experiences.
Vertical
For experiences anchored to a wall or vertical surface.
Image
For experiences attached to images in your environment, like a poster or a book.
Face
For augmenting faces using the front-facing camera.
Object
Anchor your experience to a scanned object.


What is a Cloud Spatial Anchor?
Azure Spatial Anchors

AR Anchor

$$Z = \sqrt{h^2 + Y^2 + X^2} \quad (1)$$

$$X = Y \times \tan\varphi \quad (2)$$

$$Y = h \times \tan\theta \quad (3)$$

$$\varphi = \left(i - \frac{W}{2}\right) \times \left(\frac{FOV_H}{W}\right) \quad (4)$$

$$\theta = \omega + \left(\frac{H}{2} - j\right) \times \left(\frac{FOV_V}{H}\right) \quad (5)$$

Z: distance between camera and point

h: height of camera

φ: vertical angles

θ: rotation angles

DEPTH AND GEOMETRY FROM A SINGLE 2D IMAGE USING TRIANGULATION. (2012)