

Augmented Reality

“It’s the real world - only better”

Jay Wright, Qualcomm



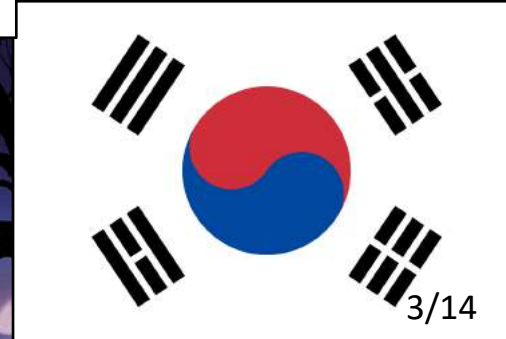
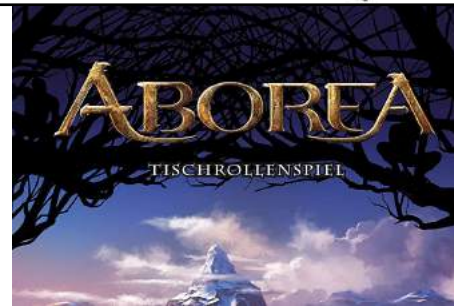
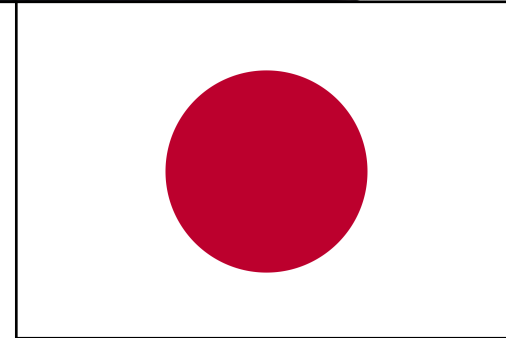
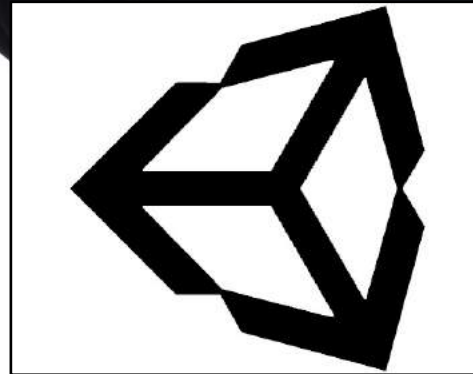
Agenda

- Short introduction
- What is Augmented Reality?
- Types of Augmented Reality
- Use-case examples
- What are the tools?
- **Stop talking and show me how it's done!!!!**

Markus Altenhofer (aka Max)



- working at Dynatrace in Linz
- .NET dev for a about 10 yrs
(focus on Unity for about 4 yrs)
- passionate Martial Artist
(Jiu Jitsu 1.Dan; Taekwondo 7. Kup)
- Pen&Paper RPG lover
- Dogster and cat servant
- Wanderlust (especially to Japan
and South Korea)



What is Augmented Reality?

- Definition of AR (Azuma R., 1997)
 - AR combines virtual reality with reality
 - Allows real-time interaction
 - Three-dimensional reference between real and virtual objects
- *Augmented reality* (AR) is an interactive experience of a real-world environment whereby the objects that reside in the real-world are "*augmented*" by computer-generated perceptual information ... (*Wikipedia*)

What is Augmented Reality?



Milgram and Kishino Virtuality Continuum 1994
(Image: <http://labs.dash.umn.edu/etc-lab/the-virtuality-continuum-for-dummies/>)

- Reality -> The real world
- Augmented Reality -> Real world with augmented information
- Augmented Virtuality -> Virtual world with real world objects
- Virtual Reality -> No interaction with the real world

Types of Augmented Reality



Sensor based AR

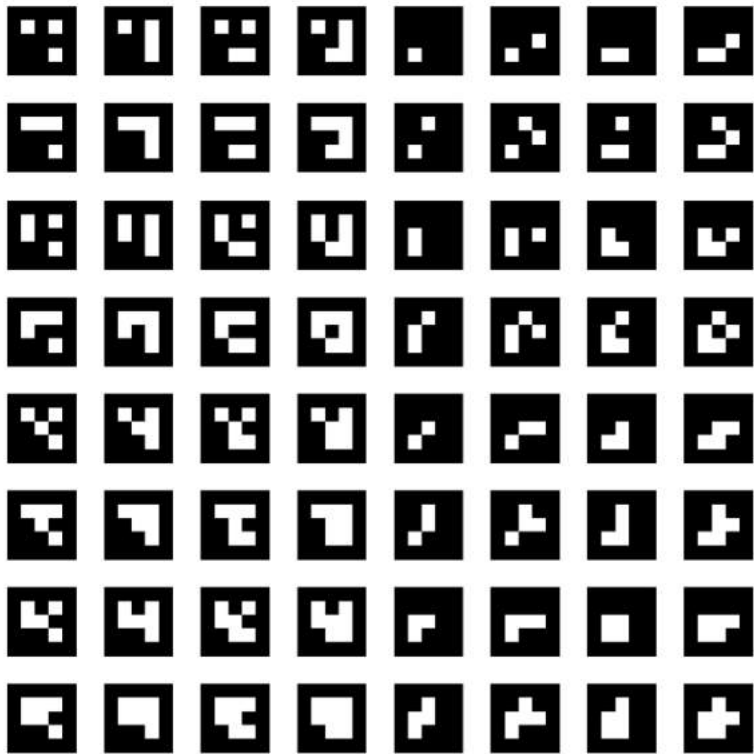
(Image:<http://www.independent.co.uk/artsentertainment/pokemon-go-uk-release-date-and-how-to-get-it-now-on-iphone-and-android-apk-a7127326.html>)



Image based AR

- Marker Tracking
- Natural Feature Tracking

Types of Augmented Reality



(Image: <https://pupil-labs.com/blog/2013-12/pupil-v0-3-6-marker-tracking/>)

Marker Tracking



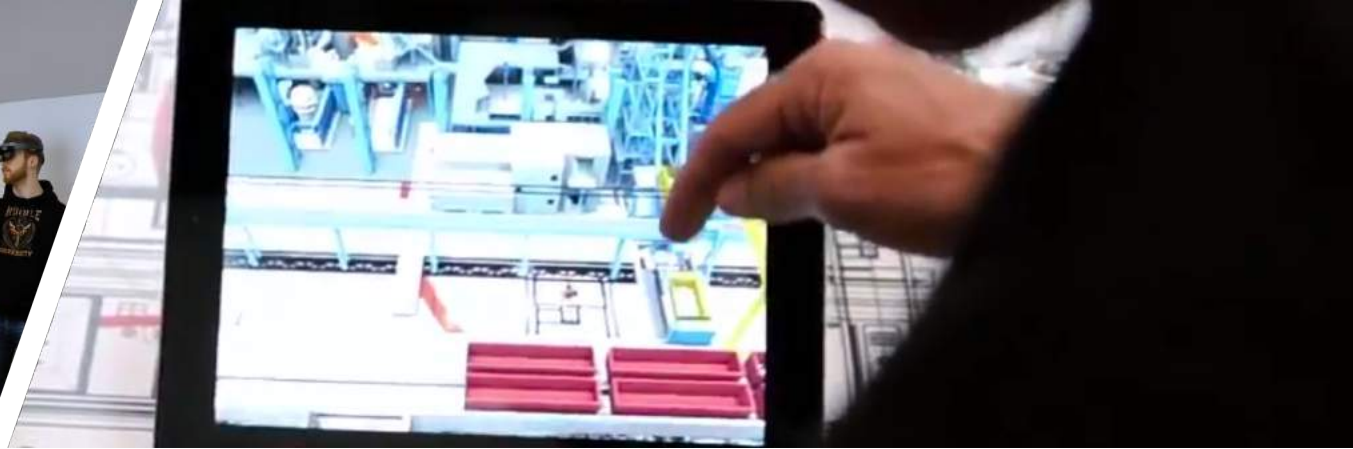
(<https://gamedev.stackexchange.com/questions/16522/object-not-augmenting-on-small-marker>)

Natural Feature Tracking

Types of Augmented Reality



Mixed AR



Use-case examples for AR apps



What tools do we need?



Quick start - What is needed?

- Basic knowledge of C# and 3D math
- Unity Game Engine with Vuforia Augmented Reality support
- opt. external Webcam
- Depending on your target application either
 - Marker
 - 3D Model data
 - ARKit/ARCore supported devices

Quick start - What is needed?



vuforia™



Model Targets

Model Targets allow you to recognize objects by shape using pre-existing 3D models. Place AR content on a wide variety of items like industrial equipment, vehicles, toys and home appliances.



Image Targets

Image Targets are the easiest way to put AR content on flat objects such as magazine pages, trading cards and photographs.



Multi Targets

Multi Targets are for objects with flat surfaces and multiple sides, or that contain multiple images. Product packaging, posters and murals all make great Multi Targets.



Cylinder Targets

Cylinder Targets enable you to place AR content on objects with cylindrical and conical shapes. Soda cans, bottles and tubes with printed designs are great candidates for Cylinder Targets.



Object Targets

Object Targets are created by scanning an object. They are a good option for toys and other products with rich surface details and a consistent shape.



VuMarks

VuMarks allow you to identify and add content to series of objects. They're a great way to add information and content to product lines, inventory and machinery.

Useful links

- <https://docs.unity3d.com/Manual/vuforia-sdk-overview.html>
- <https://library.vuforia.com/articles/Training/getting-started-with-vuforia-in-unity.html>
- <https://www.udacity.com/course/learn-arkit-using-unity--ud114?referrer=unity>
- <https://developers.google.com/ar/develop/unity/quickstart-android>
- https://github.com/Microsoft/MixedRealityToolkit-Unity/tree/mrtk_development



Quick start - Demo AR app