

Workshop: Developing for AR Glasses



Wikitude
www.wikitude.com

The global leader in Augmented Reality

Wikitude Introduction



Markus Eder – Head of Computer Vision

markus.eder@wikitude.com | www.wikitude.com

The global leader in Augmented Reality

Personal Information

- Markus Eder
- Head of Computer Vision @ Wikitude GmbH
 - Since 2011
 - Android Developer
 - SDK
 - Wikitude App



Wikitude GmbH

Founded 2009, Salzburg, AT

Focuses on AR-SDK for Mobile Devices

15+ employees



Wikitude Products

Wikitude SDK



Build your own
Augmented Reality App!
(for developers)

Wikitude Studio



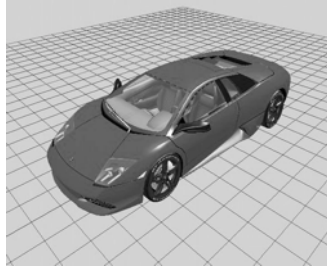
Create, manage, monitor
your AR project!
(also for non-programmers, managers)

Augmented Reality

Common Sample



Target Image



3D Model



3D Model Augmentation



“[...] real-world environment whose elements are *augmented* (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data.”

Wikitude GmbH



40.000+
Registered AR Developers



1000+ Apps



70+ Countries

AR on different types of hardware

AR eyewear

Smartphones

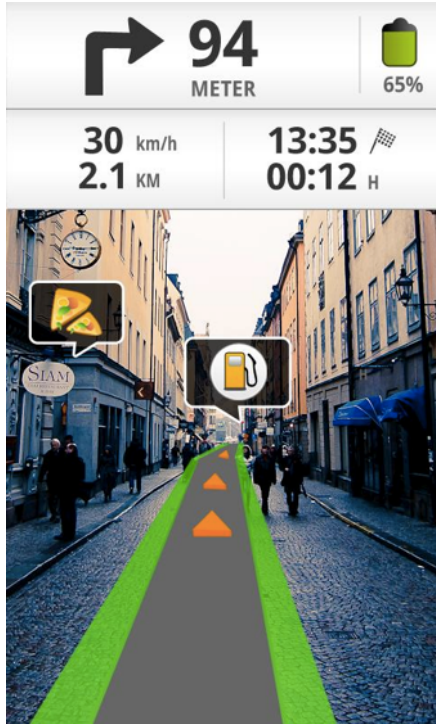
Tablets



... understand what you are looking at



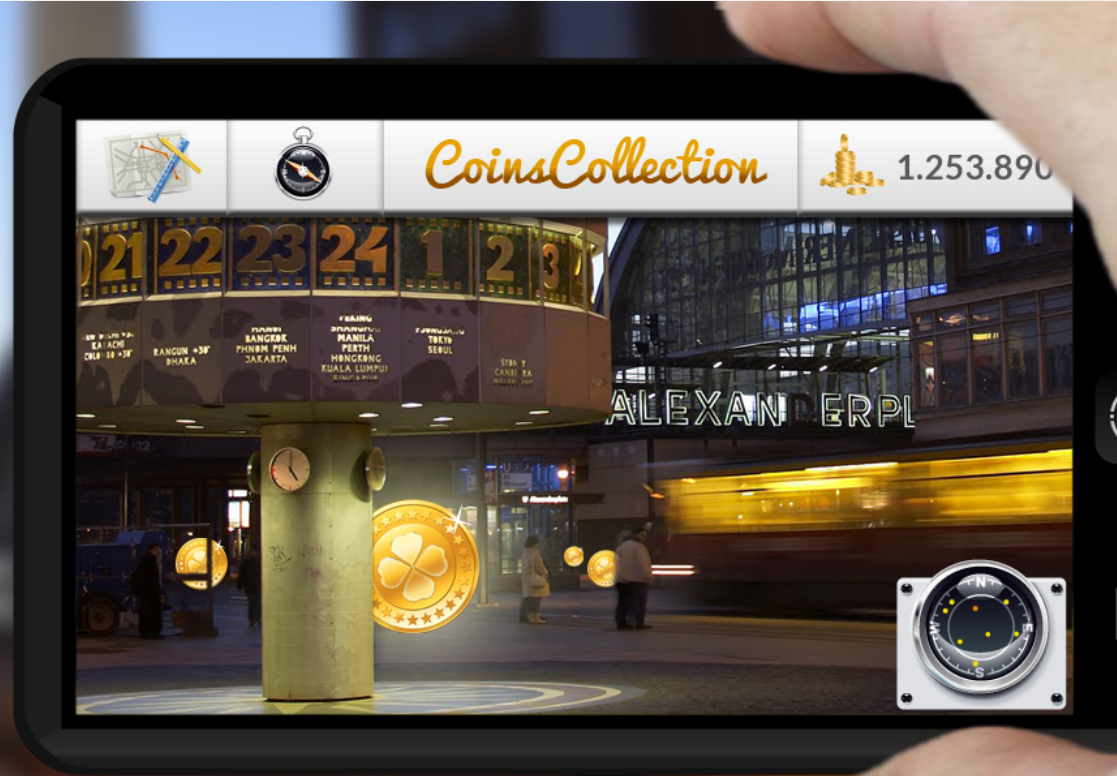
Navigation



... augment print, ads, catalogues, packaging

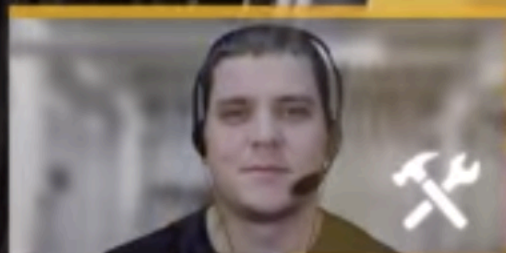


... make the World your playground



... virtually mount products





1 Get Multimeter

2 Set to DC

3 Check batteries

... visualize real estate with 3D models.



Wikitude SDK Tech Stack

AR content presentation
controlled via Javascript
web API



3D rendering
engine

"geo" AR engine



IR & Tracking



+ AR Content
creation through
wikitude Studio



iOS

Future Digital Workplace

- Konica Minolta Video
- <https://www.youtube.com/watch?v=CcZEDLagLyc>

Wikitude SDK Demos

- <https://www.youtube.com/watch?v=z1aeWUVsuKE>
- SDK
- <https://www.youtube.com/watch?v=oJYe49frl6w>
- Zalando Demo

AR Glasses Introduction



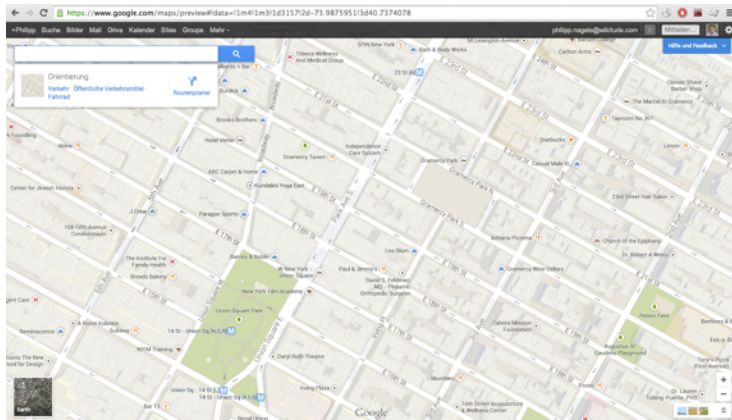
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markus.eder@wiktude.com | www.wiktude.com

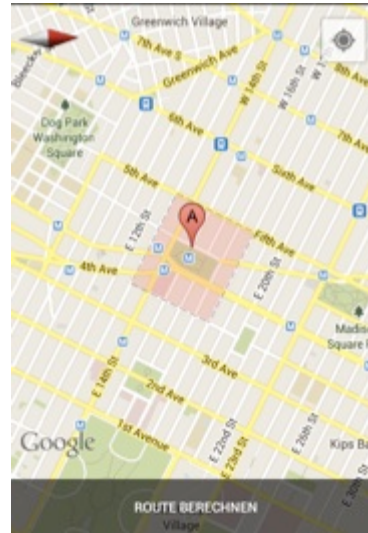
The global leader in Augmented Reality

The other third screen?

Desktop



Mobile

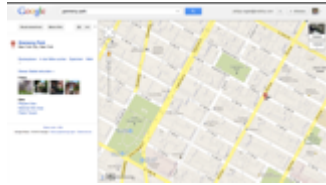


Augmented Reality



The other third screen?

Desktop



Mobile



Augmented Reality



Information
Density



+

Context

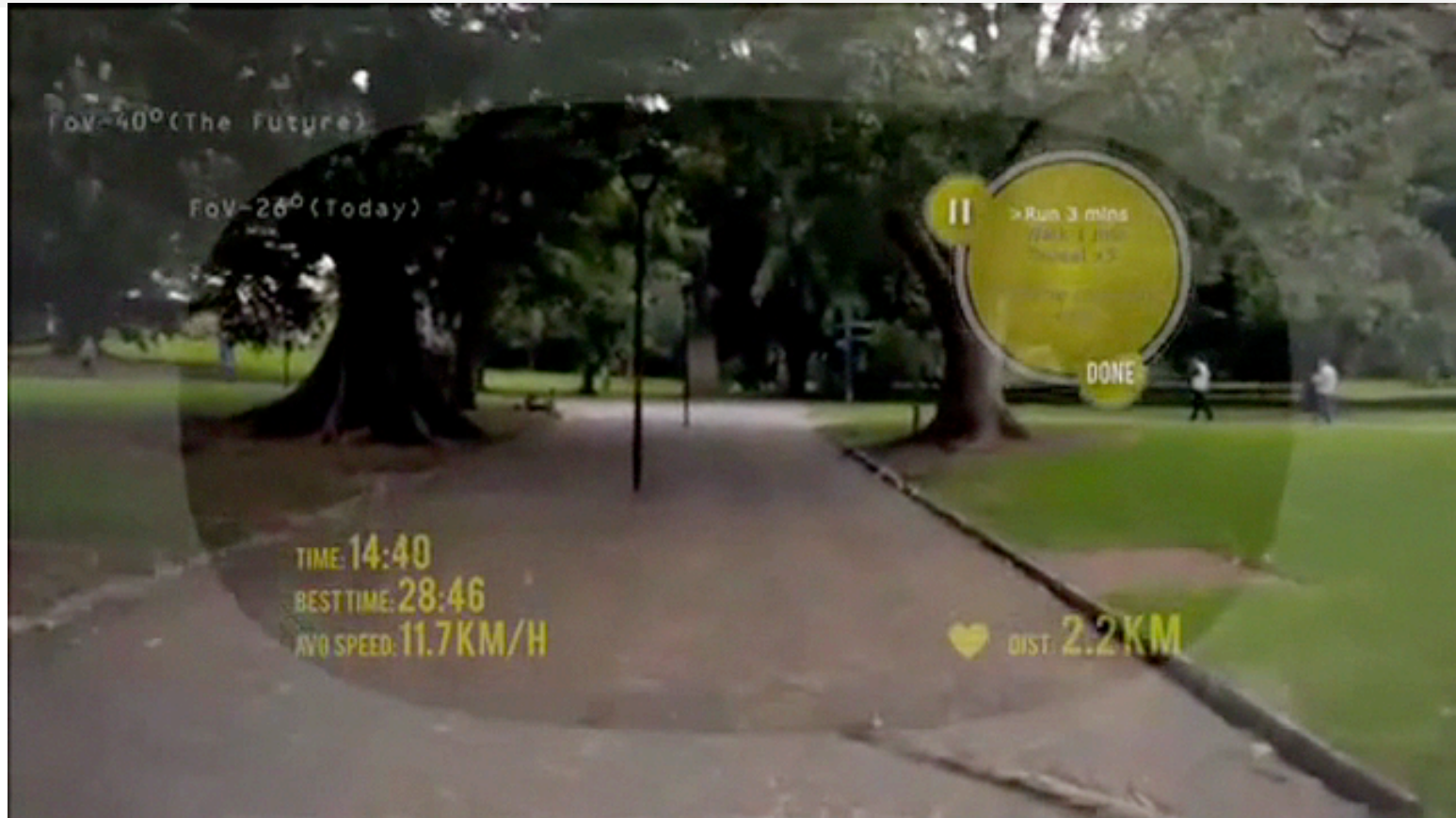


=

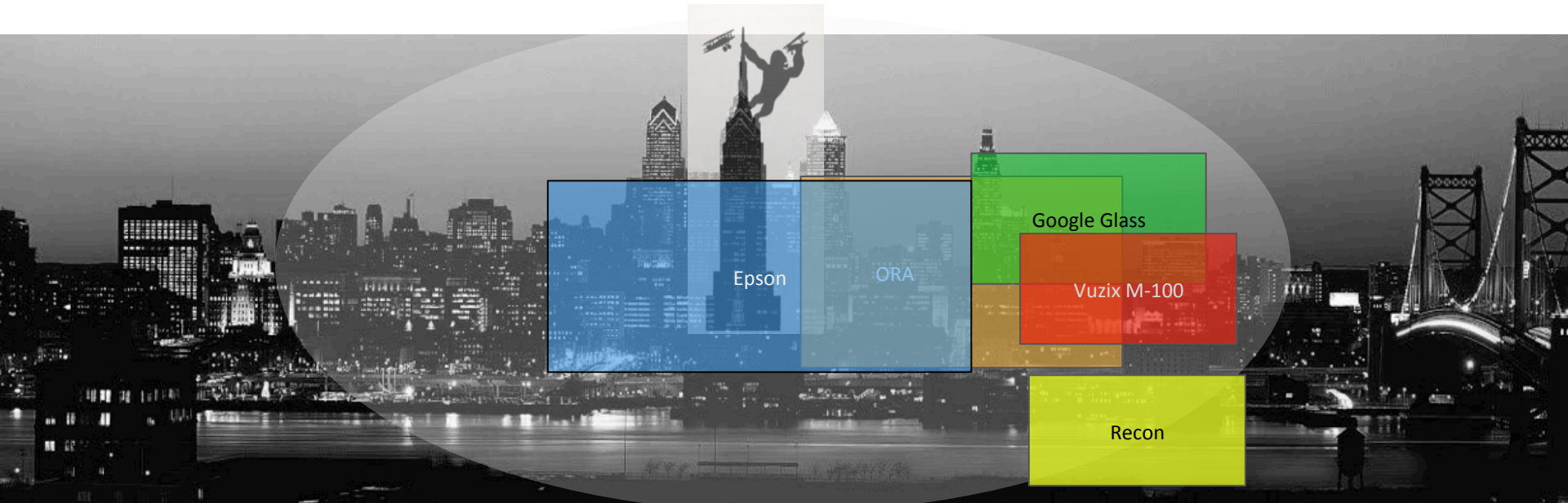
Relevance



User Interface we wish for



What you see (Glasses)



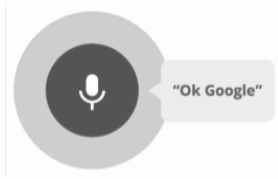
(subjective
experience)

What you see (Smartphone, Tablet)



Eyewear & Interaction

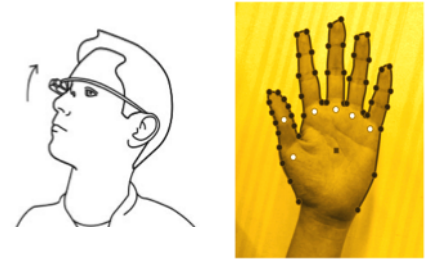
Voice Commands



Controller Unit



Gesture Detection



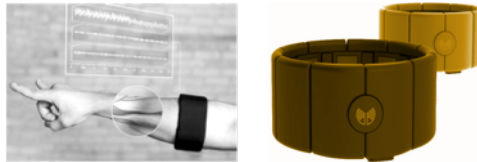
e.g. sensors or hand swipe happens in camera-frame

On Device

Companion App



Gesture Unit

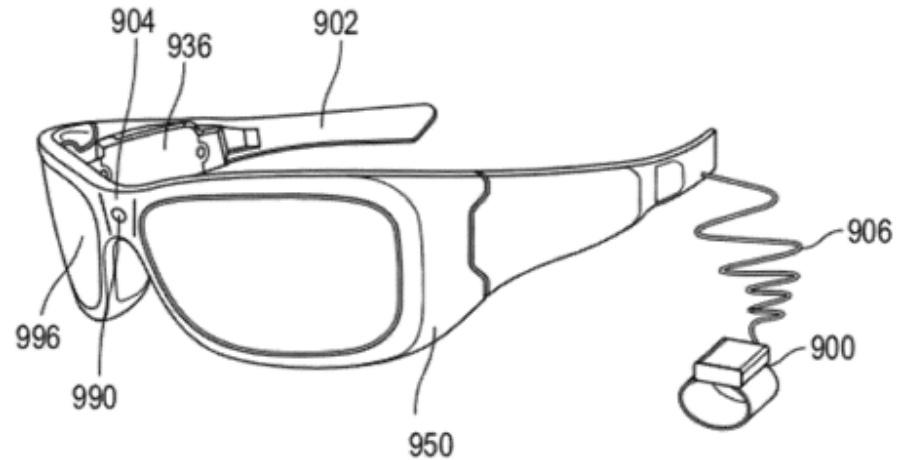


May require additional companion app



Challenges

- Small screen estate
- Always in front of user
- Information density
- How often can you show information
- Limited cursor or not clickable at all
- Minimal battery capacity
- Low CPU power



Developing for Epson Glasses

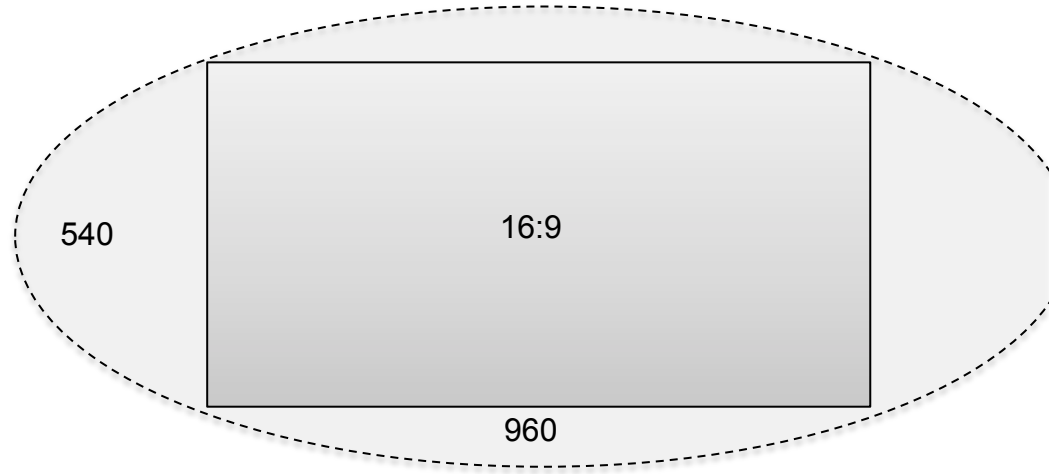


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Features

- Runs Android 4.0
- Binocular see through
- External controller unit
- 3D Stereoscopic view
- GPS built-in



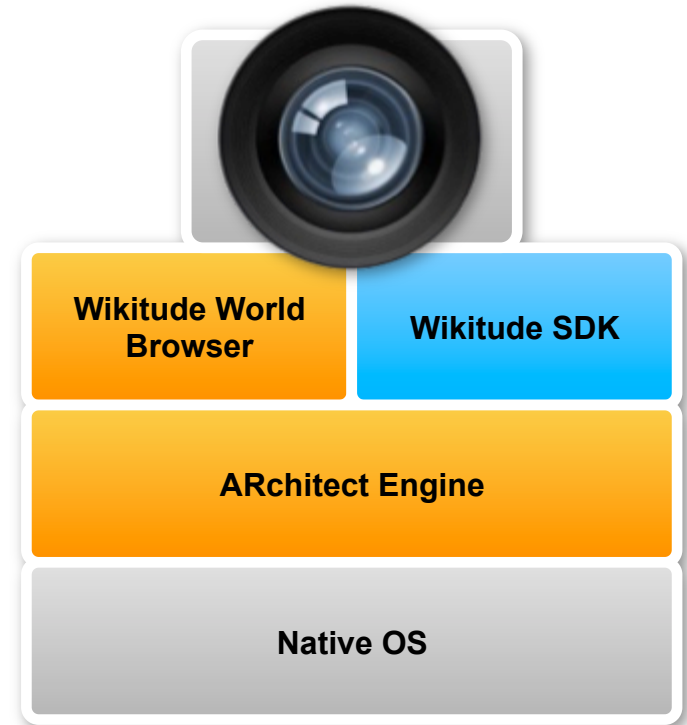
Wikitude Epson SDK

- SDK specifically tailored to Epson Moverio
- Uses Epson specific features
 - 3D Stereoscopic mode
 - GPS, Accelerometer, Compass
- Computer Vision algorithms adapted
 - HW demands
 - Screen Size



Technology Overview

- Wikitude uses **ARchitect** as central platform component for the Wikitude World Browser as well as the SDK for external developers
- Augmented Reality **Rendering Engine** incl. **JavaScript API**
- Content is created using **HTML5, JavaScript and CSS**
- Geo-based and Image Recognition features unified
- Convenience features for easy content creation
- Available for iOS and Android



HTML content creation and AR rendering

Web View

3D Augmented Reality View

Real-time camera image



SDK requirements

- Android
 - Library contained in single jar file
 - Easily added to eclipse project
 - Architect is a simple custom view
 - Interaction with native world
- Requirements
 - Android 2.2
 - OpenGL ES 2.0
 - Sensors (GPS, Compass, Camera)



```
<com.wikitude.architect.ArchitectView android:id="@+id/architectView"  
    android:layout_width="fill_parent" android:layout_height="fill_parent"/>
```

Hello World

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/
loose.dtd">
<html>
<head>

<!-- Important: Let the viewport cover the whole screen -->
<meta name="viewport" content="target-densitydpi=device-dpi, width = 540, user-scalable = 0" />

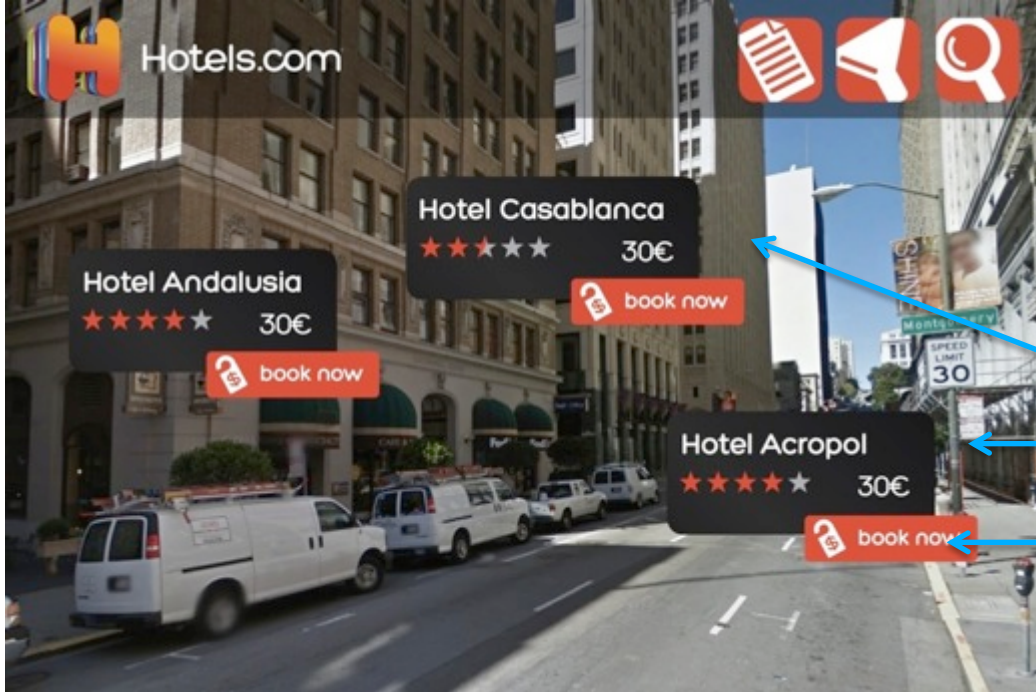
<!-- Include the ARchitect library -->
<script src="architect://architect.js"></script>

<!-- Include the ARchitect Desktop Engine for testing on a desktop browser-->
<script type="text/javascript" src="../ade.js"></script>

<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<title>Hello World</title>
</head>
<body>
<b>Hello World!</b>
</body>
```



GeoObjects & HTML content



Web View

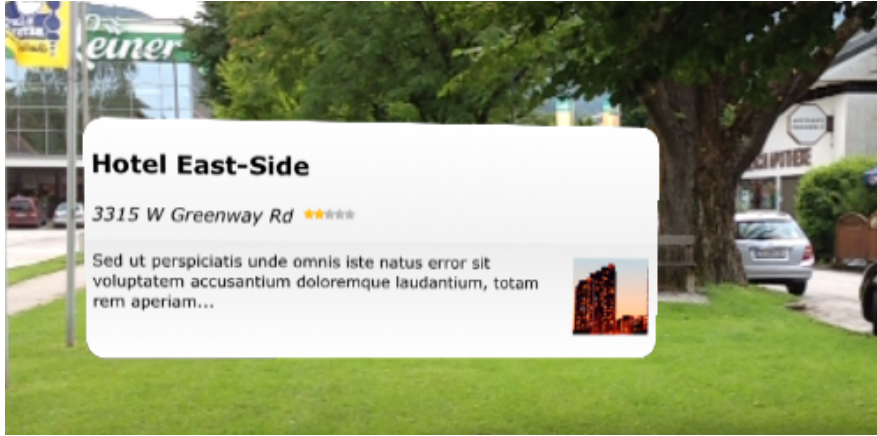
Menu bar
jQuery support

Augmented Reality View

Geo-located POIs

Multiple Drawables
- 3 images
- 3 text labels

HTML Drawables



- Complex visualization of a POI cumbersome
- adding multiple image drawables, label drawables and arrange them
- HTML Drawable renders HTML code as a composite

```
var location = new AR.GeoLocation(47.77317, 13.069929);  
var poiHTMLdrawable = new AR.HtmlDrawable(  
    {uri:"myHotel.html"}, 4);  
var obj = new AR.GeoObject(location,  
    {drawables: {cam: [poiHTMLdrawable]}  
    });
```


Animations



500 animated birds



- Sprite Animations (Key frame images)
- Animation Groups (parallel/sequential)

```
var scaleAnim = new AR.PropertyAnimation(to, 'scaling', 0.0, 1.0, 1000,  
    {type: 'easeOutQuad'},  
    {onFinish: function () { alert('animation finished'); }});
```

Image Recognition



- Augment Targets using SDK Engine capabilities (Drawables, Sounds, Animations)

```
var logoTracker = new AR.Tracker("WikitudeLogo.wtc");  
var image = new AR.ImageResource("overlay.png");  
var overlay = new AR.ImageDrawable(image, 1.0);  
var trackable2DObject = new  
AR.Trackable2DObject(logoTracker, "WikitudeLogo",  
{ drawables: { cam: overlay } });
```

Android Development Hints

- developer.android.com always a good starting point ;-)
 - API demos
 - Tutorials
 - courses
- Look at existing sample code
 - Look at best practices



Project Considerations

- 1 month timeframe
 - Not a lot of time ;-)
- Don't overthink the problem
- Try to keep it simple
 - Focus on actual use case
- Consider device capabilities

Useful links

- developer.android.com
 - Tutorials
 - Courses
- https://moverio.epson.biz/jsp/developer/dev_login.jsp
 - Quick help
- developer.wikitude.com
 - Documentation
 - Forum
- stackoverflow.com
 - Other developers might face similar problems ;-)
- opencv.com
 - Great library for Computer Vision algorithms



Thank you

Contact

Markus Eder, Head of Computer Vision
markus.eder@wikitude.com

We are hiring :-)



wikitude
See more.