

BEAM ME UP

APPLICATION DEVELOPMENT WITH HOLOLENS



Picture of Darth Sidious by <https://www.battlefront.com/news/the-villains-of-star-wars-battlefront-emperor-palpatine>





Intel® Black Belt Software Developer




Intel® Top Software Innovator 2014, 2015, 2016



Oracle® JavaOne Rockstar Award 2015




Martin Förtsch

 @MartinFoertsch

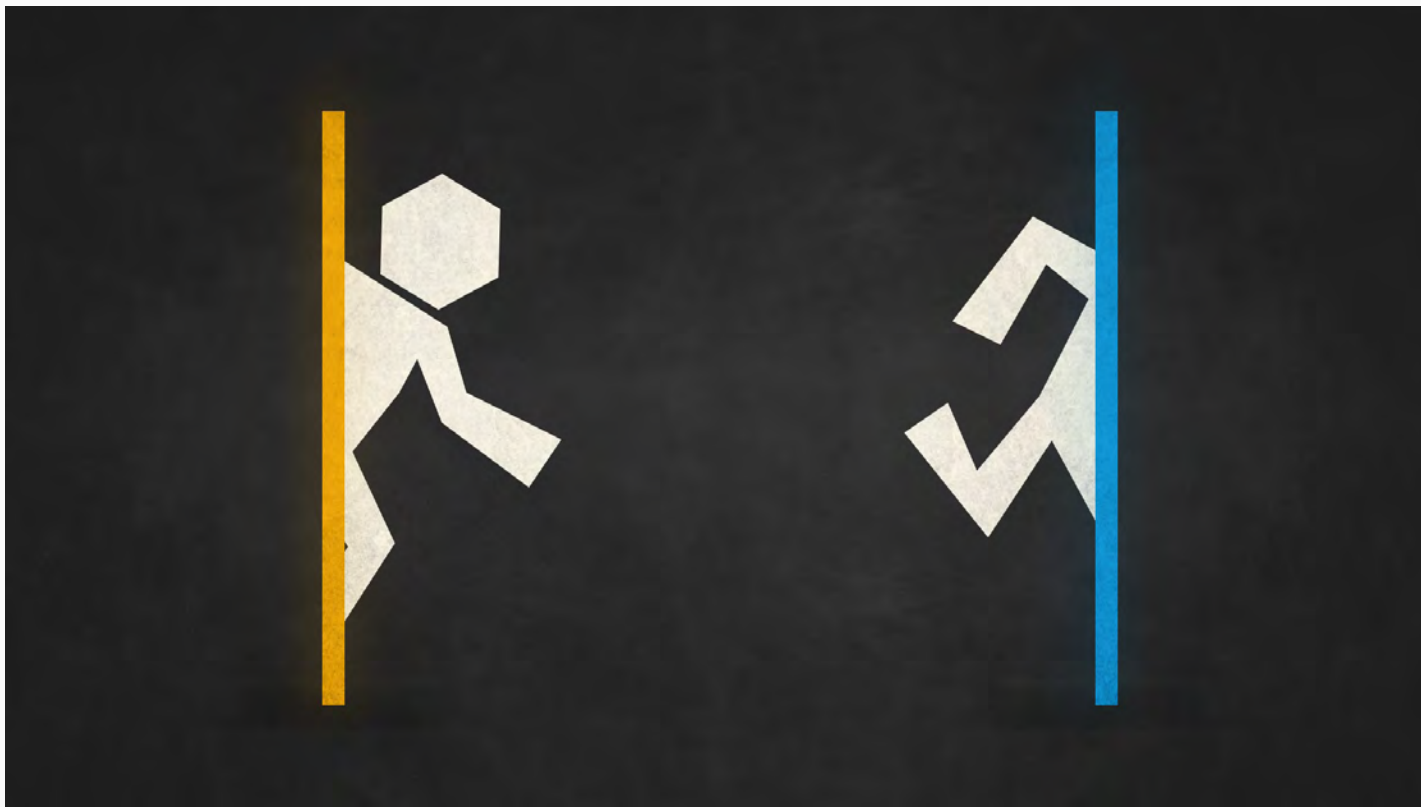
tngtech.com
parrotsonjava.com

Thomas Endres

 @originalone1984

Um was es nicht geht ...

Um Teleportation!



Um was es geht ...

Augmented Reality basierende Telepräsenz



Um was es geht ...

Augmented Reality basierende Telepräsenz



Um was es geht ...

Augmented Reality basierende Telepräsenz





Wie alles begann ...

Augmented Rift (2015)





Wie alles begann ...

Augmented Rift (2015)



Unnützes Wissen

"Beam me up, Scotty!"



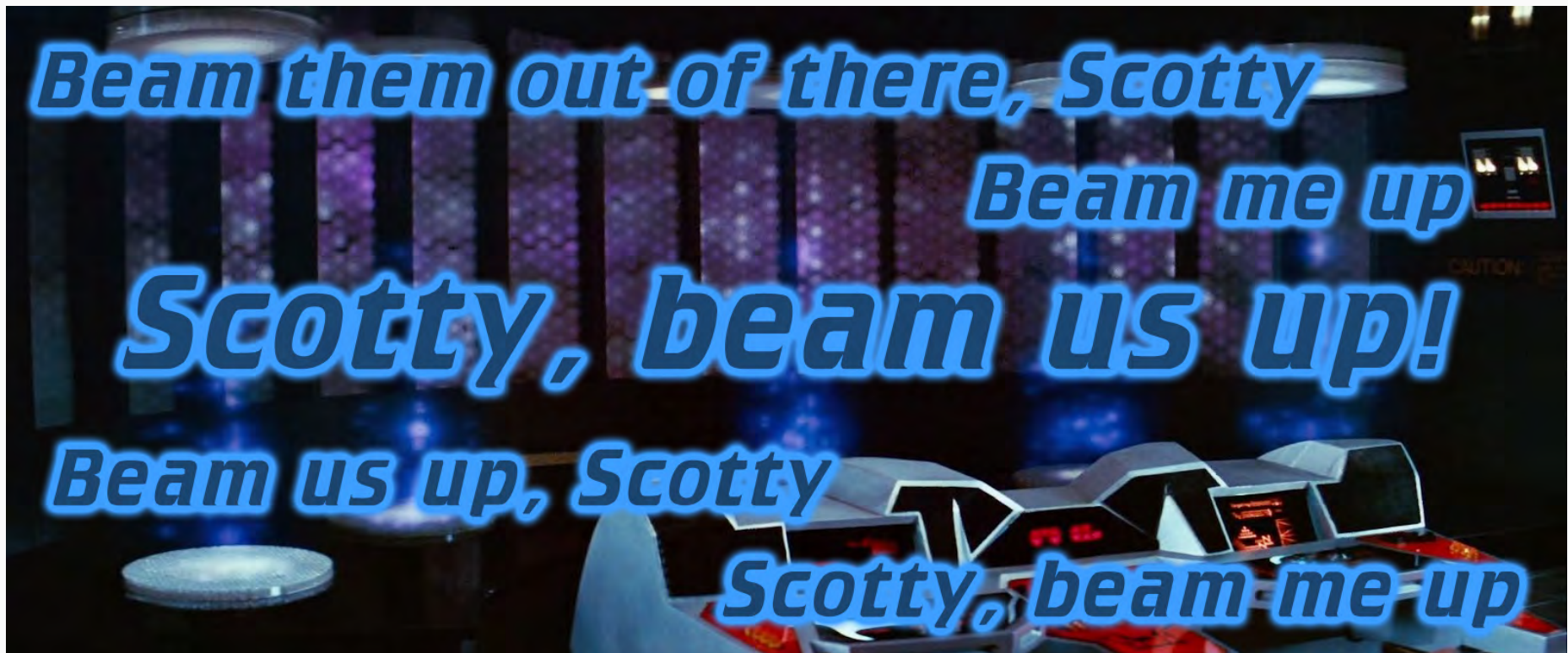
Unnützes Wissen

"Beam me up, Scotty!"



Unnützes Wissen

"Beam me up, Scotty!"





Hardware Hacking Team

TNG Technology Consulting GmbH



Thomas
Endres



Martin
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Thomas
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Florian
Gather



Markus
Spanier



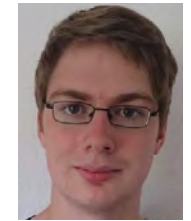
Matthias
Silbernagl



Holger
Frydrich



Tobias
Ramming



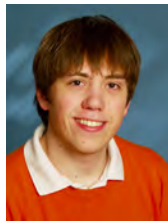
Philipp
Höllmer



Andreas
Greimel



Lukas Rinke



Mathias
Arens



Markus
Schüttler



Johannes
Leimer



Cedric Bodet



Ulf Briskot



Jan
Heidbrink



Stefan
Grafberger

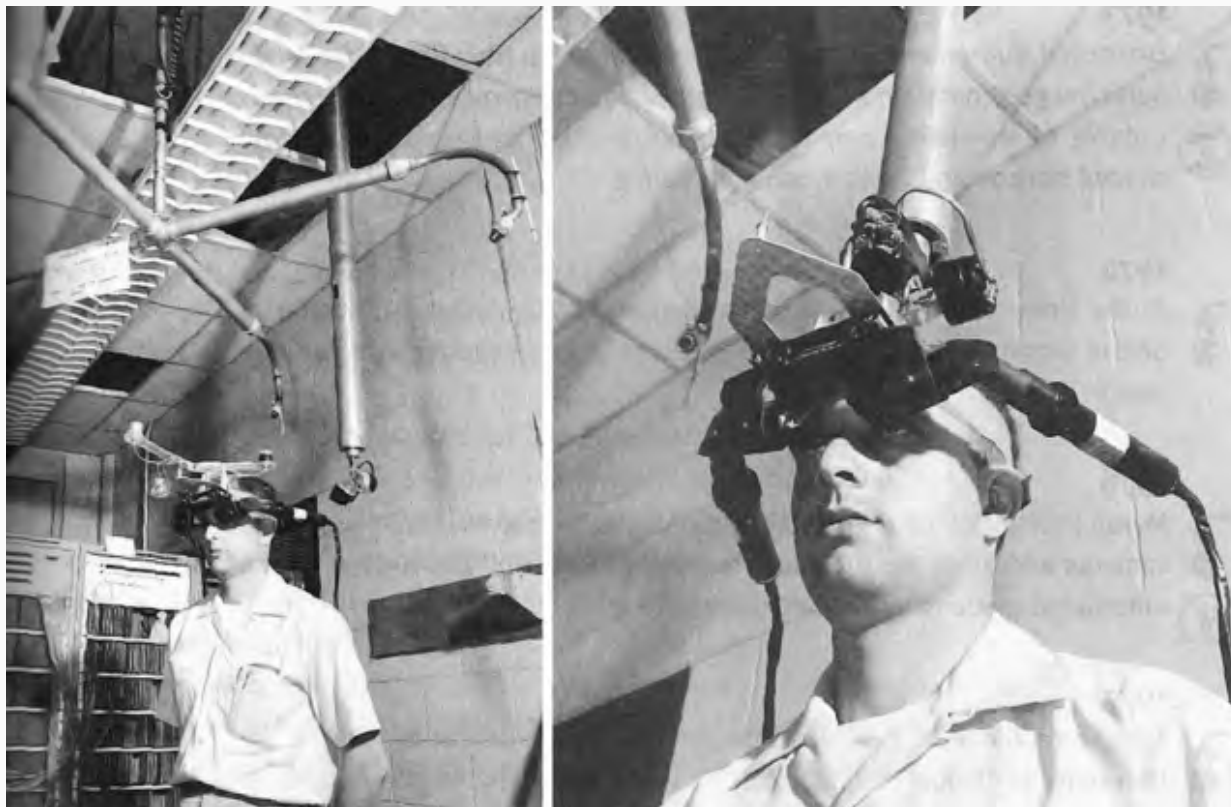


Agenda

- Einführung
- Code & Technologie
- Aktuelle
Anwendungsbeispiele
- Fazit

Einführung

Ivan Sutherland, Sword of Damocles (1965)



Einführung

Ivan Sutherland, Sword of Damocles (1965)





Einführung

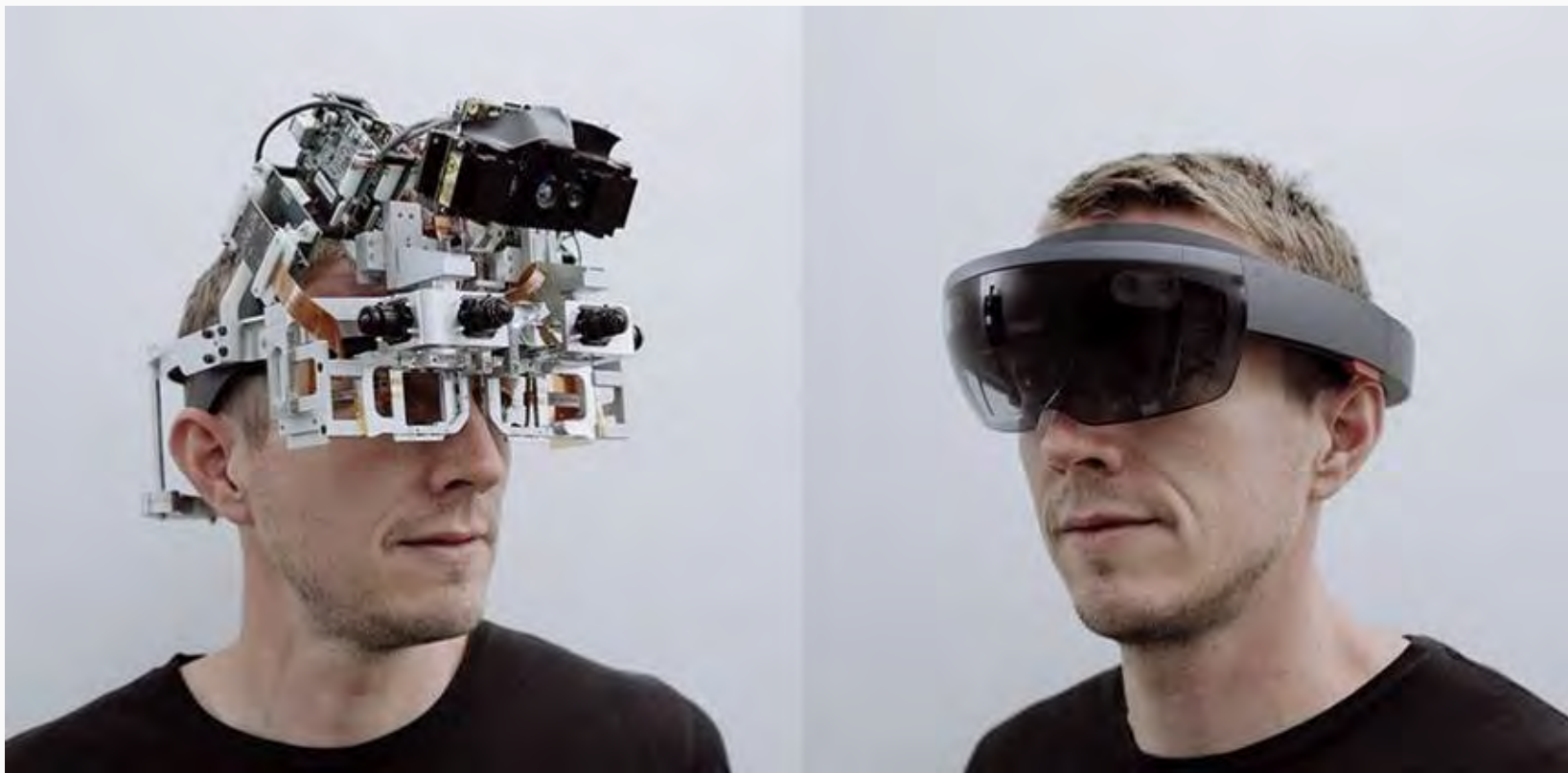
Microsoft Hololens (2015)





Einführung

Microsoft Hololens (2015)





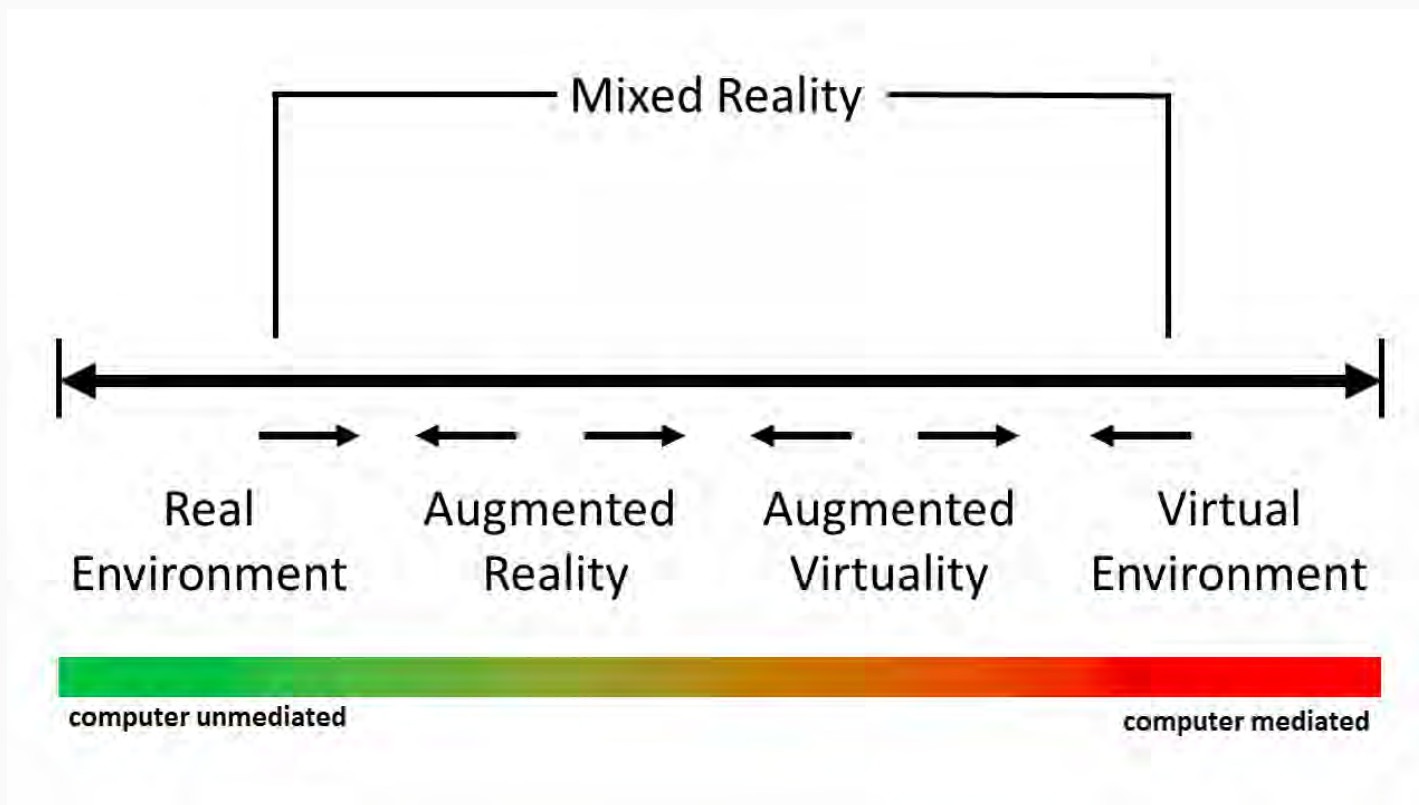
Einführung

Hologramme



Einführung

Realitäts-Virtualitäts-Kontinuum (Milgram, Kishino, 1994)



Einführung

Real Environment



Einführung

Augmented Reality



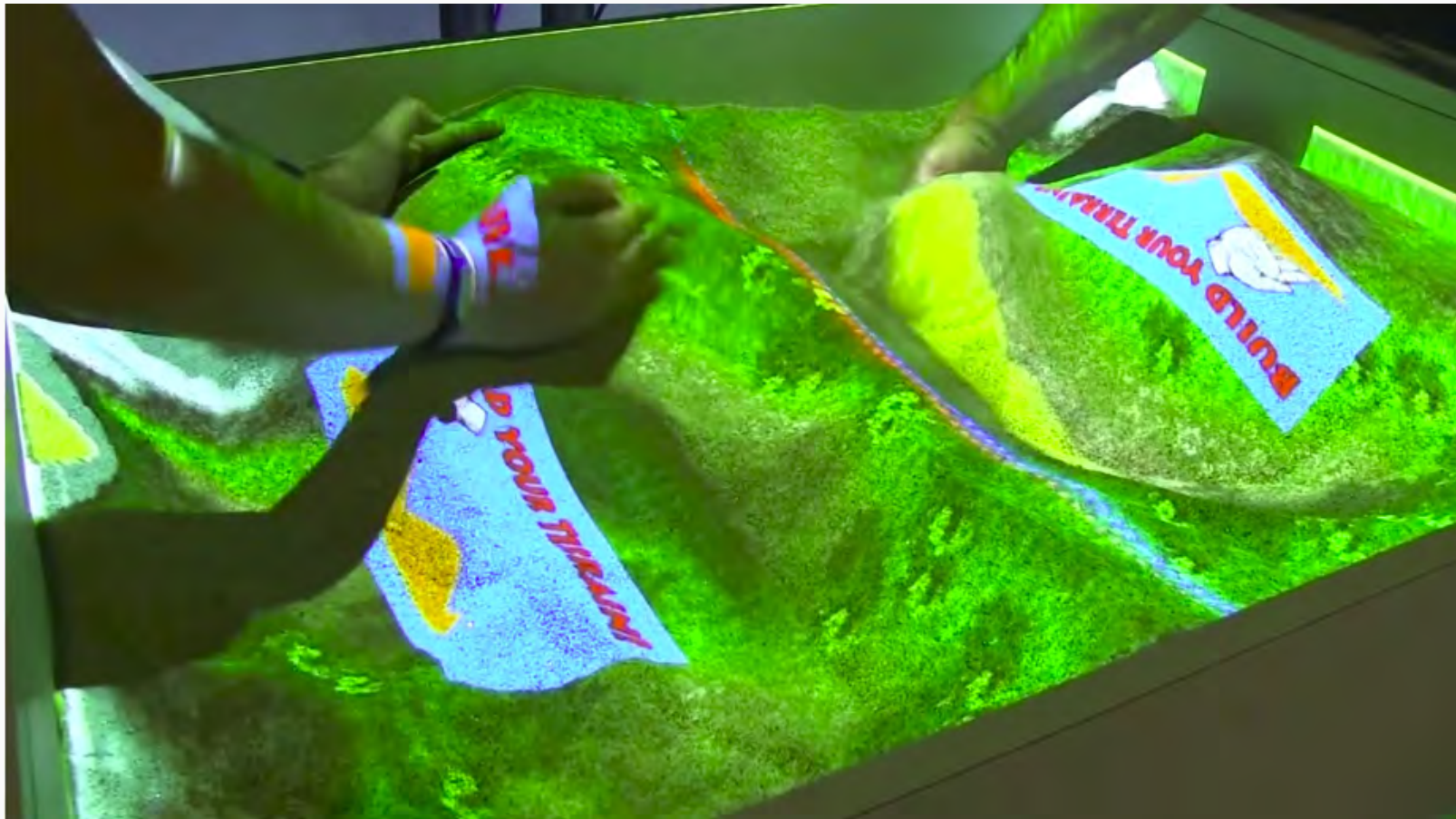
Einführung

Augmented Reality



Einführung

Augmented Reality



Einführung

Augmented Reality



Einführung

Beispiele für Augmented Reality Hardware



Atheer AiR Glasses



Epson Moverio BT-300



Microsoft HoloLens

Einführung

Augmented Virtuality



Einführung

Project Alloy



Einführung

Project Alloy





Einführung

Virtual Reality





Einführung

Beispiele für Virtual Reality Hardware



Oculus Rift CV1



HTC Vive



Google Cardboard



Samsung Gear VR

Code & Technologie

Microsoft Hololens



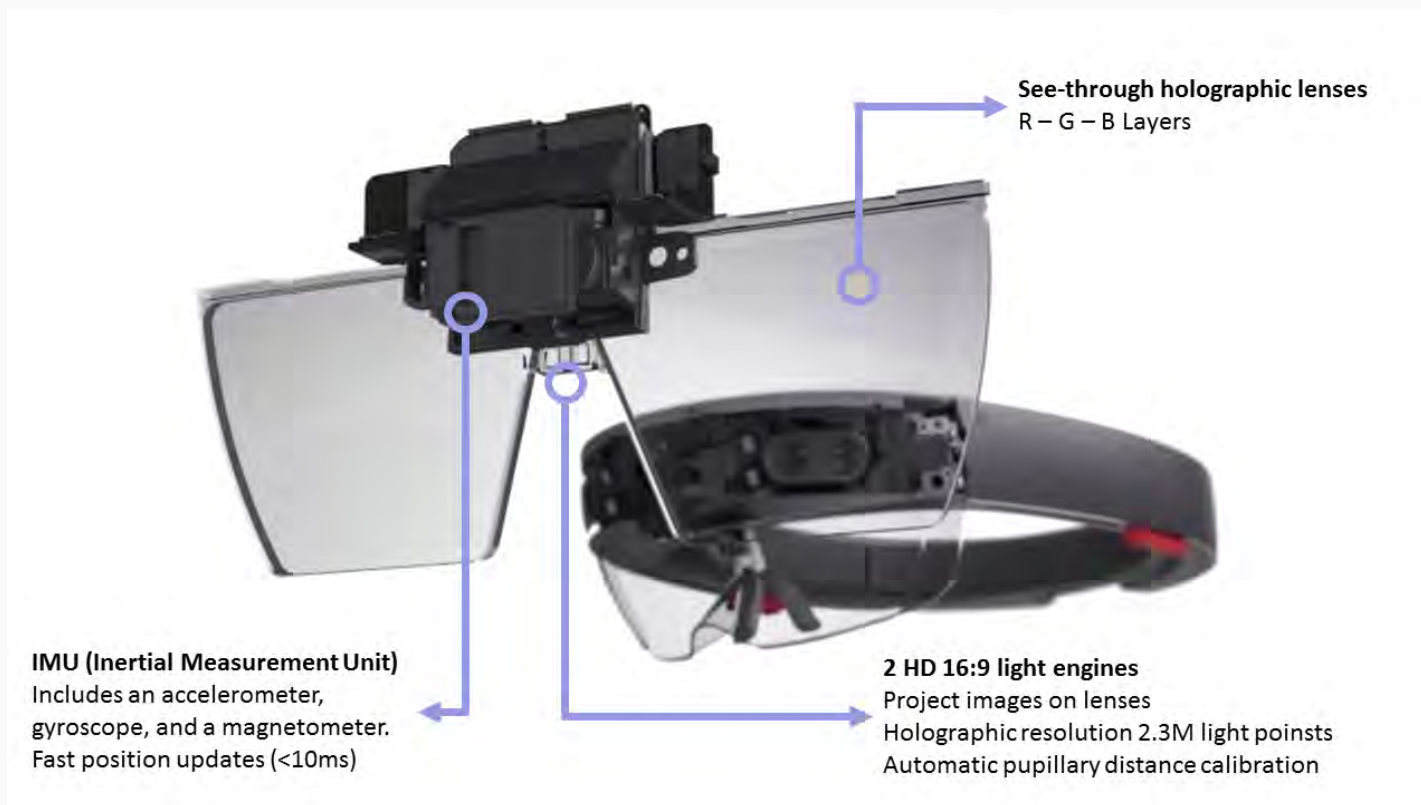
Code & Technologie

Microsoft Hololens



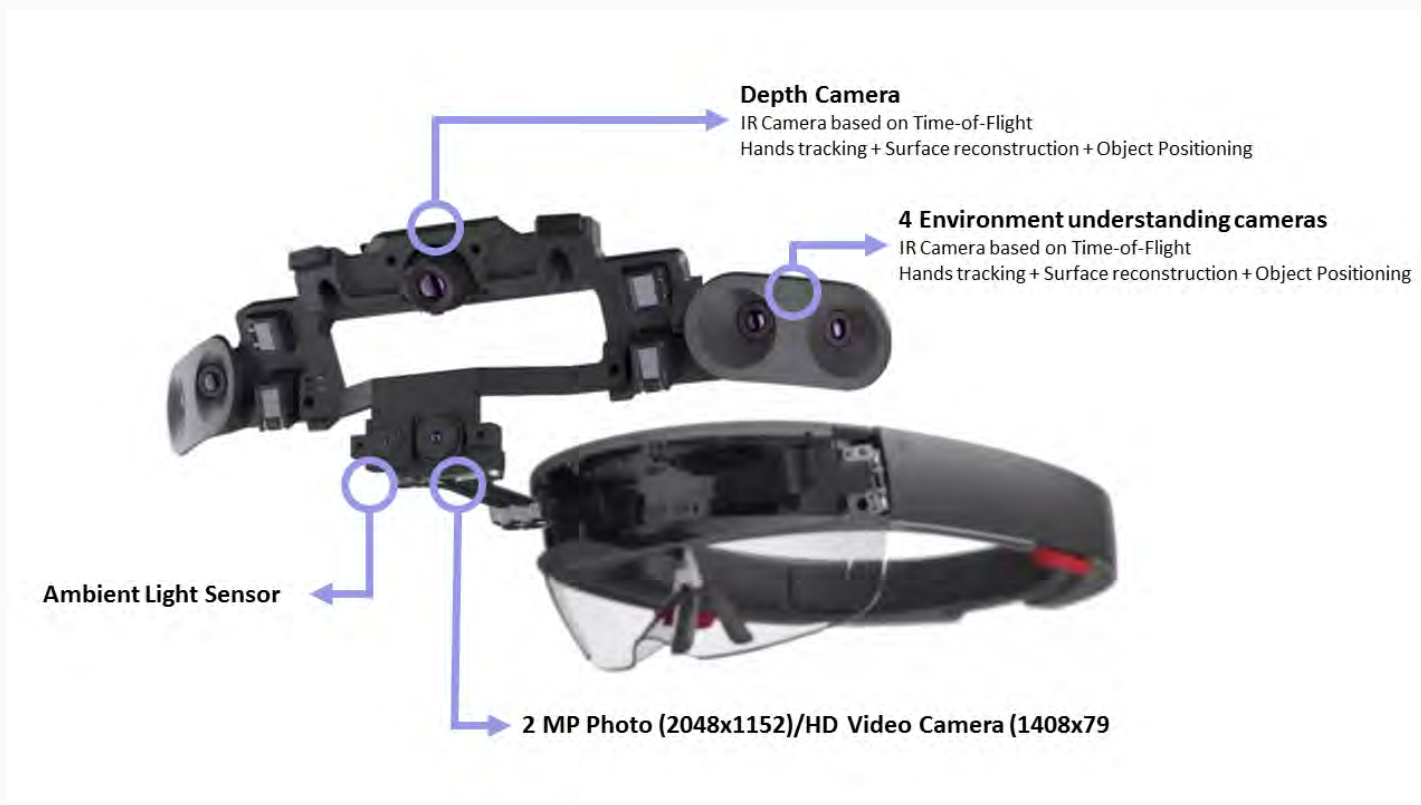
Code & Technologie

Microsoft HoloLens



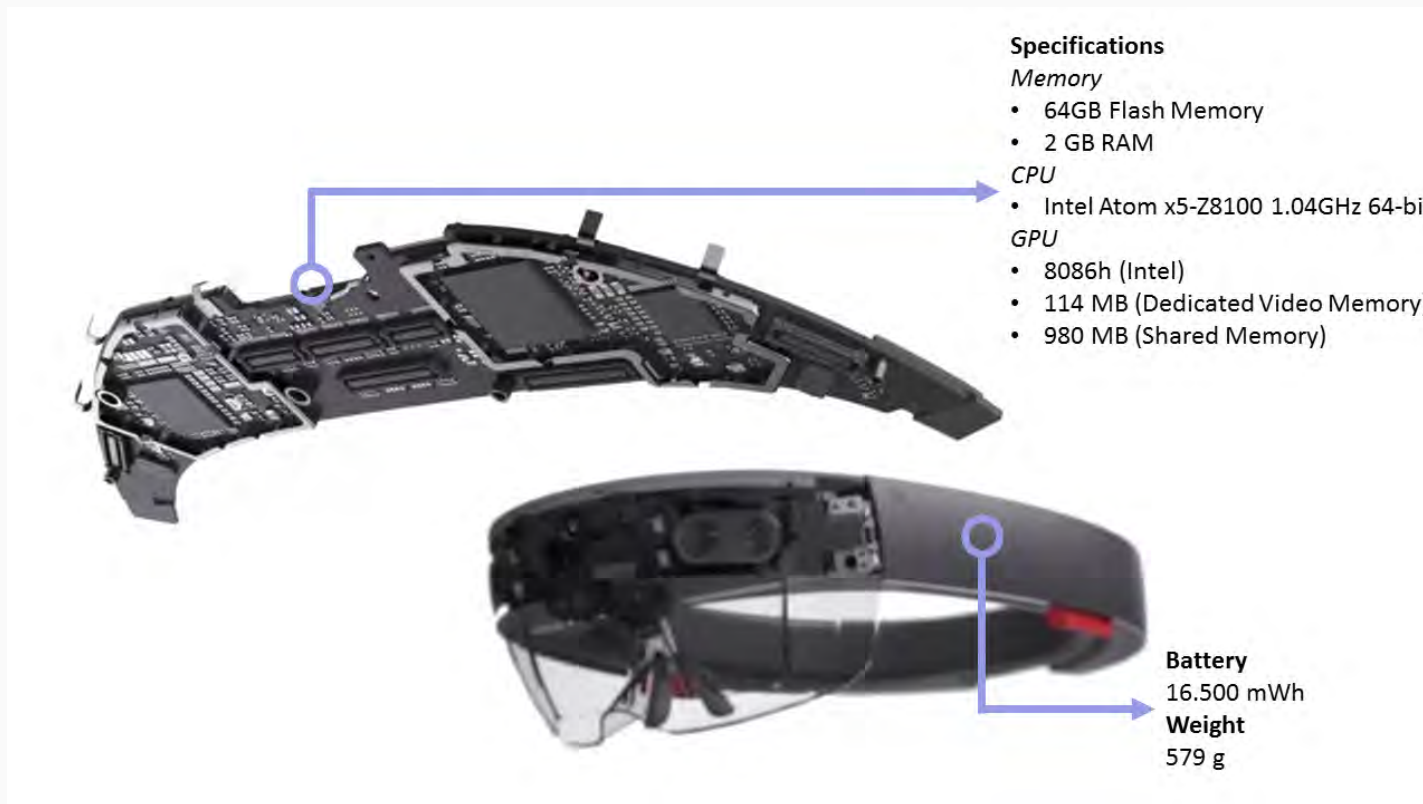
Code & Technologie

Microsoft Hololens



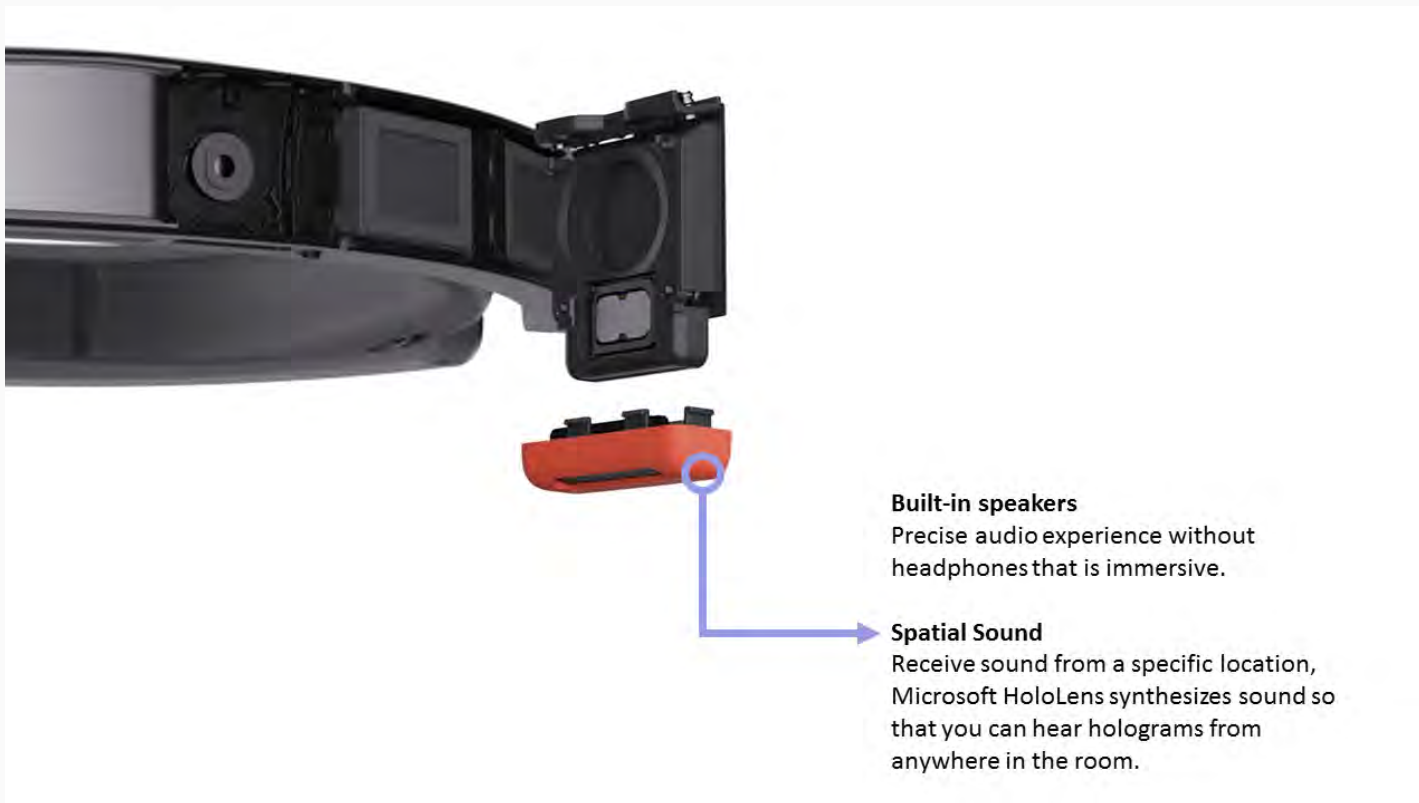
Code & Technologie

Microsoft Hololens



Code & Technologie

Microsoft HoloLens





Code & Technologie

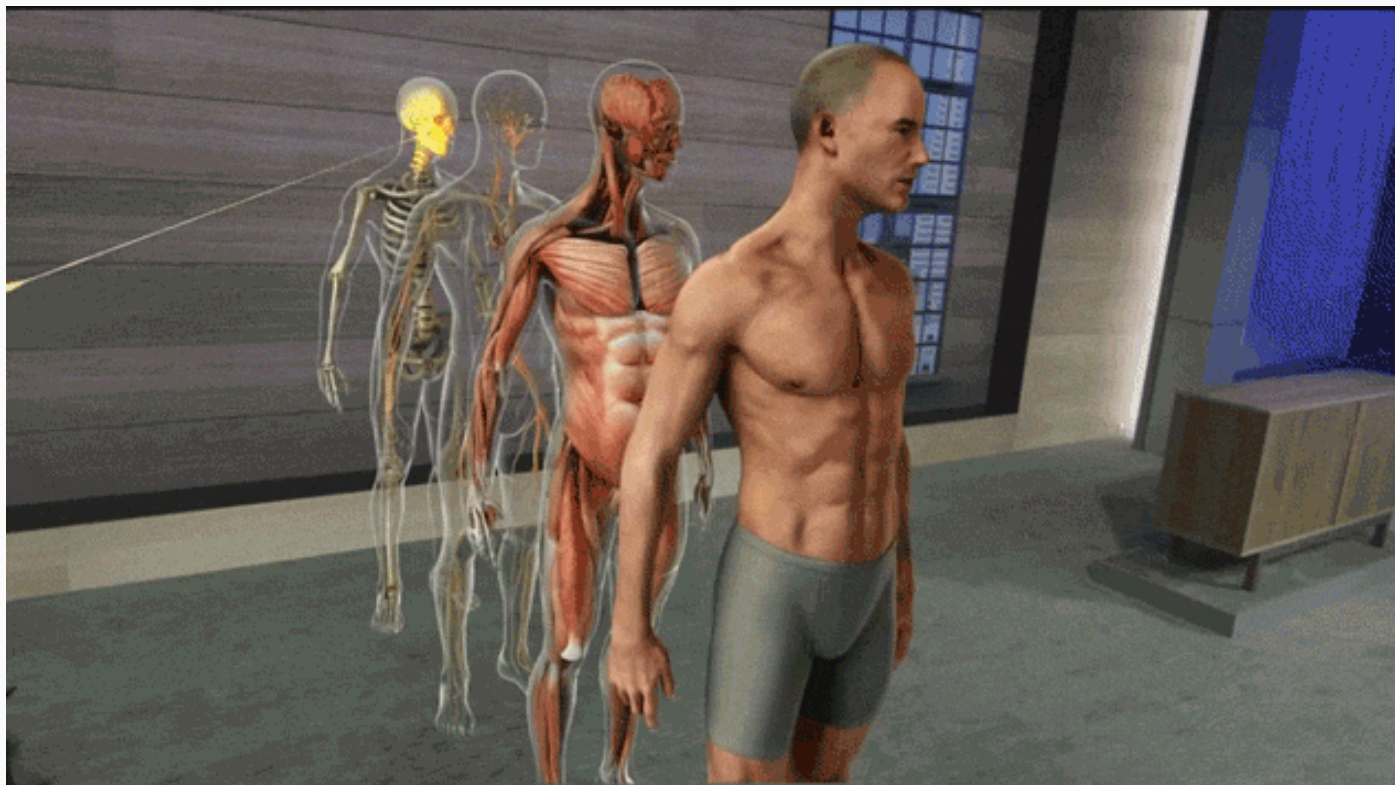
Microsoft Hololens





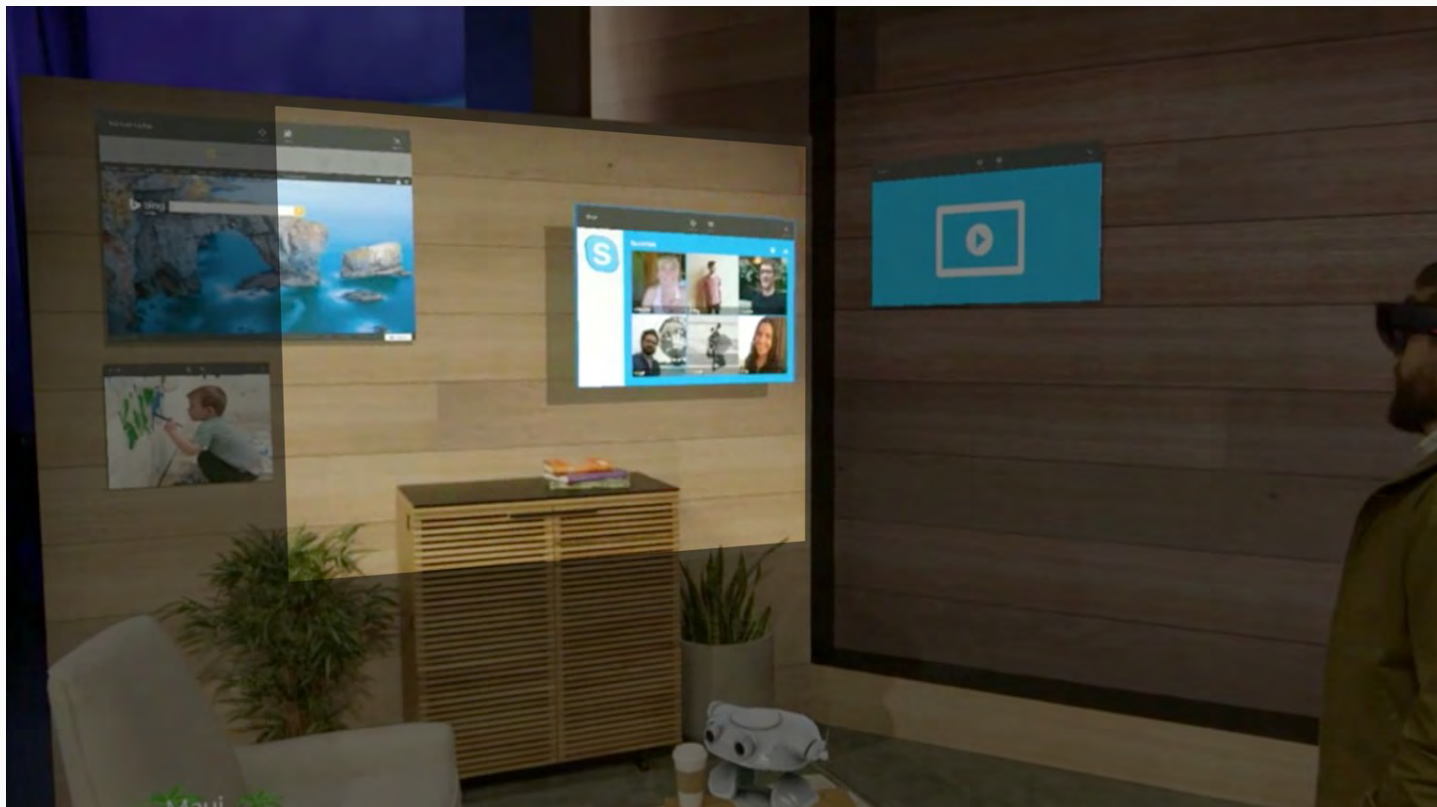
Code & Technologie

Microsoft Hololens



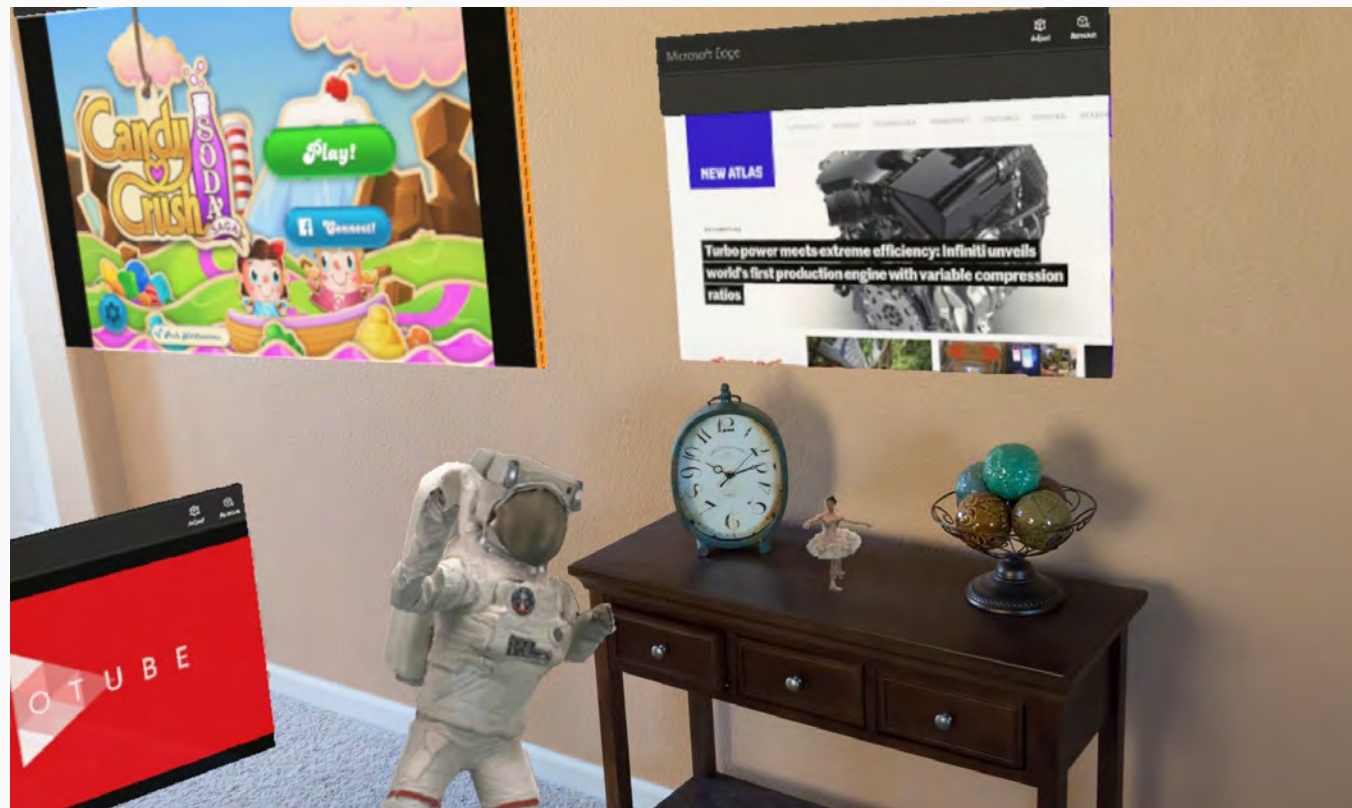
Code & Technologie

Field of View



Code & Technologie

Field of View



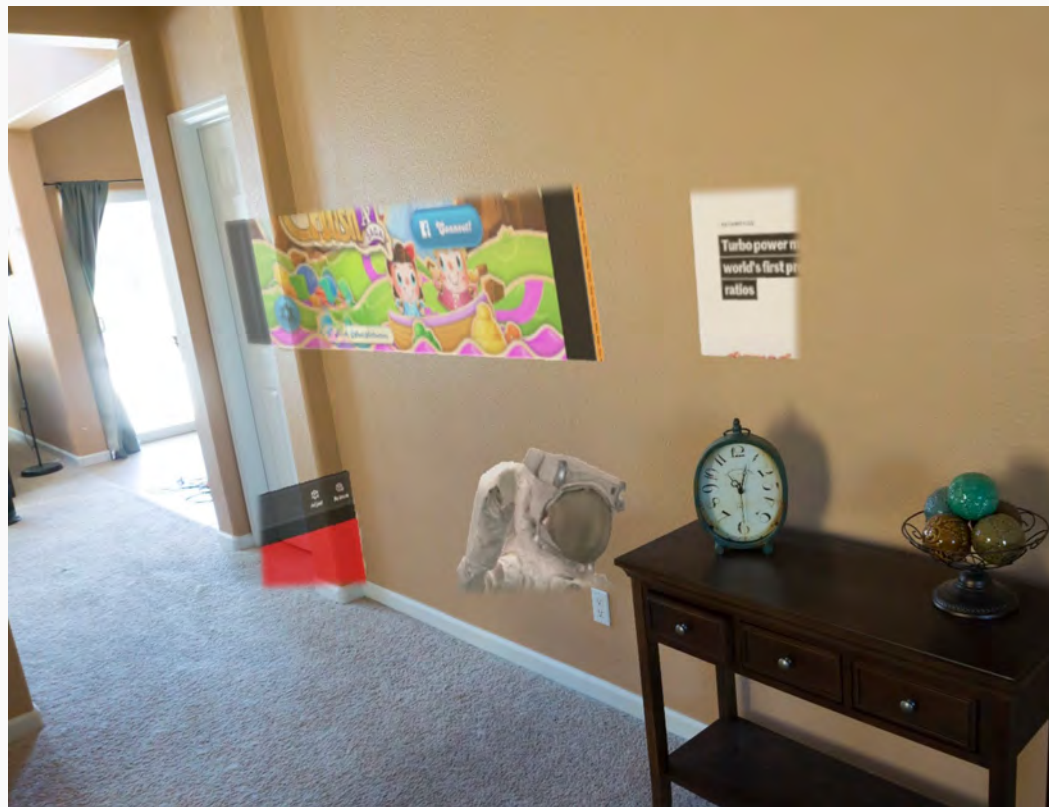
Code & Technologie

Field of View



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Field of View





Code & Technologie

Interfaces



Gesture Control



Voice Control



Gaze

(no active pupil tracking!)

Code & Technologie

Augmented Rift vs. Hololens



Augmented Rift
(TNG Technology Consulting GmbH, 2015)

TNG TECHNOLOGY
CONSULTING

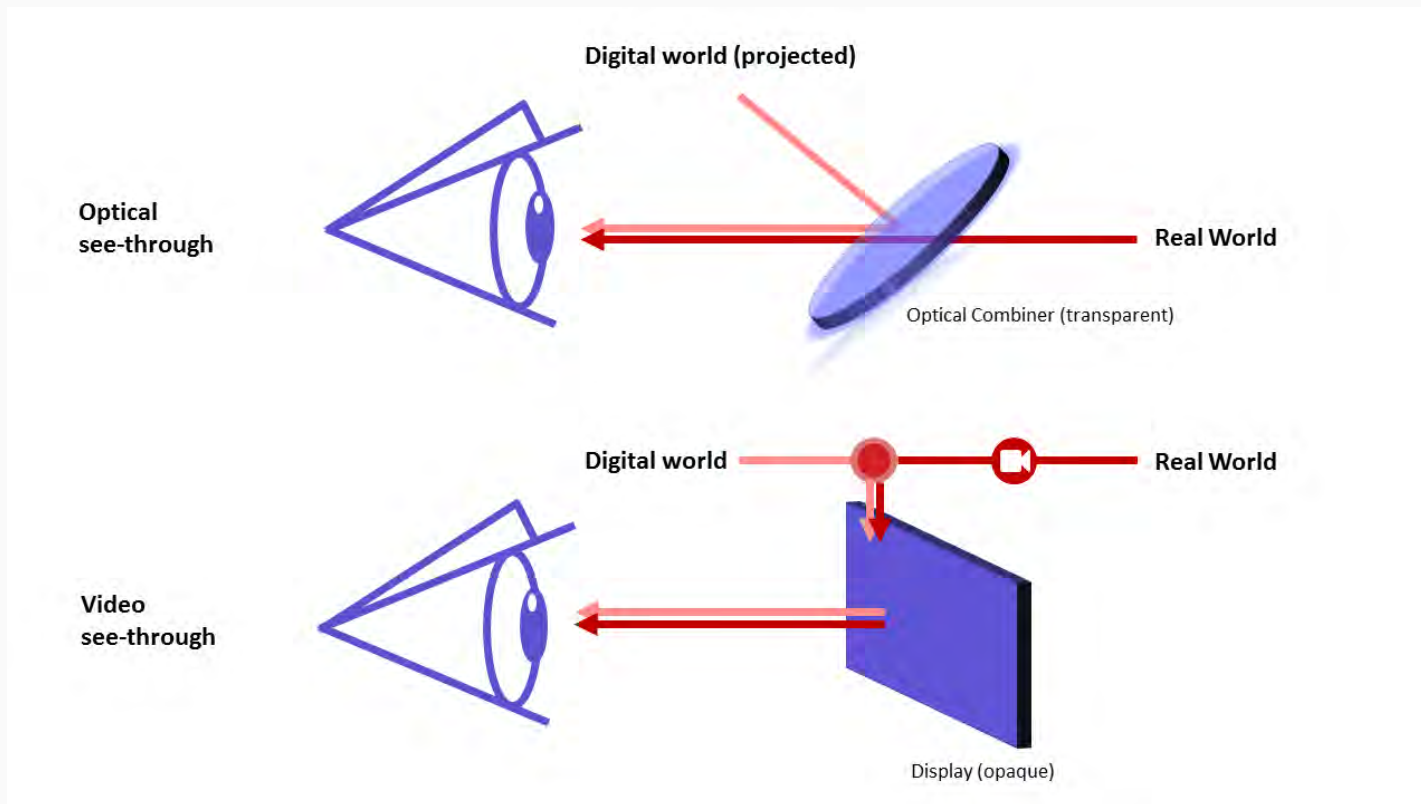


Hololens
(Microsoft, 2015)

 Microsoft

Code & Technologie

Optical See-through vs. Video See-through





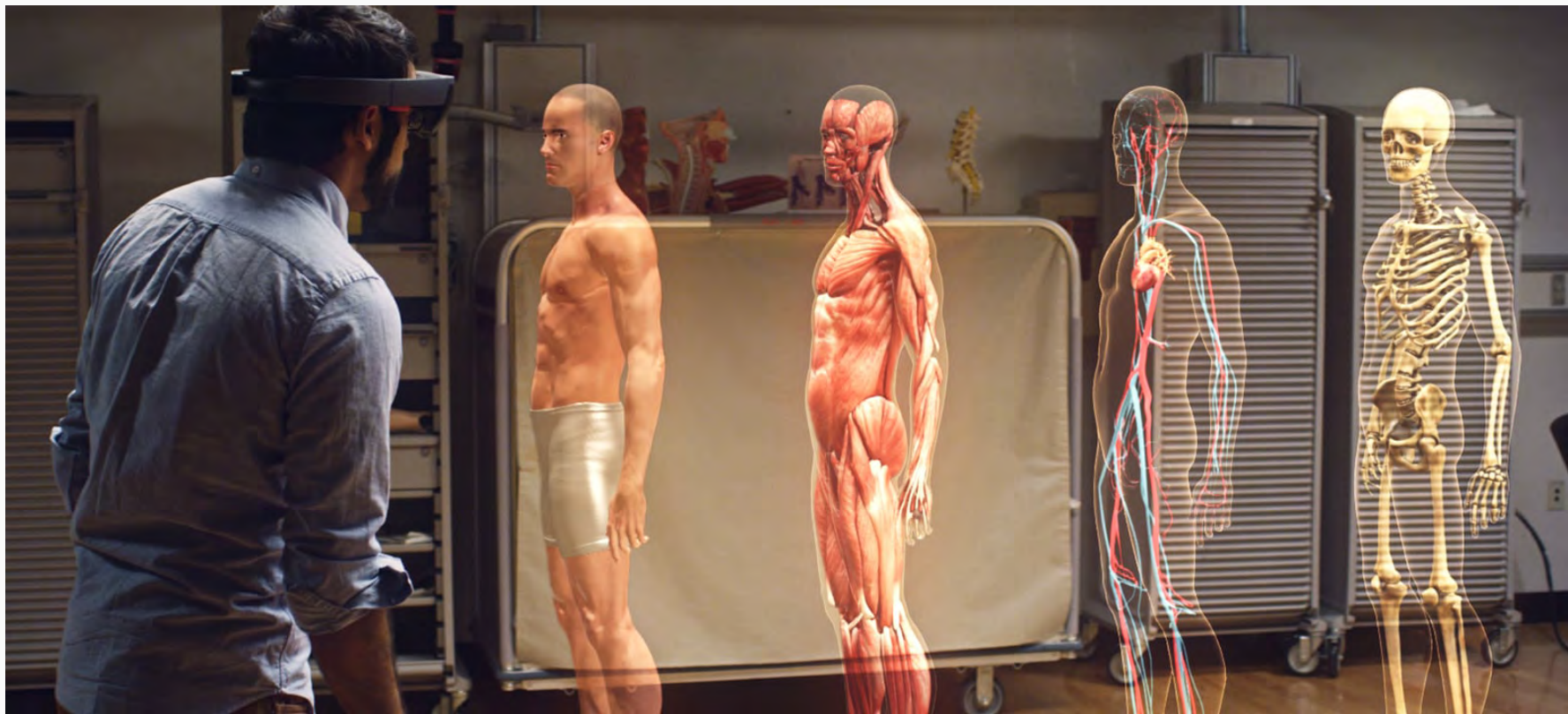
Code & Technologie

Unity



Code & Technologie

Windows Holographic



Code & Technologie

Gesture Recognizer

```
private void Start()
{
    recognizer = new GestureRecognizer();
    recognizer.TappedEvent += OnTapped;
    recognizer.StartCapturingGestures();
}

private void OnTapped(InteractionSourceKind source, int tapcount, Ray headray)
{
    // do some awesome stuff
}
```



Code & Technologie

Gaze

```
private GameObject GetFocusedObject ()
{
    var headPosition = Camera.main.transform.position;
    var gazeDirection = Camera.main.transform.forward;

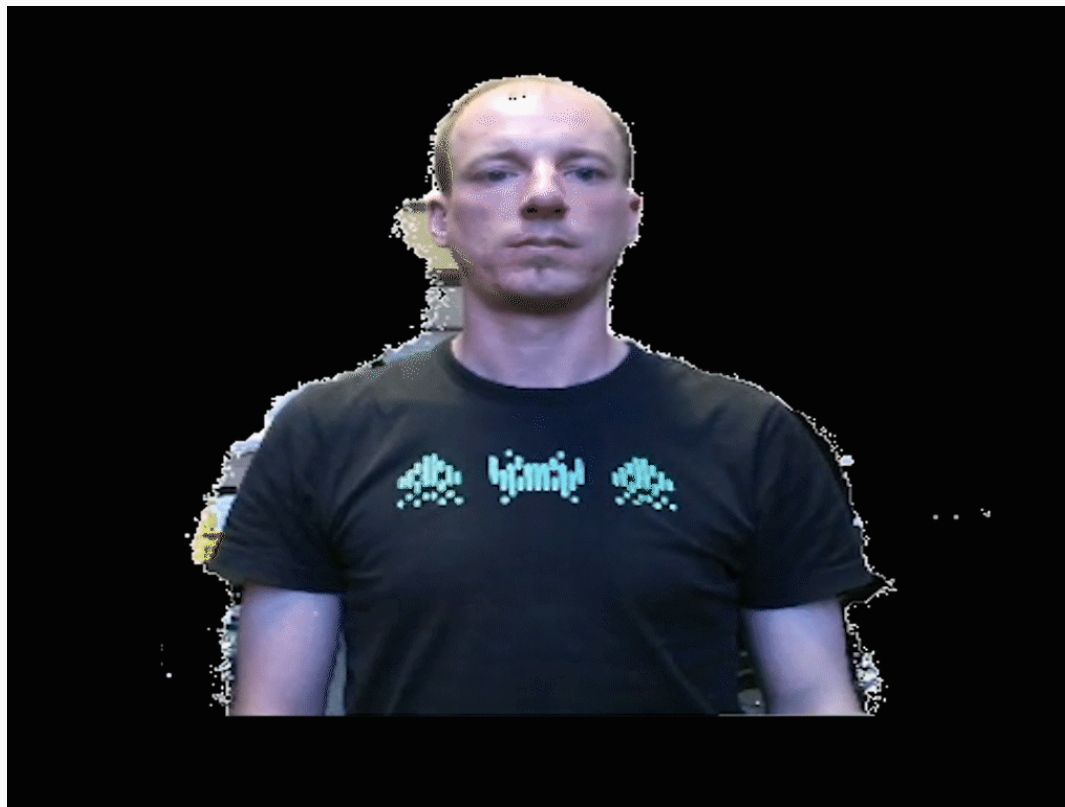
    var hits = Physics.RaycastAll(headPosition, gazeDirection);
    foreach (var hit in hits)
    {
        return hit.transform.gameObject;
    }

    return null;
}
```




Code & Technologie

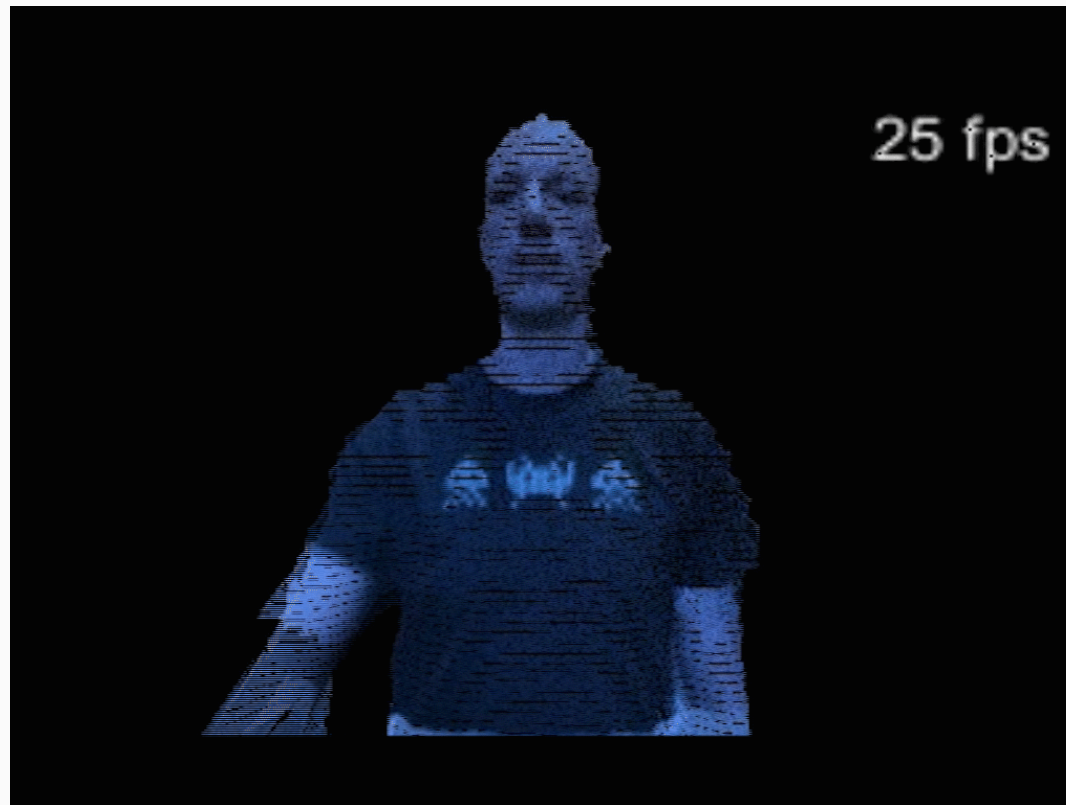
Kinect RGB-Videostream





Code & Technologie

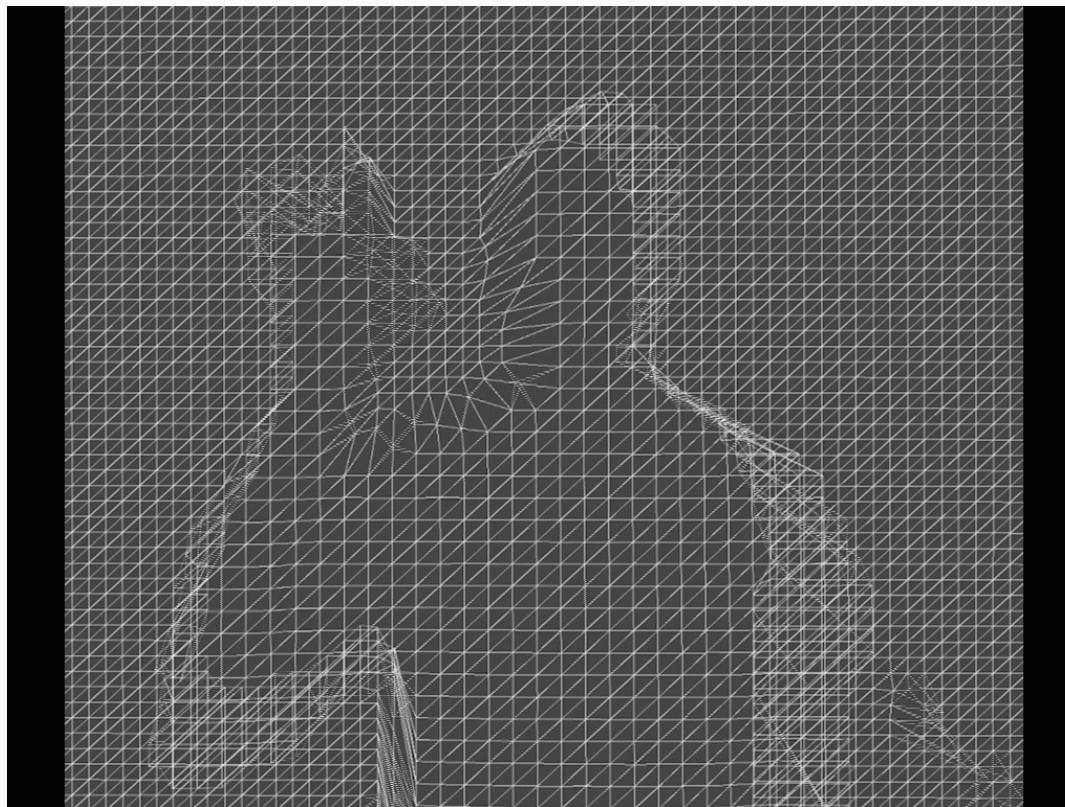
Kinect 3D-Videostream





Code & Technologie

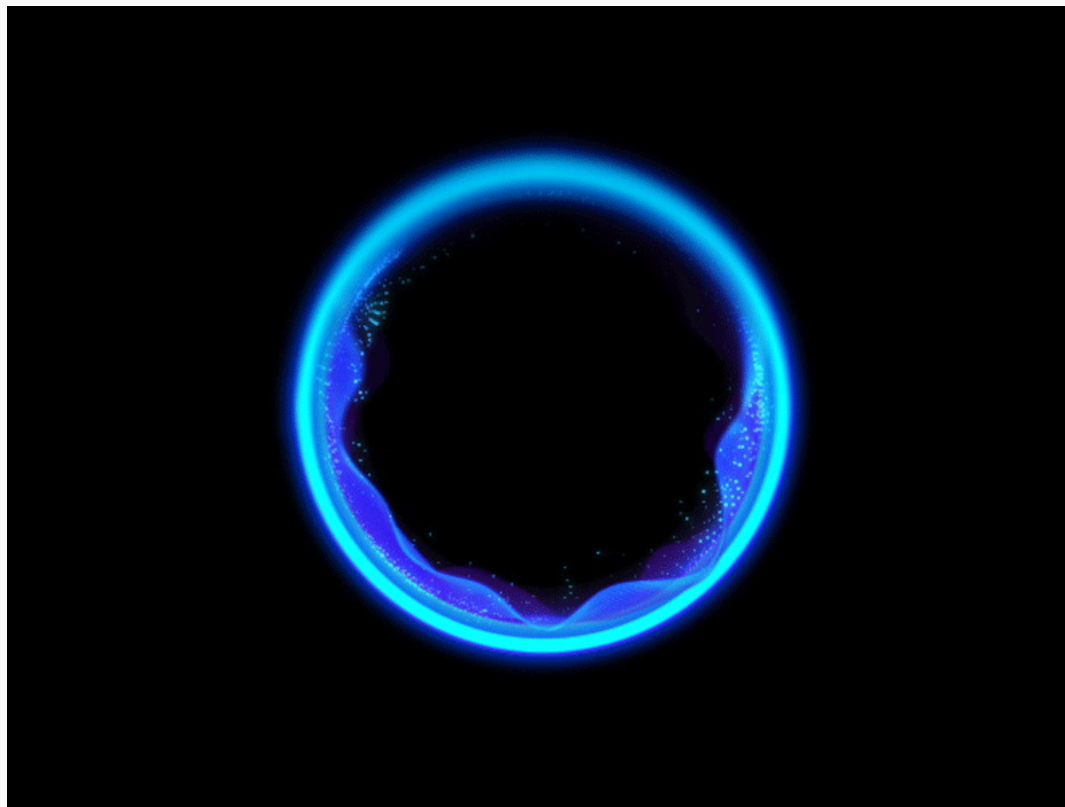
Kinect Wireframestream





Code & Technologie

Kinect Audiostream



Code & Technologie

Routerboard



△ Aktuelle Anwendungsbeispiele

Minecraft



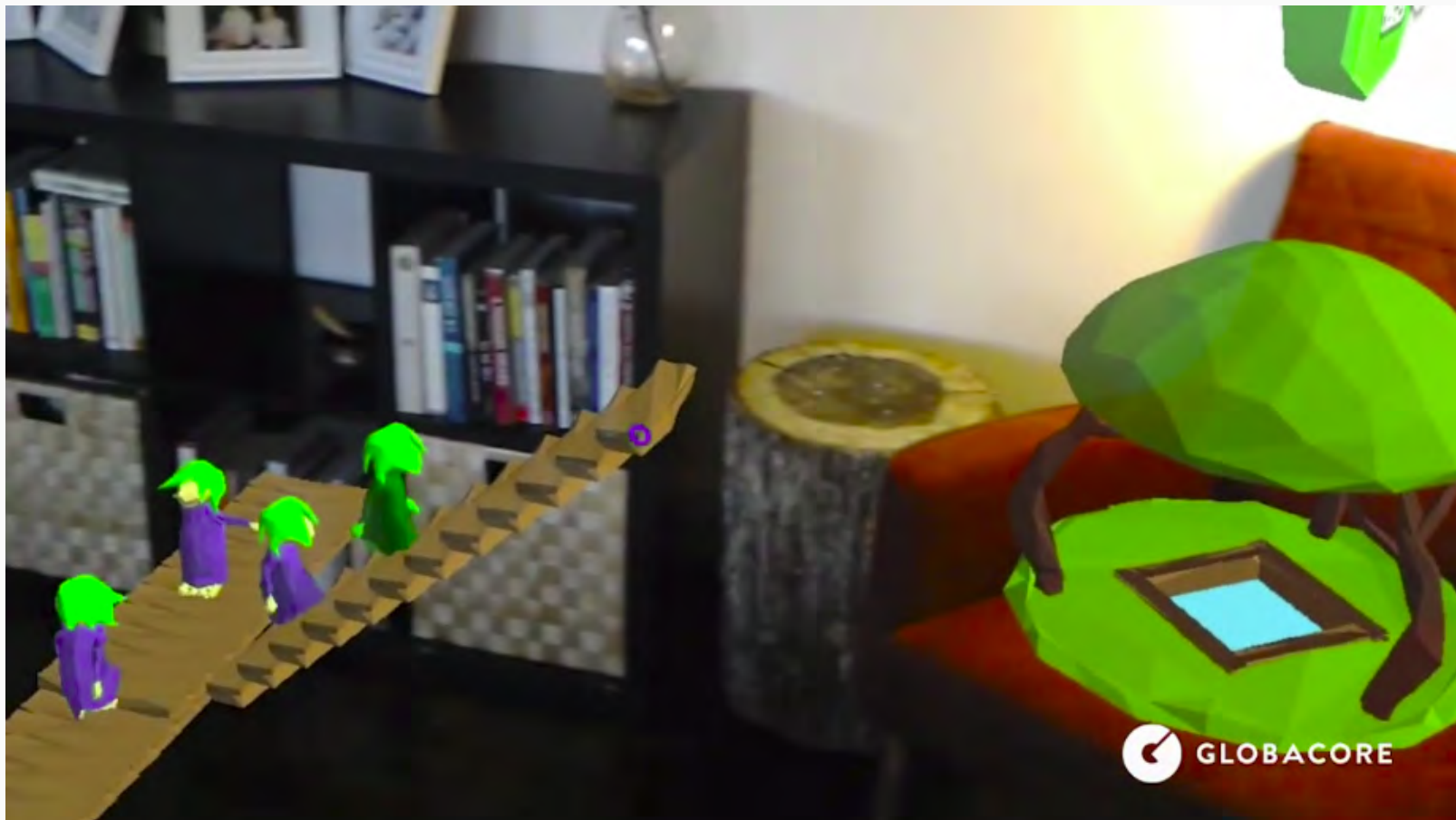
○ Aktuelle Anwendungsbeispiele

Lemmings (1991)



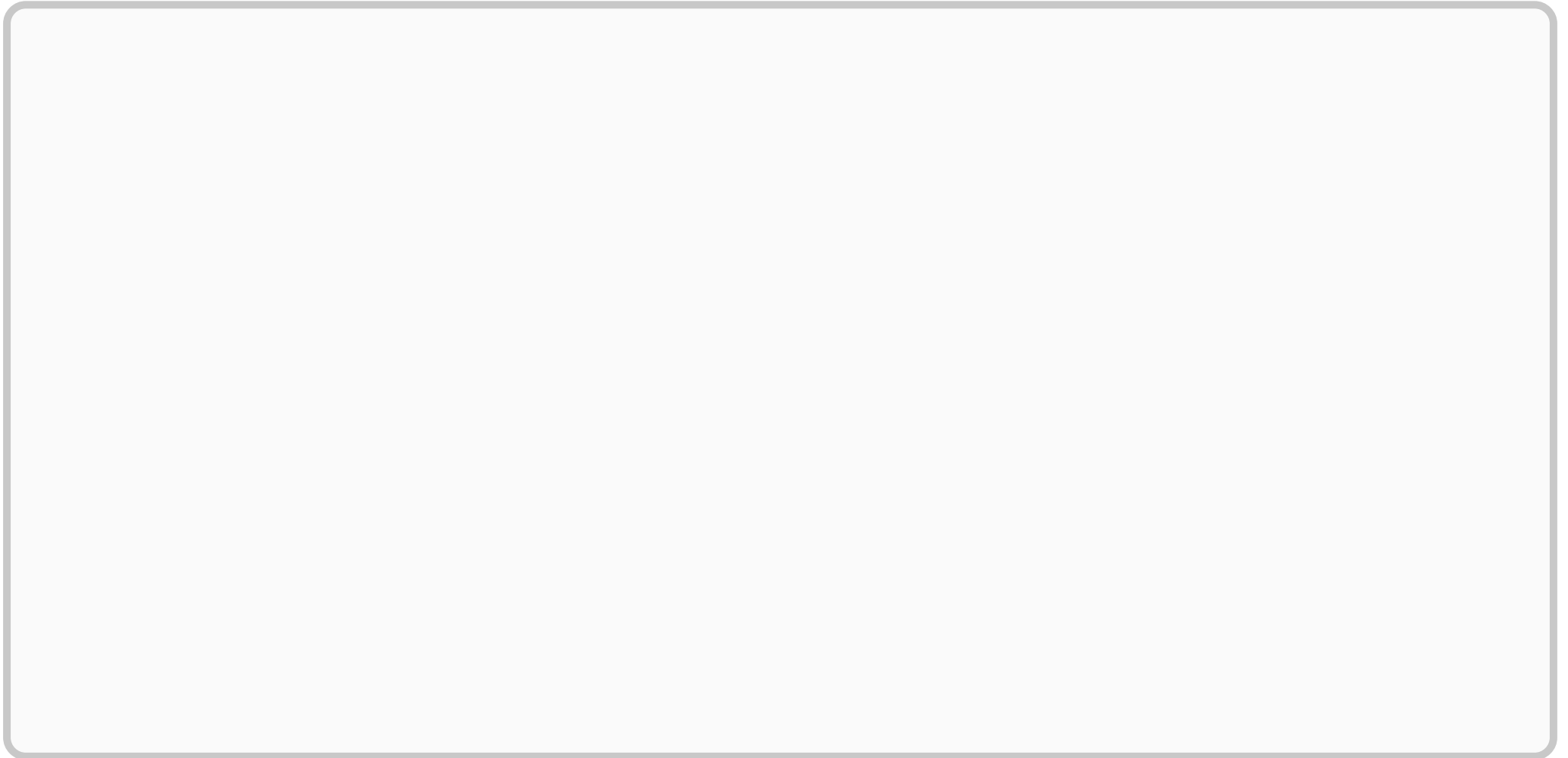
○ Aktuelle Anwendungsbeispiele

Hololems (2017)



○ Aktuelle Anwendungsbeispiele

Hololems (2017)



○ Weitere Anwendungsbeispiele

Unterstützende Informationen





Stand der Technik

Meta 2 Development Kit (2016)





Stand der Technik

Daqri



Stand der Technik

Magic Leap



Figure 2

Stand der Technik

Magic Leap



Stand der Technik

Magic Leap



Fazit

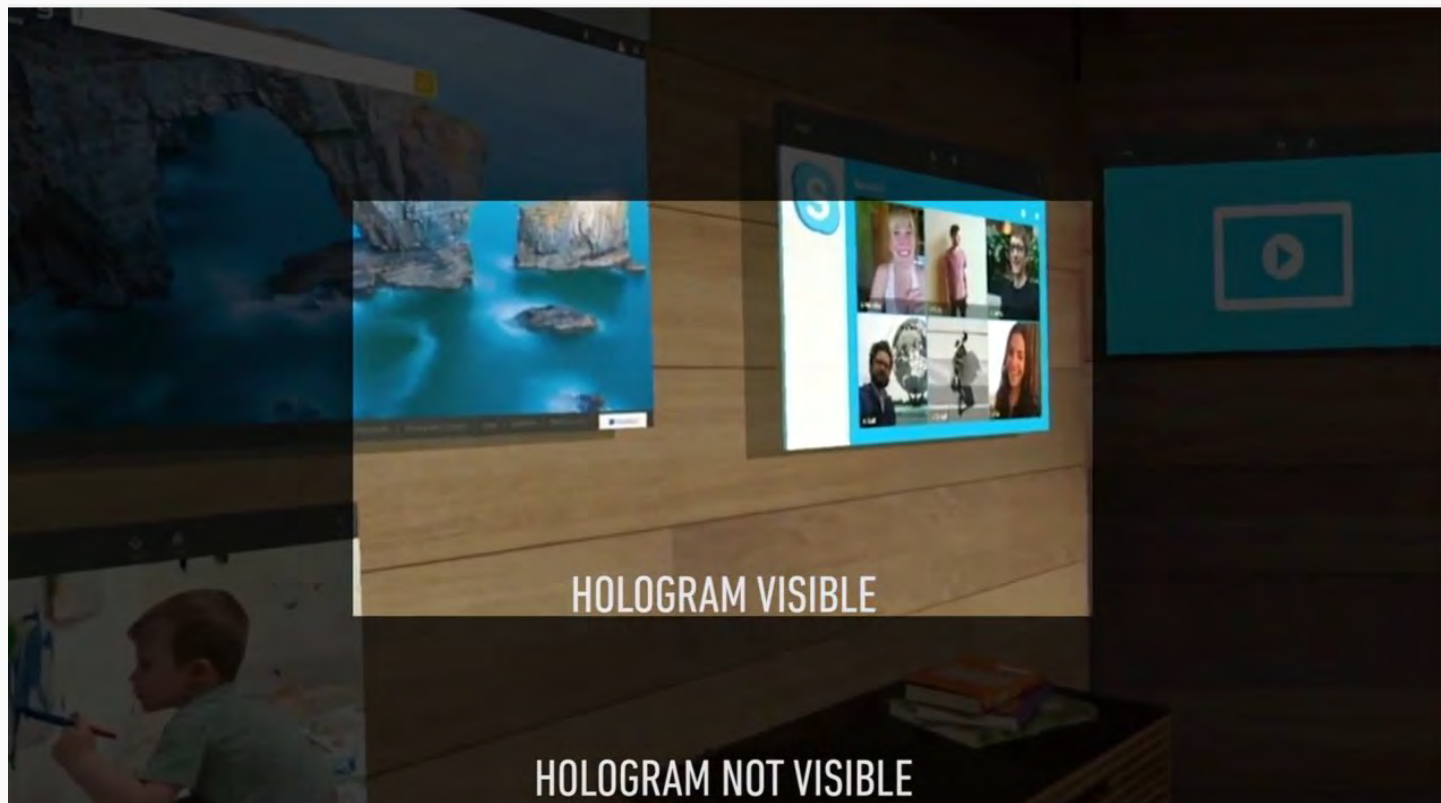
Responsivität & Genauigkeit





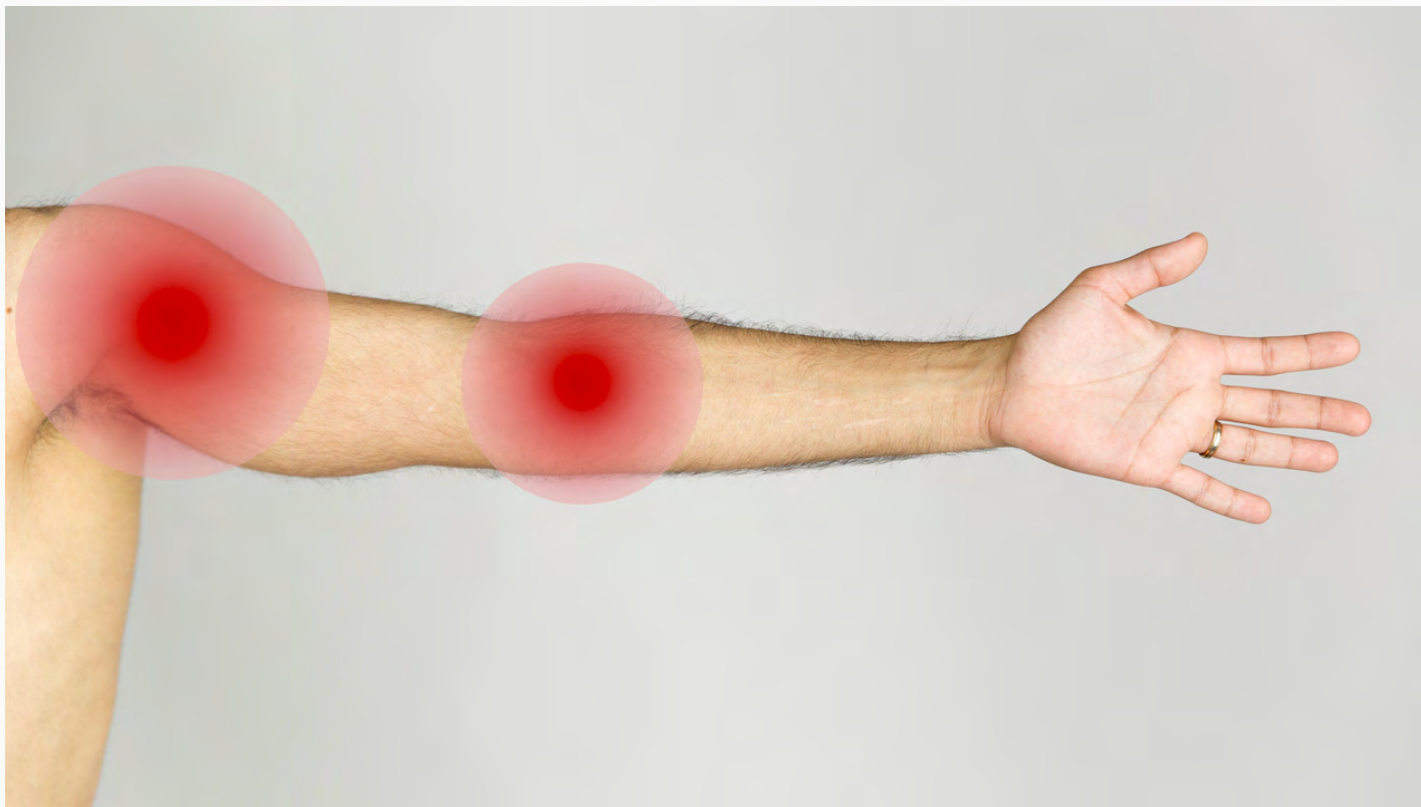
Fazit

Field of View



Fazit

Gorilla-Arm Syndrom



Fazit





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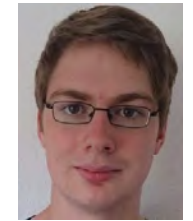
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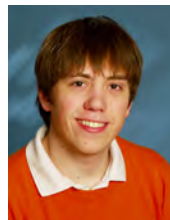
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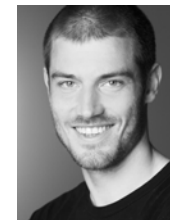
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Jan
Heidbrink



Stefan
Grafberger



Intel® Black Belt Software Developer




Intel® Top Software Innovator 2014, 2015, 2016



Oracle® JavaOne Rockstar Award 2015




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