



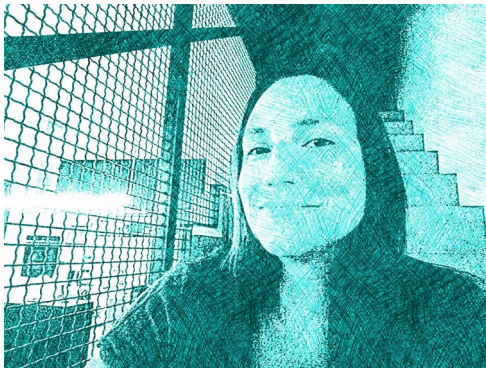
Susanne Meerwald-Stadler

30. August 2017

Die Erweiterung der
Welt wie wir sie kennen

Dipl.-Ing. Susanne Meerwald-Stadler

User Experience | Human-Robot Interaction | Virtual/Augmented Reality



www.linkedin.com/in/susannestadler/



github.com/smeerws



www.youtube.com/user/SuzieS2012



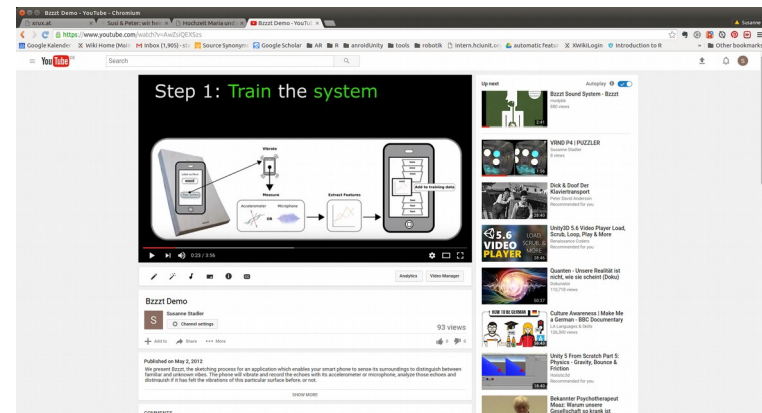
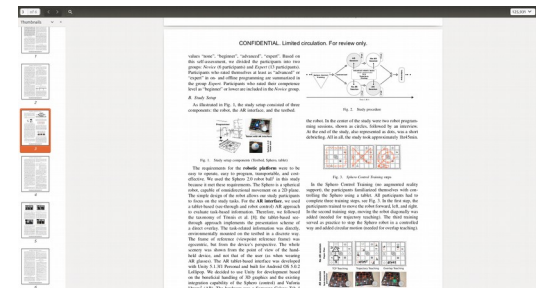
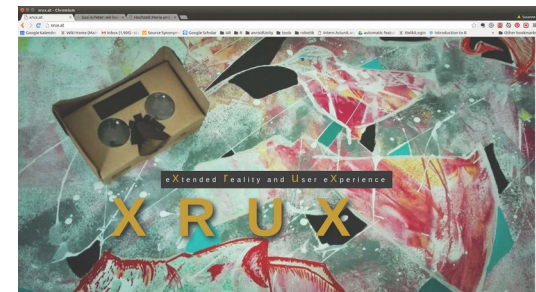
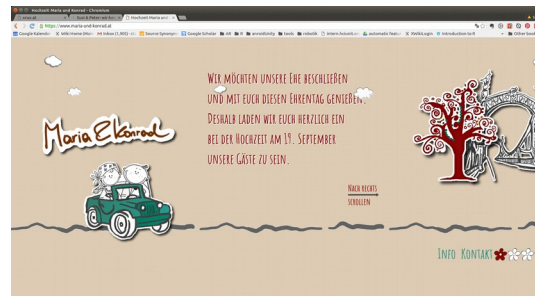
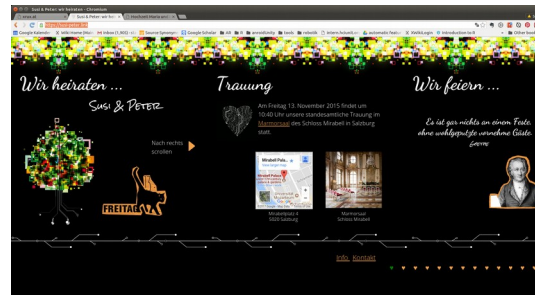
<https://www.pinterest.at/smeerws/>



xrux.at



hello@smeerws.at



Zeitplan

9:00 – 12:15

Block Intro

- Welcome
- Vorstellungsrunde
- Einführung
- History

Pause

Block VR/AR Anwendungen

- VR Experiences
- AR Experiences

Pause

Block AR UX

- Augment
- AR Effect
- Aurasma
- ENTiTi

Mittag 12:15-13:00

13:00 – 15:30

Block AR UX

- Besprechung unterschiedliche Systeme

Pause

Block AR System

- Technologien

Pause

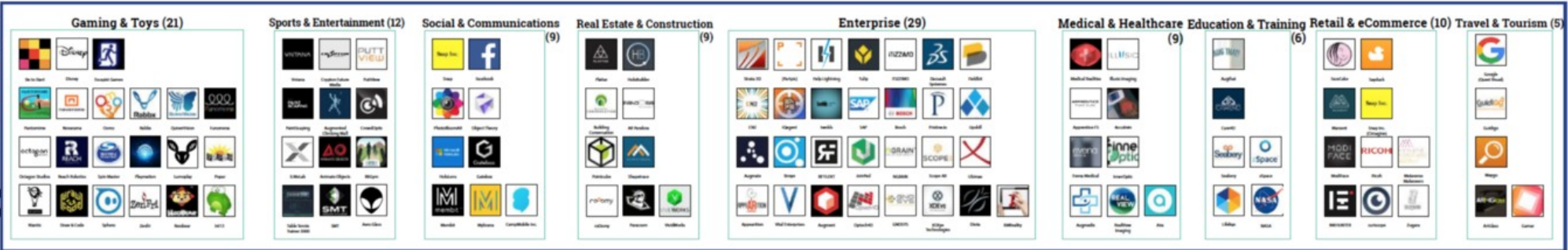
Block Ausklang

- Feedbackrunde
- Kurs-evaluierung (online)

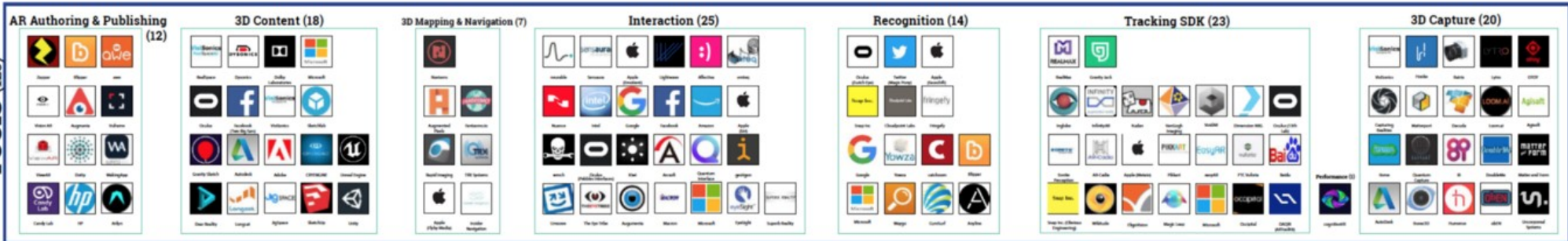
The AR Landscape

Updated: Q1 2017 - March

Applications (109)



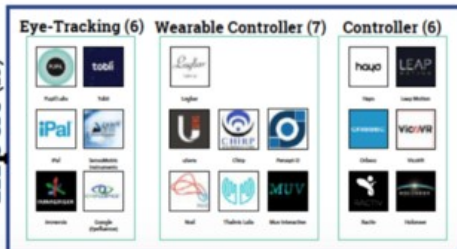
Tools (120)



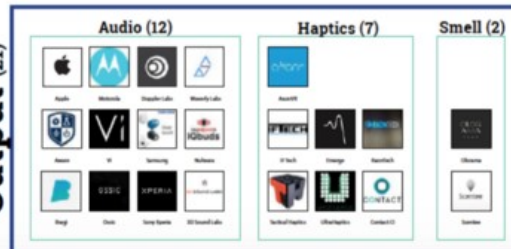
Devices (59)



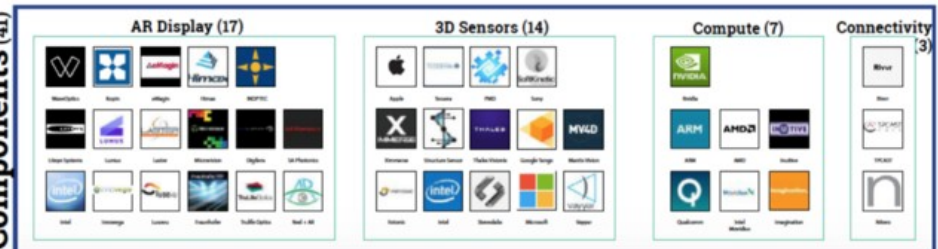
Input (19)



Output (21)



Components (41)



Vorstellungsrunde

Name

Background

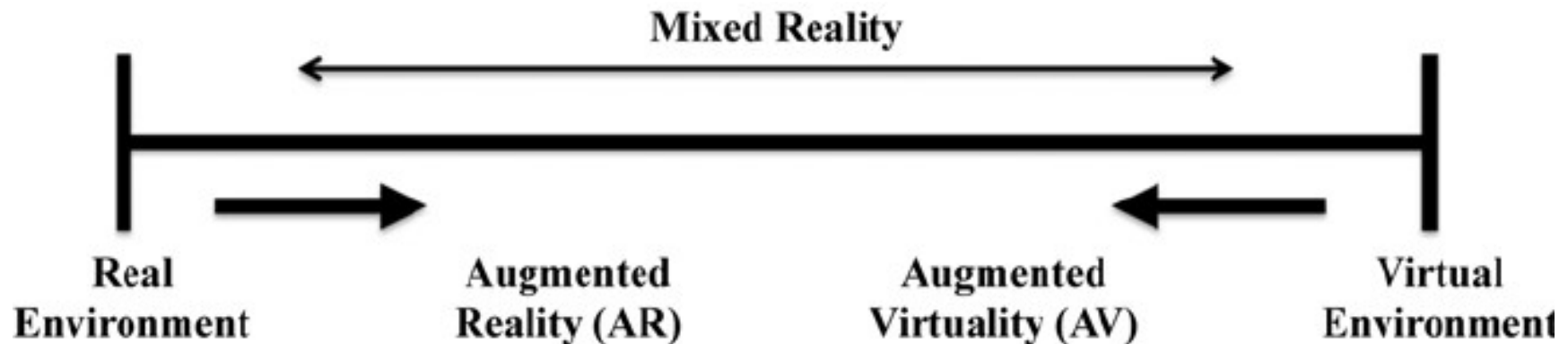
Vorwissen

Kurs – Erwartungen



Reality-Virtuality Continuum

Paul Milgram



P. Milgram and A. F. Kishino, Taxonomy of Mixed Reality Visual Displays IEICE Transactions on Information and Systems, E77-D(12), pp. 1321-1329, 1994.

Augmented Reality

- AR is defined as “a real-time direct or indirect view of a physical real-world environment that has been enhanced, or augmented, by adding virtual or computer generated information to it.

Julie Carmigniani ; Borko Furht ; Marco Anisetti ; Paolo Ceravolo ; Ernesto Damiani ; Misa Ivkovic ,
“Augmented Reality Technologies, Systems and Applications,”
Multimedia Tools and Applications, 51, no. 1 (2011): 342,

- An AR system has three characteristics: 1) Combines real and virtual, 2) Interactive in real time, 3) Registered in 3D

Azuma, Ronald T. "A survey of augmented reality."
Presence: Teleoperators and virtual environments 6.4 (1997): 355-385.

3 Laws of AR Design

- 1) Augmentation must emerge from the real world
- 2) Augmentation must not distract from reality
- 3) Augmented interaction must deliver a superior experience

Ori Inbar presentation, laws from Lex Ardez

Virtual Reality

- Virtual Reality refers to immersive, interactive, multi-sensory, viewer-centered, three-dimensional computer generated environments and the combination of technologies required to build these environments.

Carolina Cruz-Neira, Siggraph'93 Course Notes "Virtual Reality Overview"

- Goal of VR : " ... to make it feel like you're actually in a place that you are not."

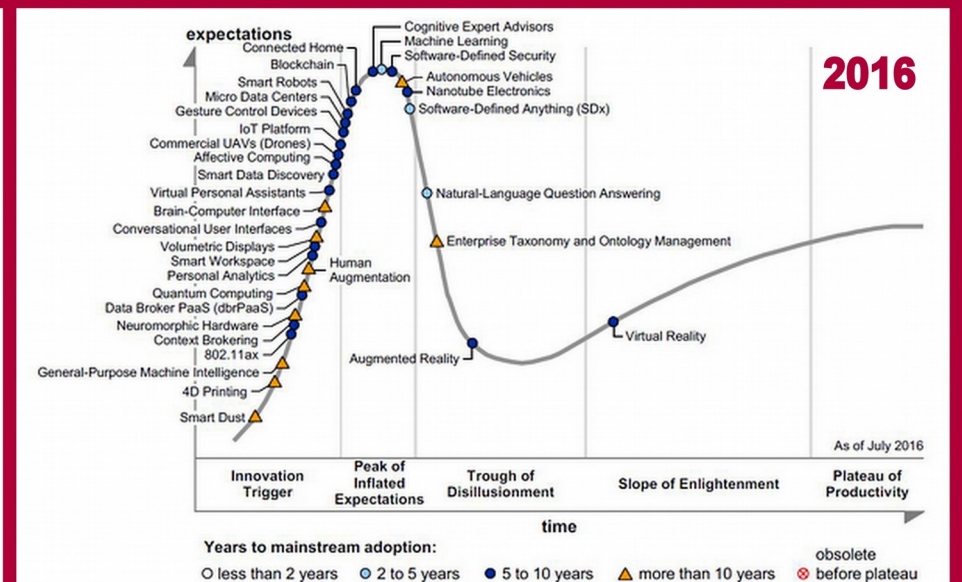
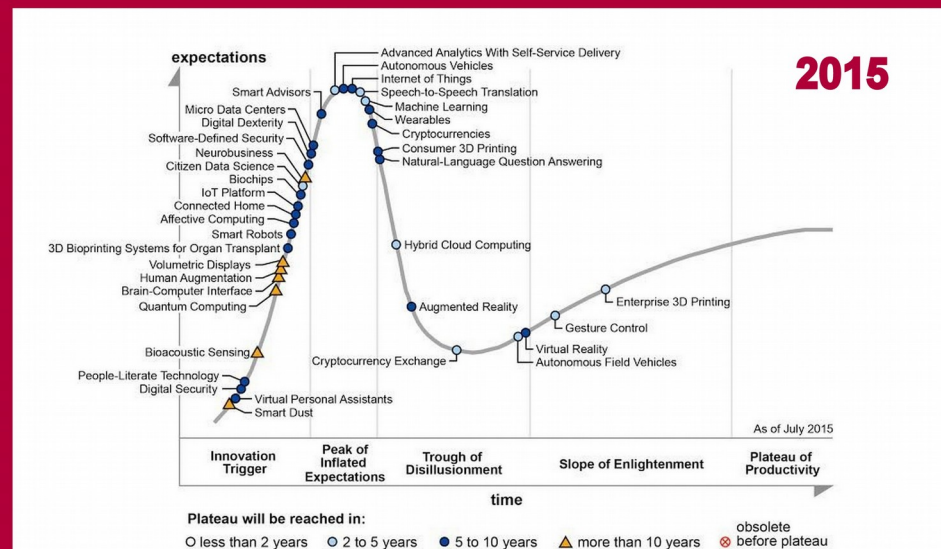
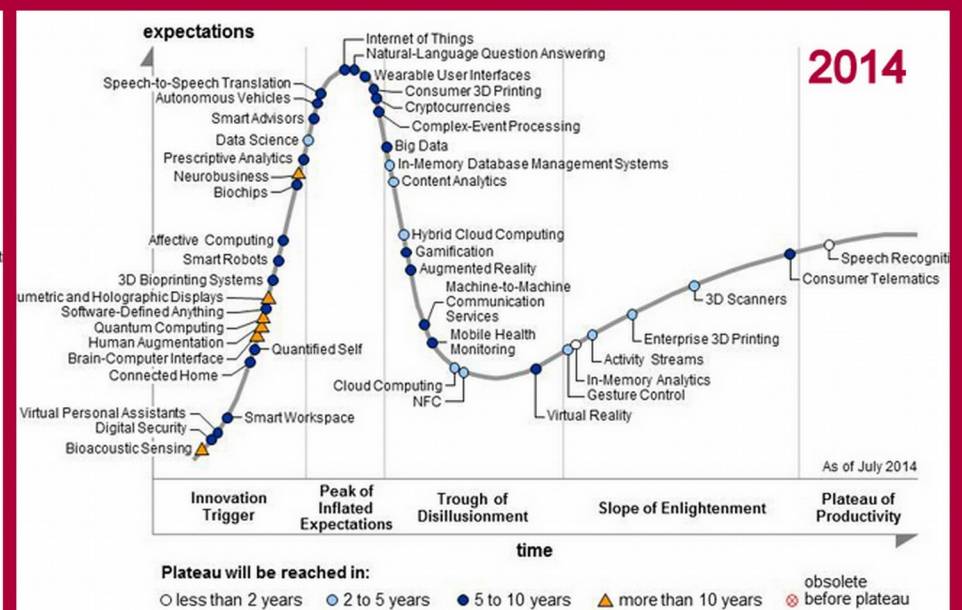
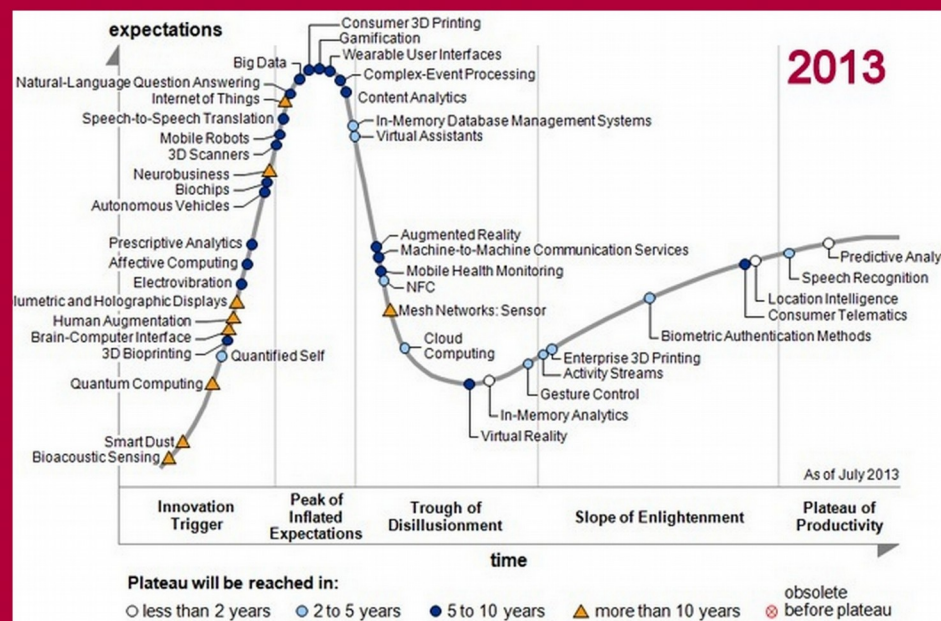
Palmer Luckey, Co-founder, Oculus

Difference VR/AR

AR vs VR

	Virtual Reality <i>Replaces Reality</i>	Augmented Reality <i>Enhances Reality</i>
<i>Scene Generation</i>	Requires realistic images	Minimal rendering okay
<i>Display Device</i>	Fully immersive, wide field of view	Non-immersive, small field of view
<i>Tracking</i>	Low to medium accuracy is okay	The highest accuracy possible

Gartner's emerging technology hype cycle



VR/AR History

- 1512 Michelangelo, Sixtinische Kapelle
- 1962 Sensorama, Morton Heilig, Cinema of the future



Interview with Morton Heilig on his
Sensorama
Interviewer by video camera:
Itsuo SAKANE

<http://www.spiegel.de/panorama/360-grad-ansicht-der-sixtinischen-kapelle-hier-wird-der-papst-gewaehlt-a-888486.html>

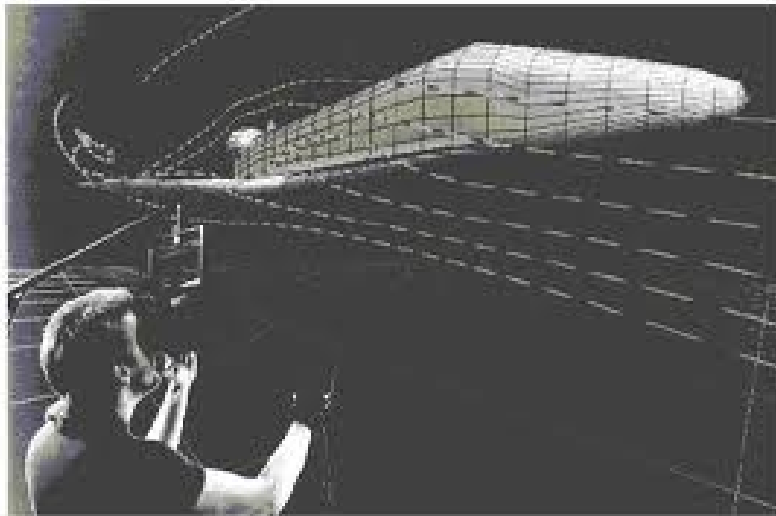
VR/AR History

- 1966 Ivan Sutherland first HMD for AR
- 1975 Myron Krueger creates the videoplace



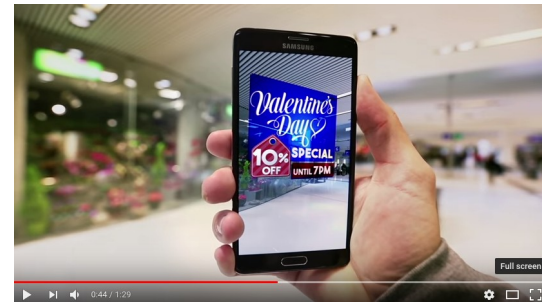
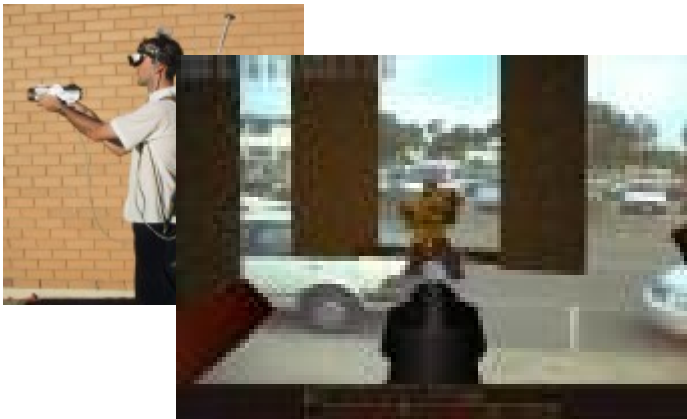
VR/AR History

- 1990 Tom Caudell and David Mizell from Boeing coin the phrase, "Augmented Reality"
- 1999 Steven Feiner, Blair MacIntyre and Doree Seligmann publish the benefits of KARMA system, <http://monet.cs.columbia.edu/projects/karma/karma.html>



VR/AR History

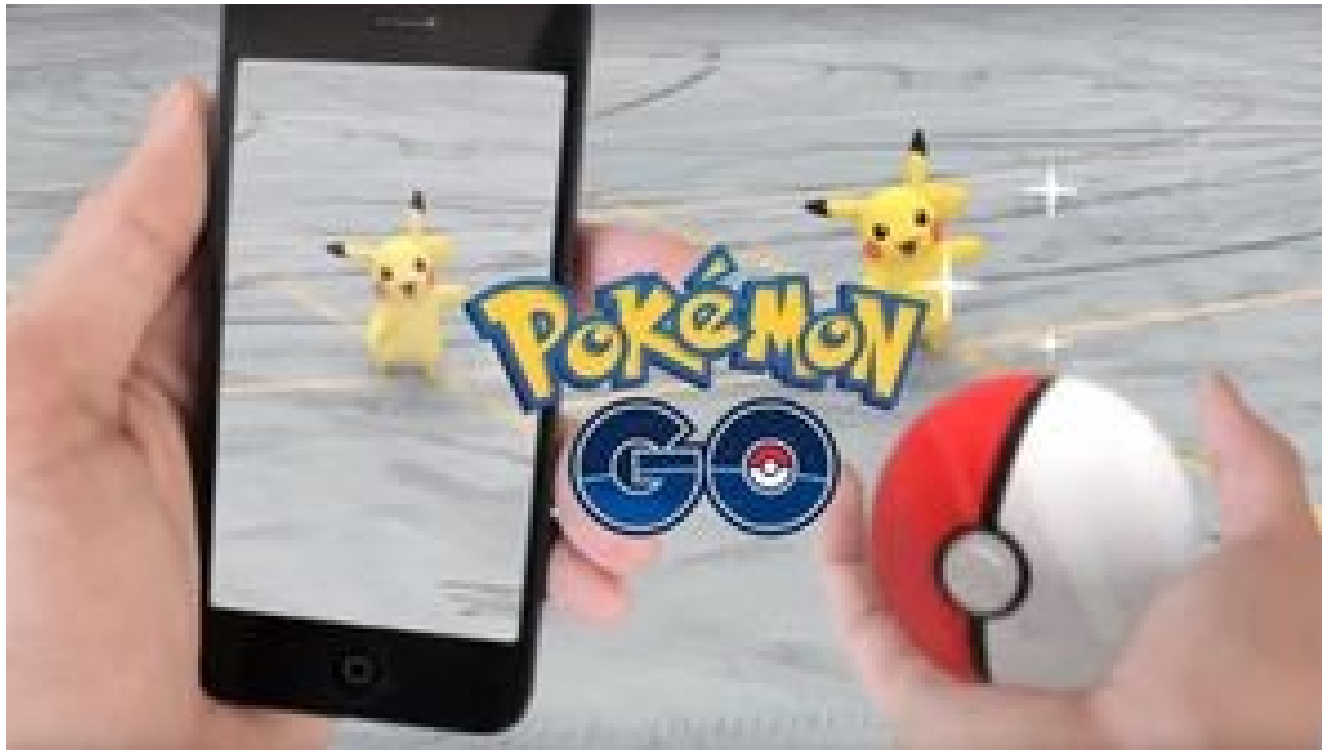
- 2002 Bruce Thomas creates the first AR game, ARQuake, <http://wearables.unisa.edu.au/projects/arquake/>
- 2009 Outdoor information overlay (GPS + Compass), Travel guide, advertising, Wikitude, Layar, etc. iOS/Android public API released



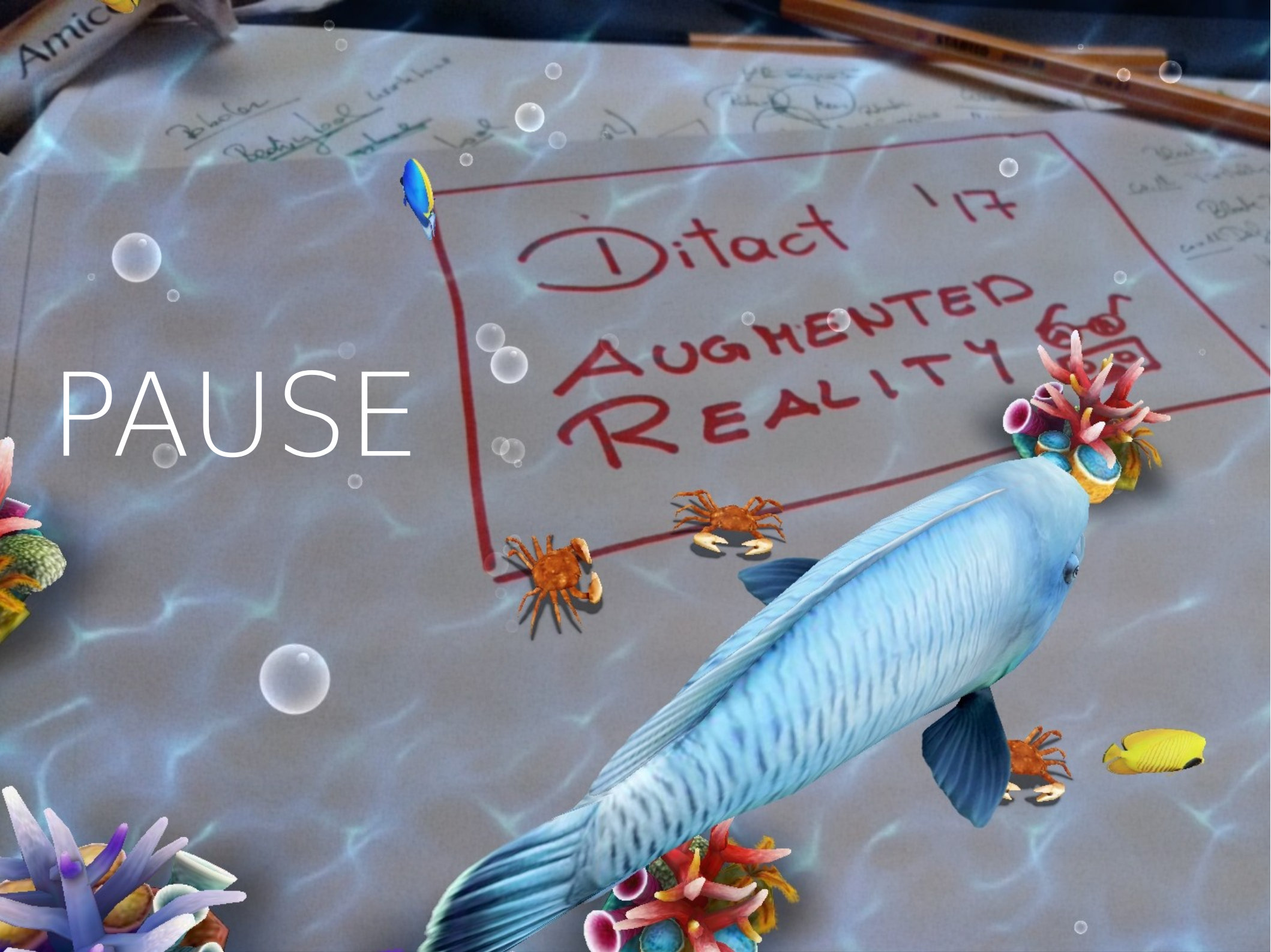
<https://www.youtube.com/watch?v=wJmeAH4Q7SY>

VR/AR History

- 2016 (Ingress-2013) Pokemon GO
Nintendo



PAUSE



Anwendungsbereiche

- Fabrik
- Games
- Architektur: Augmented City
- Ausbildung
- Kunst
- Marketing/Werbung
- Gesundheit: Augmented Human

Anwendung Fabrik



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xrux.at



hello@smeerws.at

Augmented Reality
for
Robot Programming in the Factory

Schunk-Study (7.10.2016 to 19.10.016)

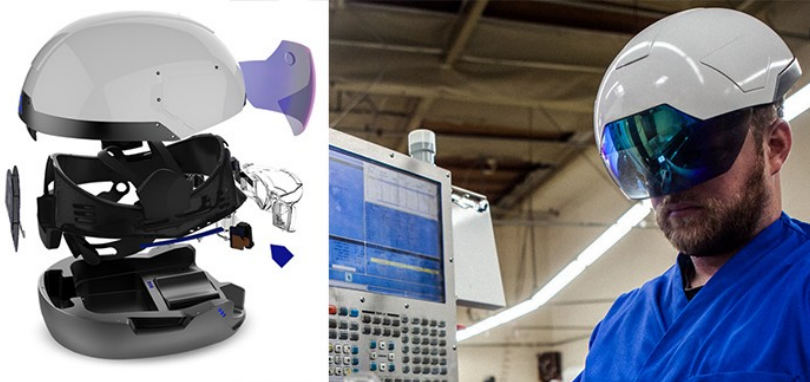
Susanne Meerwald-Stadler | Cornelia Zenz | Kevin Kain | Manuel Guliani

 Center for
Human-Computer Interaction
University of Salzburg

 **KEBA**
Automation by innovation.

VR XRUX oder YouTube

Anwendung Fabrik



- IOT
- Effizienzsteigerung
- Kollaboratives Arbeiten
- Weniger Reisen

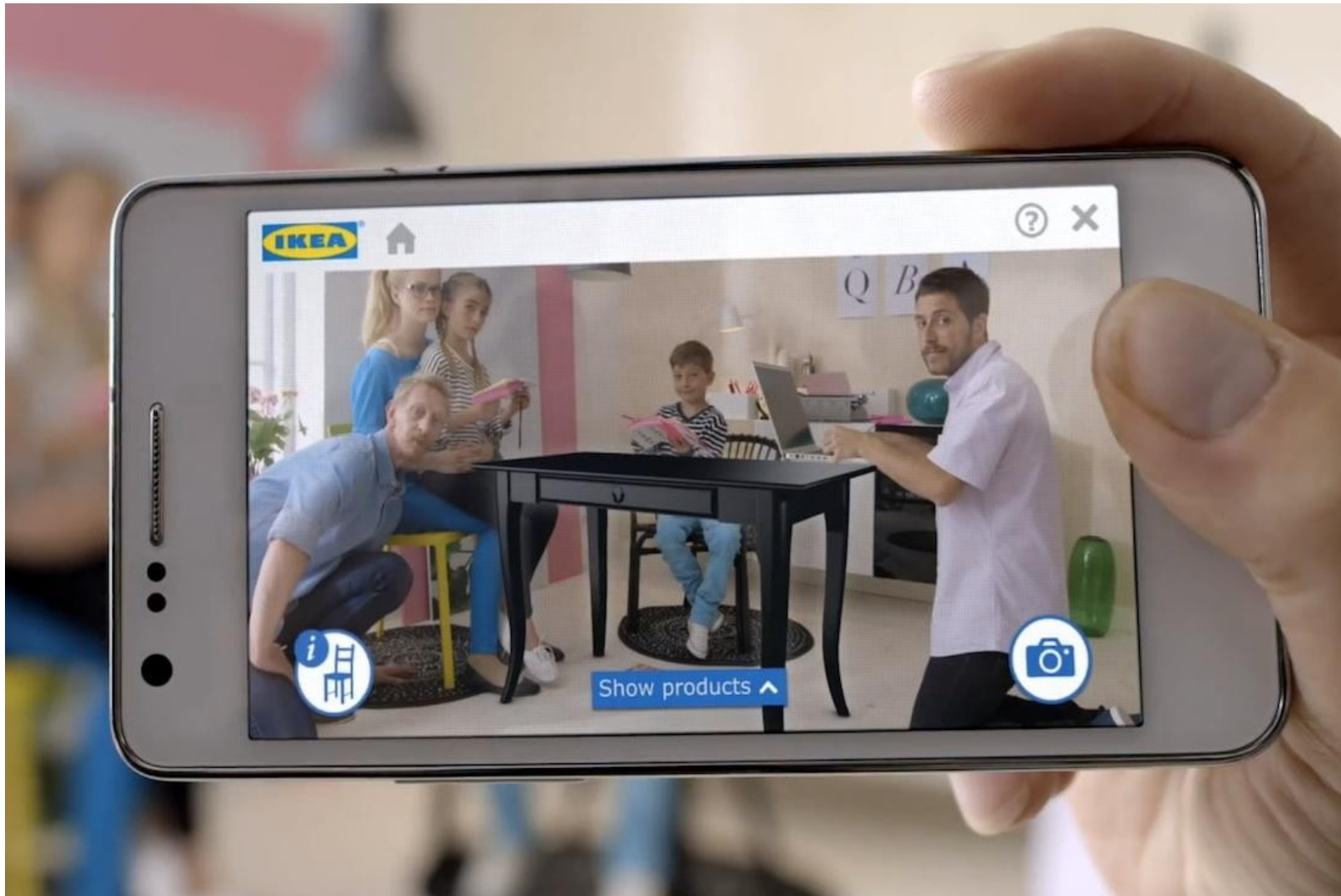
Anwendung Games



- <https://www.youtube.com/watch?v=UPn3jVGQw68>
- Augmented-Reality-Gesellschaftsspiele



Anwendung Architektur/Einrichtung



- <https://www.youtube.com/watch?v=vDNzTasuYEw>

Anwendung Architektur/Einrichtung

CAD computer-aided design

Fassadenarchitektur

Innenarchitektur

Stadtplanung

<http://www.form3d.de/category/virtual-reality/>



- <https://www.youtube.com/watch?v=vDNzTasuYEw>

Anwendung Werbung/Marketing

<https://www.youtube.com/watch?v=5TZmQPdhpak&index=9&list=PLgYTVaqhQsLEUFHLDI V0YUuDwgwbzsApJ>



Anwendung Gesundheit/Therapie

<https://www.youtube.com/watch?v=SKpKlh1-en0>

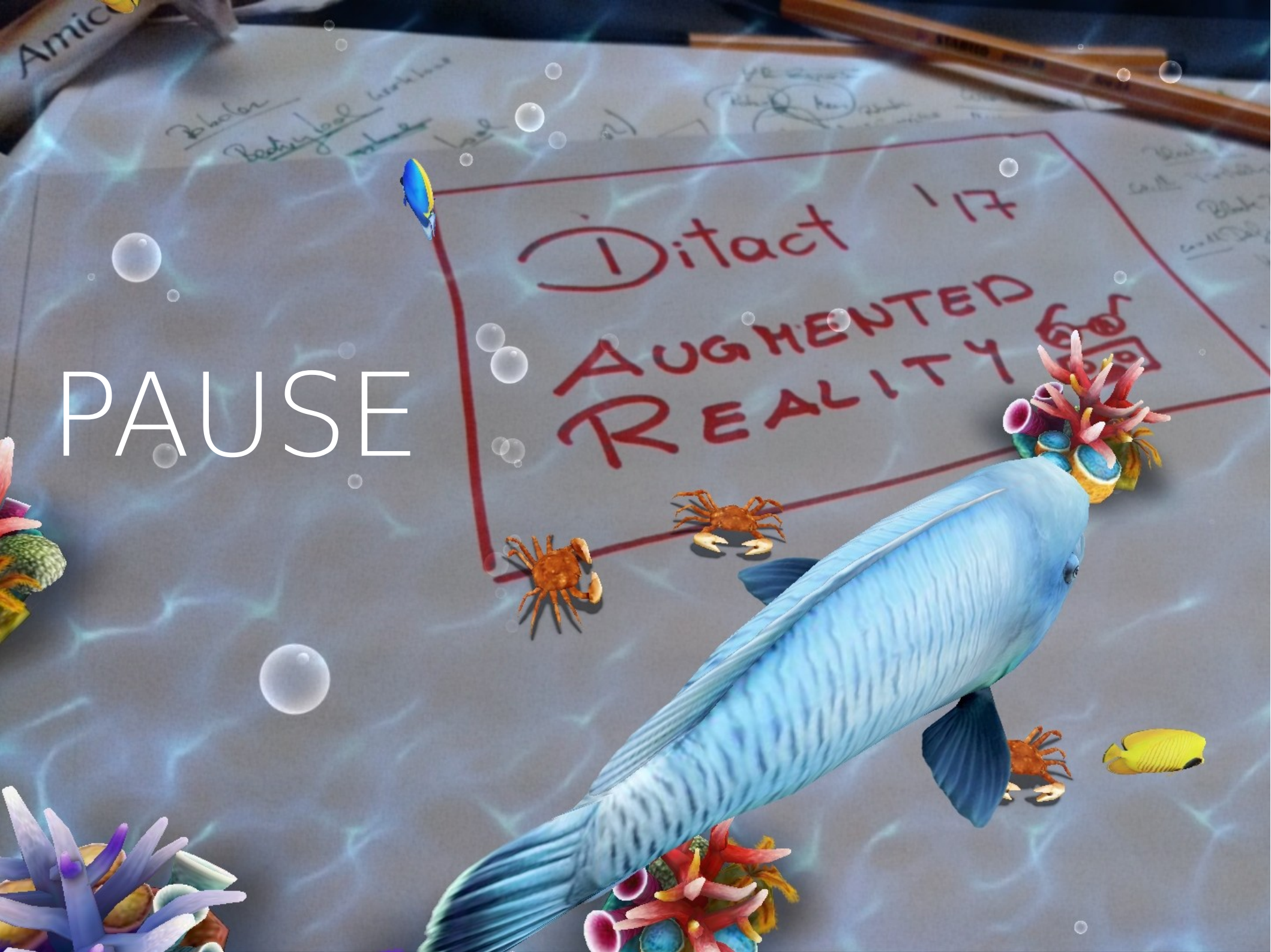


Anwendung Kunst

<https://www.youtube.com/watch?v=LBJPIgNXUDI>



PAUSE



UX AR Apps (phone & desktop)

- Augment (14 Tage Testversion) <http://www.augment.com/>
- ENTiTi <https://www.wakingapp.com/>
- AR Effect
<https://play.google.com/store/apps/details?id=com.sony.mobile.androidapp.cameraaddon.areffect&hl=de>
- Aurasma <https://www.aurasma.com/>

Mittag



THE VR FUND Q1 2017 VR INDUSTRY LANDSCAPE



Google Tango

<https://www.youtube.com/watch?v=70XngUDNcJw>



AR System

- 1) Combines Real and Virtual Images
 - Display technologies
- 2) Registered in 3D
 - Tracking technologies
- 3) Interactive in real-time
 - Interaction Technologies

Display technologies

- <https://www.kickstarter.com/projects/aryzon/aryzon-3d-augmented-reality-for-every-smartphone>
- HMD Hololense (2016)
 - Integrated system – Windows
 - Stereo see-through display
 - Depth sensing tracking
 - Voice and gesture interaction



Display technologies

Projektion, <https://www.youtube.com/watch?v=yBJEP4lsRFY>



Display technologies

Video see through <https://www.youtube.com/watch?v=Go9rf9GmYpM>



Tracking Technologies

Tracking ist das Ermitteln und Verfolgen von Position und Rotation beliebiger Objekte.

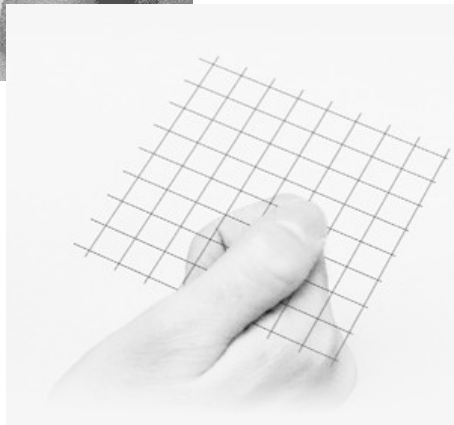
- Akustisches Tracking (Ultraschallwellen)
- Mechanisches Tracking
- Elektromagnetisches Tracking (Magnetfeld)
- Optisches Tracking (marker/markerless)
 - <https://www.youtube.com/watch?v=Ud8wbrRKPIU&index=5&list=PLgYTVaqhQsLFYCg032HweKbTqAj9b9dOP>

Interaction Technologies

Alles ist möglich :)



Soli



Konferenzen und mehr

- Meetup: Linz VR Plauscherl
- Blogs: VRNerds, VRscout
- Konferenzen: VR Summit FH Salzburg
<http://www.vr-summit-salzburg.at/> (5. Oktober 17)
 - AWE München <http://www.aweeu.com/> 19-20 Oktober 2017

Fragen AR/VR

Wie wird AR/VR unseren Alltag beeinflussen?

Rolle der Frau in AR/VR?

<http://www.wivr.net/>

<https://vodo.de/studie-zwei-drittel-der-frauen-haben-kein-interesse-an-virtual-reality/>

<http://www.20min.ch/schweiz/news/story/Frau-in-Virtual-Reality-Spiel-sexuell-belaestigt-17938508>

<https://www.thememo.com/2016/06/08/women-in-vr-women-in-tech-virtual-reality-unity3d-unity-labs-dio-gonzalez/>