



T17

Mobile Testing

Thursday, May 3rd, 2018

1:30 PM

AR and VR for Mobile Apps: Are You Ready to Test?

Presented by:

BJ Aberle

Float

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350 Corporate Way, Suite 400, Orange Park, FL 32073
888-268-8770 · 904-278-0524 - info@techwell.com - <http://www.stareast.techwell.com/>

BJ Aberle

Float

BJ Aberle has been Float's quality assurance lead for six years. Originally hired in 2003 as the director of audio for multimedia projects, the journey into game and procedural audio introduced him to the world of code and development. BJ found that testing and QA allowed him to use those skills to bring new value to the organization. Since no two projects at Float are the same, he wears many QA hats and morphs many roles into one—automation engineer, manual tester, agile test coach—depending on the need at any given time. When he's not wrestling with flaky UI tests, BJ enjoys creating music in his studio and spending time with his wife and three daughters.



AR and VR for Mobile Apps: Are You Ready to Test?

A look at mobile AR, VR and testing challenges

Thank You!

STAR EAST

A TECHWELL EVENT



Float mobilizes people, processes, and software in high-performing organizations through custom apps, digital strategy, and human-centered design.

A Bit About Me

- Started in music/audio
- Moved into audio for interactive media
- Thrown into testing and QA
- Patent owner



bjaberle.com

What is AR/VR?!?

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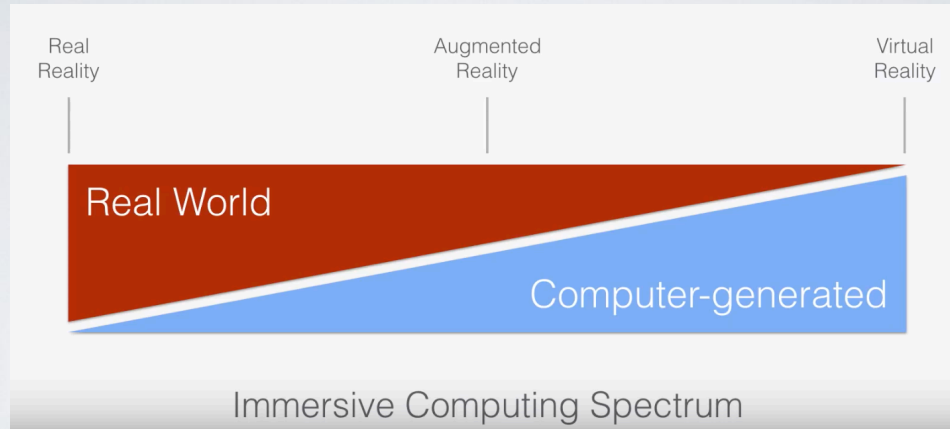
What is AR and VR?

- Augmented reality is the integration of digital information with the user's environment in real time. This gives the user augmentations to their current modes of perception and knowledge.
- Virtual reality is an artificial, computer generated environment presented to the user in such a way that the user suspends belief and accepts it as a real environment. Virtual reality is primarily experienced through sight and sound.

<http://whatis.techtarget.com/definition/augmented-reality-AR>
<http://whatis.techtarget.com/definition/virtual-reality>

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What is AR and VR?



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Why AR/VR?!?

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Why AR and VR?

ISN'T THIS JUST A FAD?

- The more computers evolve to operate more like humans good things have resulted.
 - Punchcards
 - Command line
 - GUI
 - Touch screens

The World is the interface

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Why AR and VR?

ISN'T THIS JUST A FAD?

- Glasses have a lot of resistance:
 - Specs
 - Battery life
 - Field of view

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Why AR and VR?

ISN'T THIS JUST A FAD?

Serious **Dork Factor** With Current Offerings



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Why AR and VR?

ISN'T THIS JUST A FAD?

Intel Vaunt Smart Glasses



<https://www.theverge.com/2018/2/5/16966530/intel-vaunt-smart-glasses-announced-ar-video>

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Why AR and VR?

ISN'T THIS JUST A FAD?

You're spending a lot of time on glasses, what gives?

<https://www.theverge.com/2018/2/5/16966530/intel-vaunt-smart-glasses-announced-ar-video>

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Why AR and VR?

ISN'T THIS JUST A FAD?

- Tech giants are doubling down on the technology

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Why AR and VR?

ISN'T THIS JUST A FAD?

- Tech giants are doubling down on the technology

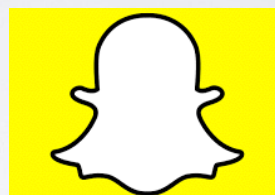


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Why AR and VR?

ISN'T THIS JUST A FAD?

- Tech giants are doubling down on the technology



- Facebook made three separate multi-billion \$\$ pleas for Snapchat.

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Why AR and VR?

ISN'T THIS JUST A FAD?

Who's Missing?!?!



... stay tuned!!

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What About Mobile?!?!

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What About Mobile?

VR EXPERIENCES

- VR can be experienced on mobile devices with the use of goggles that position the screen of the device in front of the user's eyes



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What About Mobile?

VR EXPERIENCES

- VR can be experienced on mobile devices with the use of goggles that position the screen of the device in front of the user's eyes
 - Not tethered to a computer
 - Little friction to get running
 - NO positional awareness



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What About Mobile?

AR EXPERIENCES

- AR on mobile devices is *generally* experienced with digital information overlaying the camera view.



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What About Mobile?

AR EXPERIENCES

- AR on mobile devices is *generally* experienced with digital information overlaying the camera view.



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What About Mobile?

AR EXPERIENCES

- AR on mobile devices is *generally* experienced with digital information overlaying the camera view.
- Technologies like Google's Tango are going to dramatically change the landscape of mobile AR

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What About Mobile?

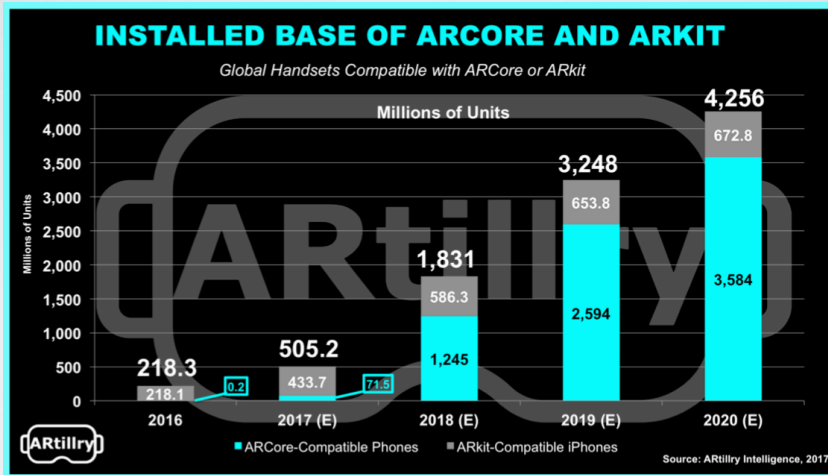
MOBILE AR PLATFORMS

- In 2017 Apple and Google announced their AR Developer platforms
- ARKit
- ARCore

Why is this important?

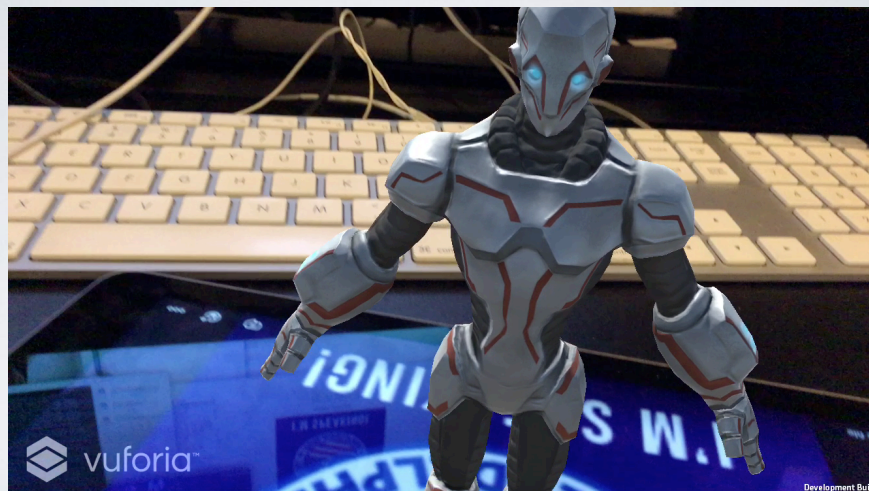
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Why AR and VR?



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Common Perception of AR!!!



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What the ...?!?

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"AR is most powerful when it's tightly coupled to the real world, and the more precisely, the better," - Clay Bavor, Vice President of Virtual Reality for Google

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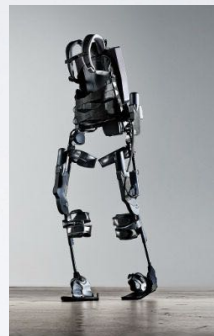
What Does Cydalion Do?

- Through the use of Tango technology Cydalion allows people with visual impairments to more successfully navigate their environment.



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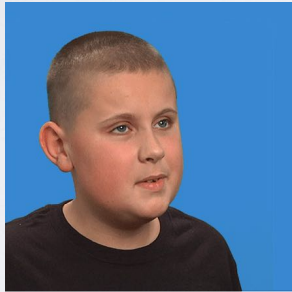
Augmented Reality



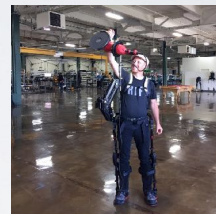
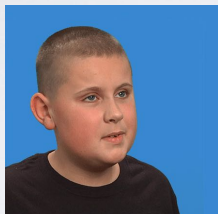
<http://www.robotistrends.com/hub/category/wearable>

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Augmented Reality



Augmented Reality



Cydalion Test Phases

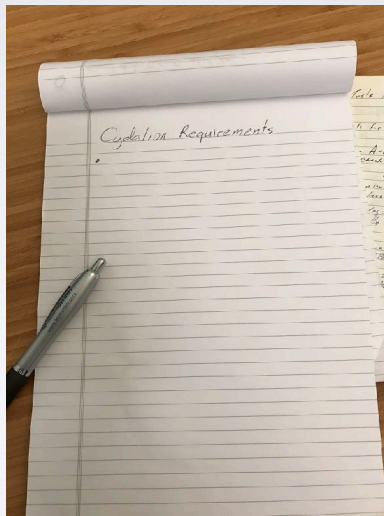


In emoji form

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Cydalion Test Phases

- Oh, Crap



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Cydalion Test Phases

- Finding Testers
- Interviews
- Project Tango Education
- Testing Day



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Cydalion Test Phases

- Okay
 - Very ambiguous results early on
 - Got familiar with the apps personality and attitude
 - Quantitative Data



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Cydalion Test Phases



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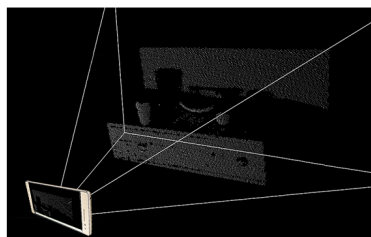
Cydalion Test Phases

- What happens when you ask developers to help you solve testing challenges?



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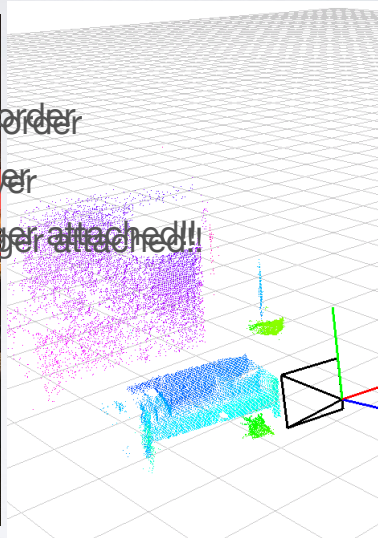
Can we mock the point cloud data?



Cydalion Test Phases



- Point Cloud Recorder
- Point Cloud Player
- Test with debugger attached!!



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Cydalion Test Phases

- Uncovered some flaws in the detection algorithm
- Went from around 34% accurate high/low detection to 84% - 85%



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Cydalion Test Phases

- Two weeks worth of dev time saved months of testing walking around
- We know if it is working because we have a basis for expected results



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Cydalion Test Phases

- With enough point cloud files we could start experimenting with training a neural network
- Able to create Automated UI-ish tests



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What Else?

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Other AR apps I've Tested

- Osterhout Design Group
- Abbvie
- Realities 360
- Frito-Lay



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Are You Ready, Player One?

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Working on AR/VR projects means
you'll have to:



Photo credit: Lisa Crispin's Twitter feed

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Are you ready?

- Physical test environments are not technically difficult, just time consuming.
 - Users
 - Device(s)
 - Data
 - State
 - Markers
 - Space

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Are you ready?

- The sun ruins everything! Account for lighting conditions.
- You may have to start tracking different units of measurement:
 - Lumens - *unit of luminous flux, a measure of the total quantity of visible light emitted by a source.*
 - Color Temperature - *conventionally expressed in kelvin, using the symbol K*

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Are you ready?

- For AR, What does your production environment look like?
- Get as much information about the the intended space as possible
 - Lighting
 - Windows
 - What will markers be printed on

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Are you ready?

- Test the Design
 - Start prototyping in VR immediately
 - Don't just focus on the 3 dimensionality of your VR space
 - Text rendering
 - Where the eyes are in relation to the projected camera makes a difference.

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Are you ready?

- Test the Performance

```
/**
 * Request options configured once we have camera intrinsics available.
 */
private var imageRequestOptions = [VNIImageOption: Any]()
/**
 * The center of the screen, in VisionFramework coordinates.
 */
private let visionCenter = CGPoint(x: 0.5, y: 0.5)

var count = 0

override func captureOutput(_ output: AVCaptureOutput, didOutput sampleBuffer:
CMSampleBuffer, from connection: AVCaptureConnection) {

    count += 1
    if count % 30 != 0 {
        return
    }

    guard let pixelBuffer = CMSampleBufferGetImageBuffer(sampleBuffer) else {
        return
    }

    if imageRequestOptions[.cameraIntrinsics] == nil,
        let cameraData = CMGetAttachment(sampleBuffer,
            kCMSampleBufferAttachmentKey_CameraIntrinsicMatrix, nil) {
        imageRequestOptions[.cameraIntrinsics] = cameraData
    }

    let imageRequestHandler = VNIImageRequestHandler(cvPixelBuffer: pixelBuffer,
        orientation: .right,
        options: imageRequestOptions)

    do {
        try imageRequestHandler.perform(requests)
    }
}
```

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Are you ready?

- Test the Performance

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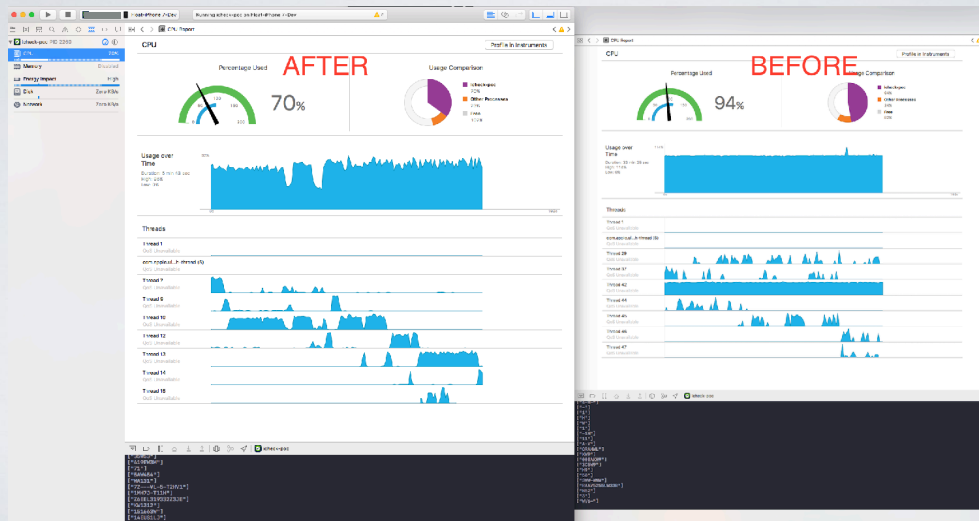
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}
```

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Are you ready?



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Are you ready?

- Test the Experience
 - Are interactions in a comfortable space?
 - Are users reaching for items?
 - Are objects in a difficult place to find?
 - Are key objects near by?
 - Do the controllers work as expected?
 - Test different types of controllers

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Are you ready?

- Test the Experience
 - Barf control is a real thing!!



- When the information coming into your eyes disagrees with your Vestibular system you get sick.
- Your eyes are telling you one sense of acceleration - your ears are telling you another.

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Are you ready?

- Test all the other stuff too!!!



Are you ready?

TOOLS & PROCESSES

- SDK's for AR/VR are relatively closed in terms of testing
- Difficult to pull off AR/VR in CI

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Are you ready?

TOOLS & PROCESSES

- Future AR/VR test environments will probably be made with game engines

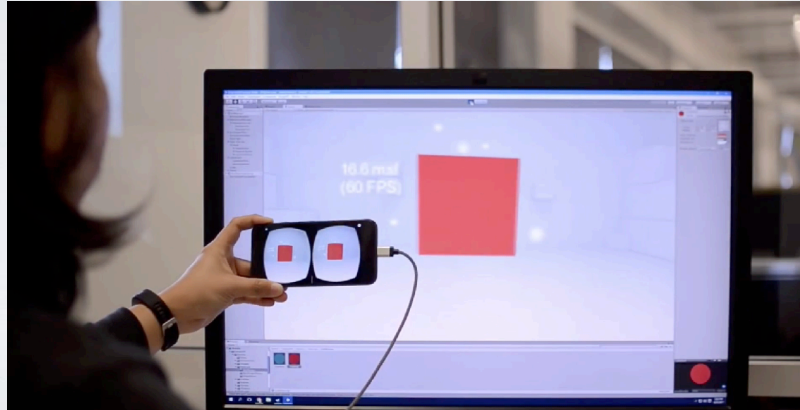


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Are you ready?

TOOLS & PROCESSES

- Chromecast
- Google Instant Preview plug-in



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Are you ready?

TOOLS & PROCESSES

- In my estimation, the biggest challenge currently is the lack of maturity of the field.
- ARKit and ARCore are barely a year old. A lot of developers are working with the APIs for the first time.
- We're probably a few years out from viable testing frameworks, good practices, or reliable CI.
- The best experiences of VR are not going to be adaptations of existing media forms.

This is good news for testers!!!!

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Are you ready?

TOOLS & PROCESSES

- Once *you've* tested, how are you going to conduct usability testing?
- Give new testers time
 - Testing at Bradley University has been relatively easy because most testers are gamer nerds.
 - If testers are from another demographic, it is very likely that they have had little to no VR exposure.

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Are you ready?

- Mobile Augmented Reality (AR) and Virtual Reality (VR) platforms
- What makes mobile AR and VR testing different
- My experience testing Cydalion
- Challenges you may expect to encounter when testing AR and VR apps
- What the future of AR may look like

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Thank You!!

Go forth and test

Twitter: @bjaberle