TechTogether 2019

Johan Ospina - Wayfair Next

Bitly: https://bit.ly/2CBp4r8

Agenda

- Hackathon Challenge
- Wayfair and Next
- History of 3D model formats and where we are going!
- Example Mobile AR Projects (with code!)
- High-Level AR Concepts
- Hackathon Challenge
- API and Resources

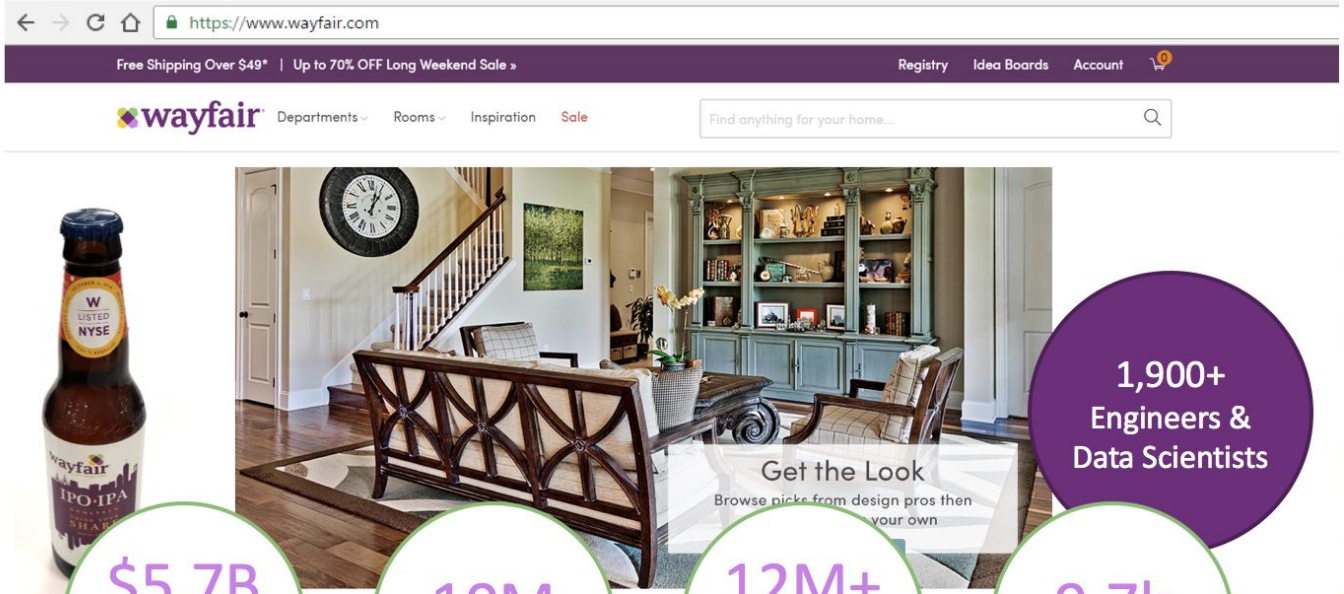
Our Challenge for you!

The Future of Home:

Wayfair decorating your home should be a source of fun, not stress. Through technology and innovation, Wayfair makes it possible for shoppers to quickly and easily find exactly what they want from a vast sea of choices.

We want to see what you can do with our 3D assets!

About Wayfair



Wayfair Brands

wayfair.com

Est. 2011

An online destination for all things home

Joss & Main

Est. 2011

Where beautiful furniture and finds meet irresistible savings

ALLMODERN

Est. 2006

Your home for affordable modern design

BIRCH LANE

Est. 2014

A collection of classic furnishings and timeless home décor

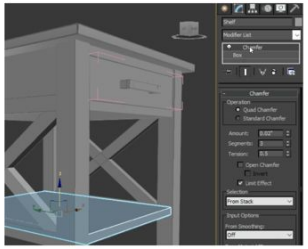
PERIGOLD

Est. 2017

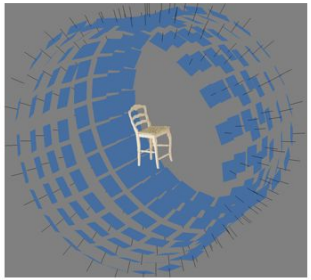
Unparalleled access to the finest home décor and furnishings

Wayfair’s 3D Content!

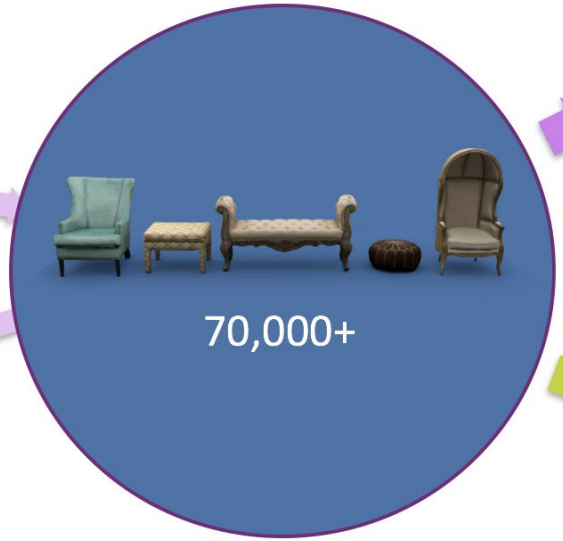
Wayfair's 3D Model pipeline



Hand Drawn



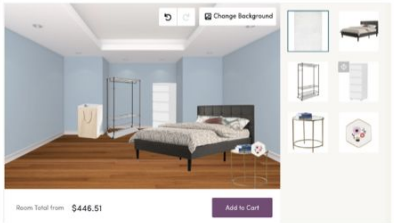
3D Scans



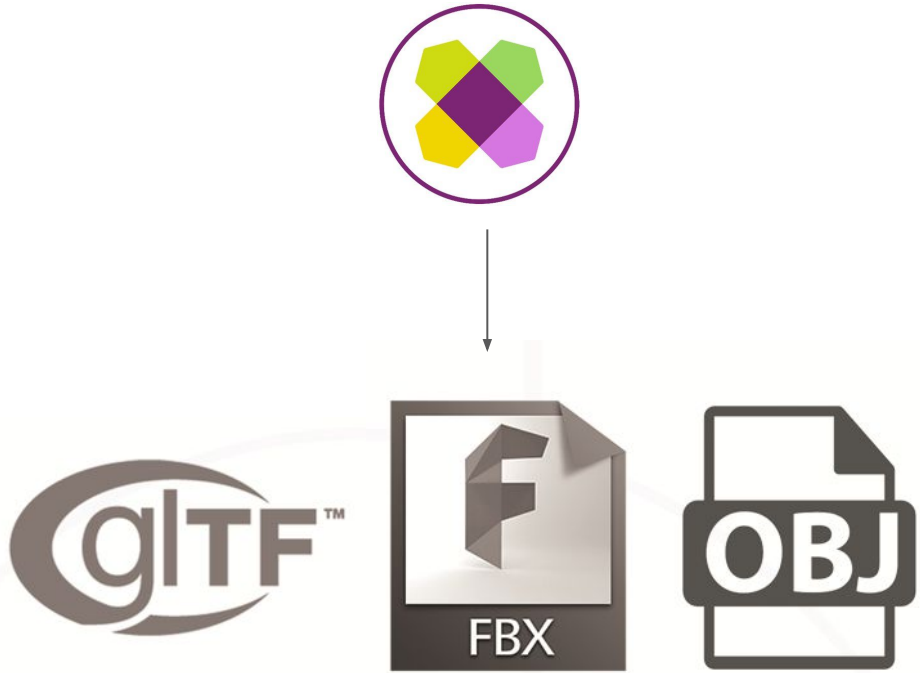
Renders

VR/AR

Room Planner



3D Model API



We try to support multiple 3D model formats

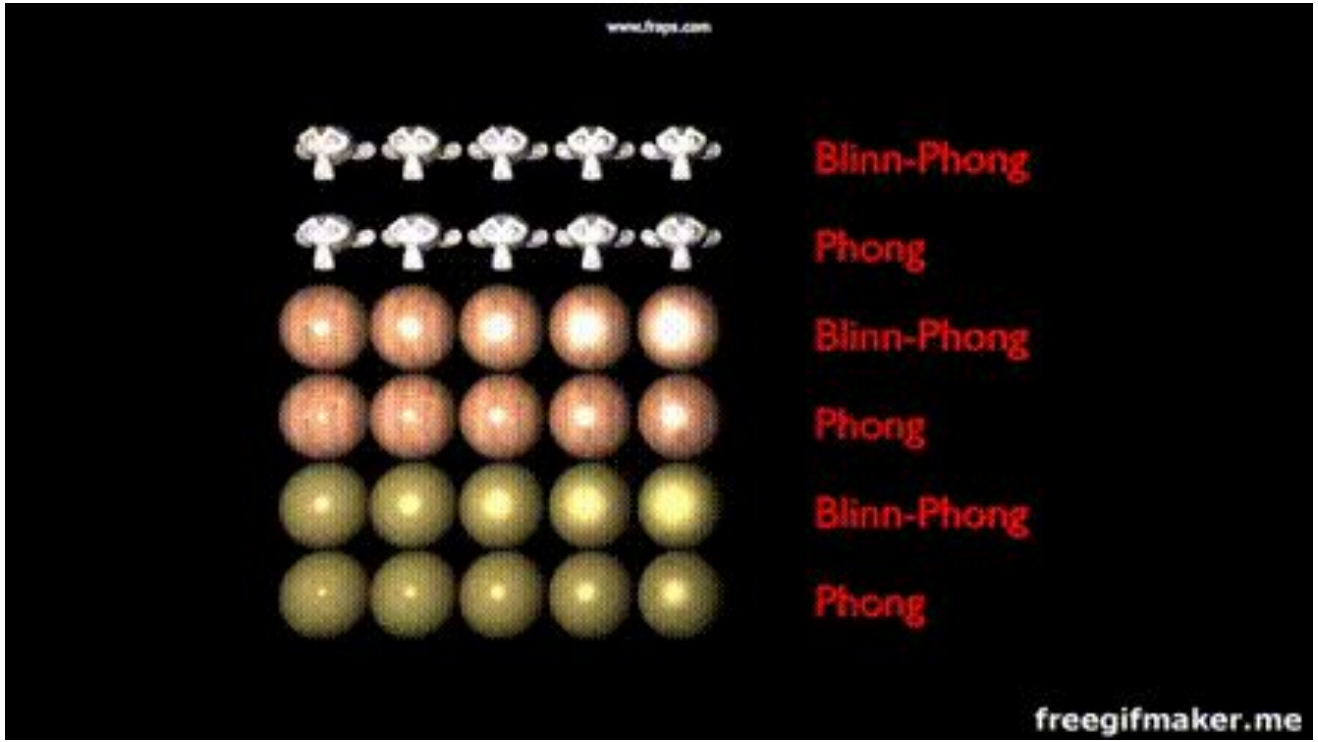
glTF 1.0 Created by the Khronos Group (think OpenGL) 3 years ago
glTF 2.0 came out 1.5 years ago

Created by Autodesk in 2006 to work with their software stack (3ds Max, Maya, etc…)

Created by Wavefront technologies almost 20 years ago. Wide support across many different software packages

What are the most important factors for E-Commerce?

- Material/Image Quality



Current State of the Art for real time

- Physically Based Rendering
  - Resource
  - Real Time Example

What are the most important factors for E-Commerce?

- Object Representation (1980-1990s)
- Material/Image Quality (early 2000's, PBR is the new state of the art)
- Accuracy (Current problem)
  - Models not only look good, but match what they represent
  - How do you represent multiple options for the same couch?
- Load times

Quality is good but visuals differ

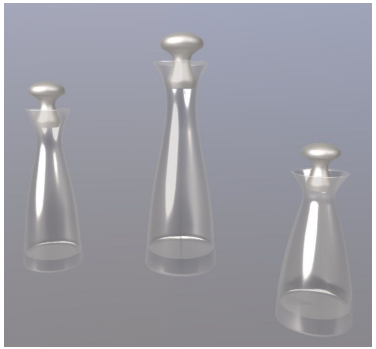
Ground Truth

3 Different Interpretations

Sometimes material features are missing from platforms

Ground Truth

2 Different Interpretations

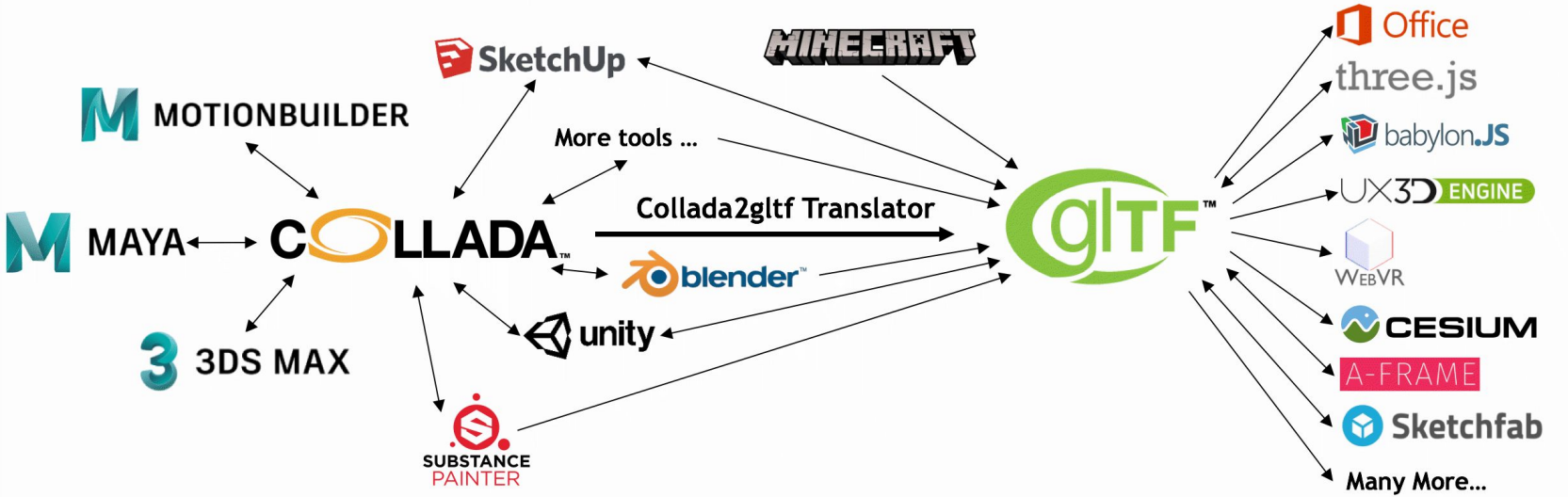


Manual Texture

Proposition: Standardize the material definition

COLLADA FOR AUTHORING INTERCHANGE
Retains extensive data to enable editable assets to be passed between authoring tools

glTF FOR RUN-TIME TRANSMISSION
Compact file size and efficient processing/import



COLLADA is intended to be used for intermediate interchange, glTF is designed for run-time delivery

glTF can be generated from intermediate formats such as COLLADA, or exported directly from authoring tools to fit individual use cases

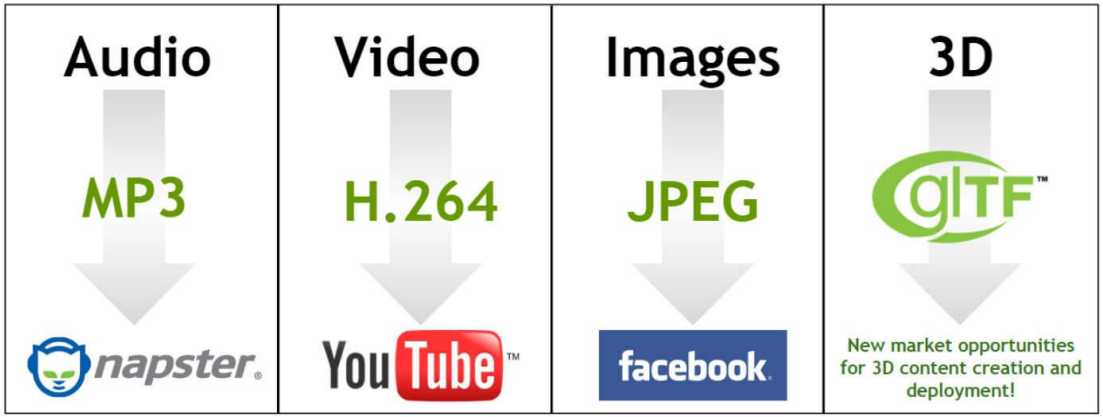
Apps and Engines Based on any 3D API

Vulkan. WebGL

Proposition: Standardize the material definition

- Define how things should look using a known standard
- Any viewer that is compliant should show the correct output
  - Industry is still aligning on this

Market Examples



Current State of the art for “offline” rendering

VRayFur

Code Examples!

Example Android Project

https://github.com/google-ar/sceneform-android-sdk/tree/master/samples/hellosceneform

Example iOS Project

https://developer.apple.com/documentation/arkit/handling_3d_interaction_and_ui_controls_in_augmented_reality

Example Projects Links

iOS: ARKit + SceneKit

https://github.com/zgay/iOSHackathonModelViewer

Android: ARCore + SceneForm

https://github.com/khonakr/hello-ar-wayfair

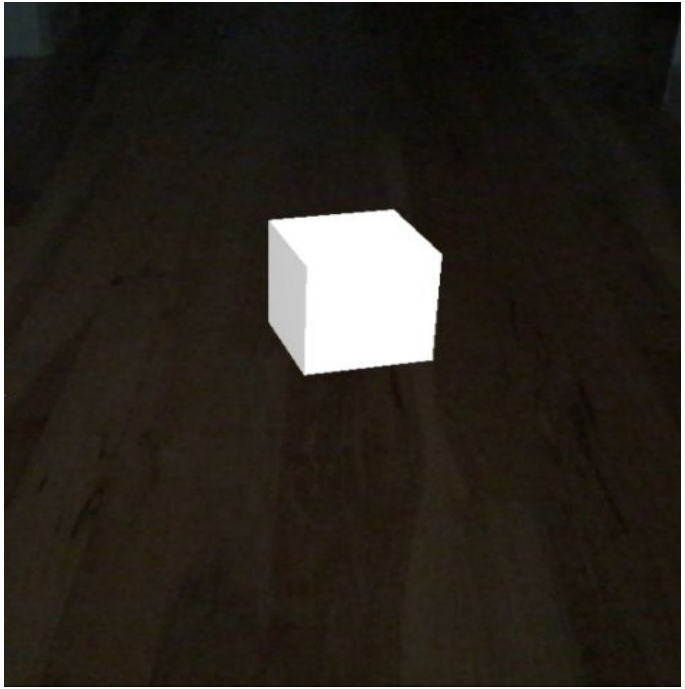
AR Lighting

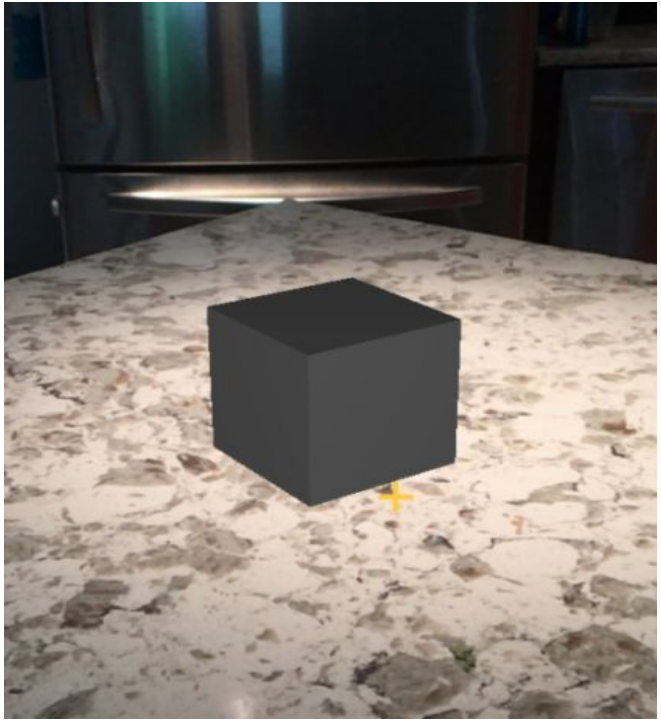
- The lighting in your scene should match the real environment
- Use ambient lighting data to adjust the intensity of your own lights
- Use appropriate environment maps to make your object look like it's really there
  - And give it reflections

Image: https://pbs.twimg.com/media/Dmetl2qX4AAnOVT.jpg

AR Lighting

Objects that are too bright or too dark appear out of place





https://blog.markdaws.net/arkit-by-example-part-4-realism-lighting-pbr-b9a0bedb013e

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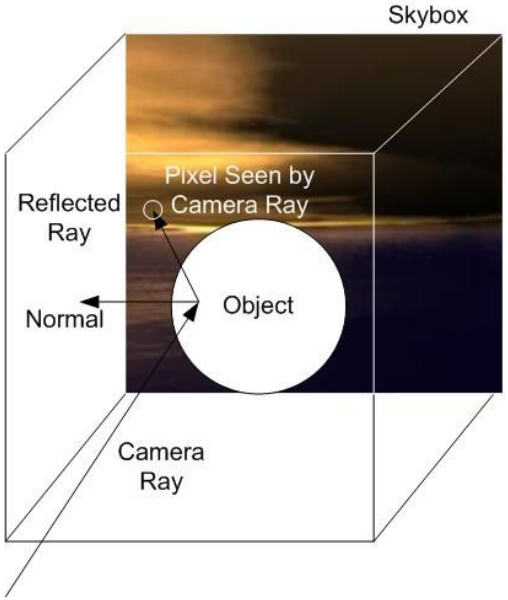
AR Lighting

- Environments in PBR are represented as Cube Maps! Also known as equirectangular images



Both Map to a Cube!

AR Lighting

Environment maps generated from the environment produce the best results

https://medium.com/@ivannesterenko/realistic-reflections-and-environment-textures-in-arkit-2-0-d8d0f1332eed

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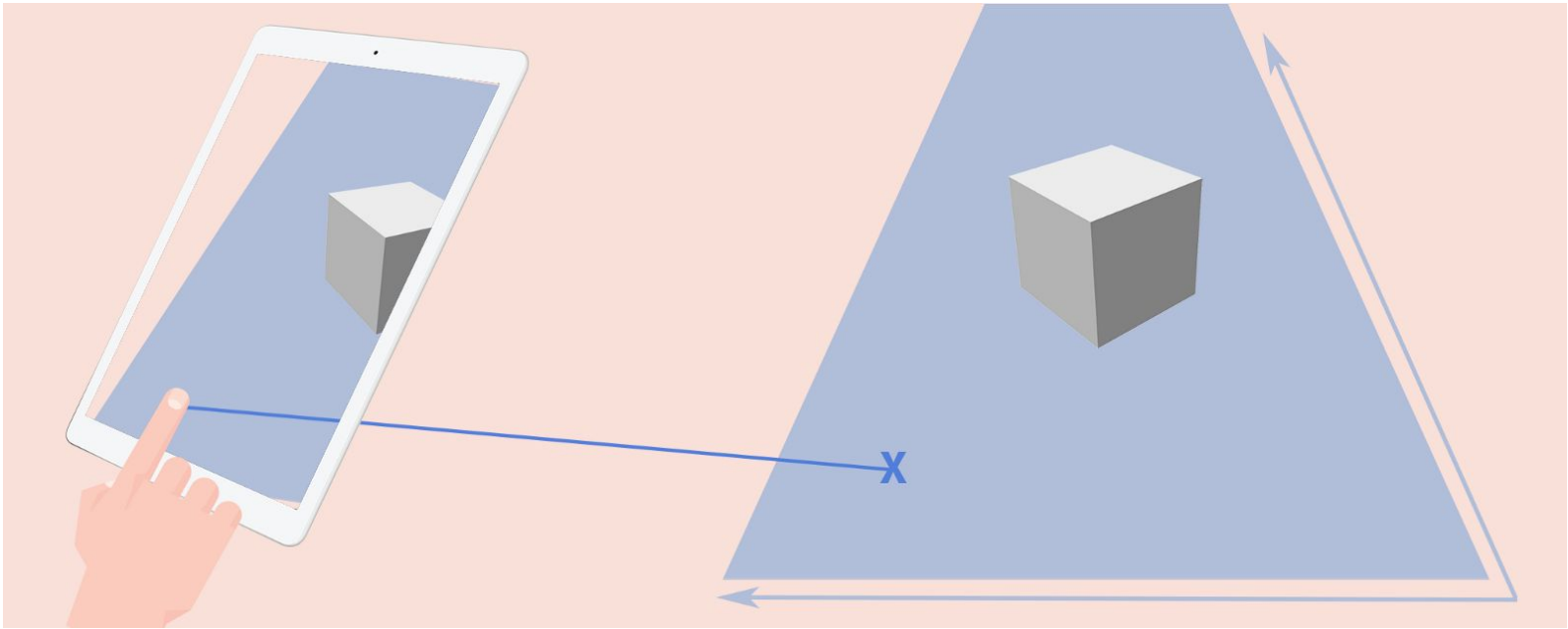
AR Gestures

- Touch locations need to be translated from a 2D plane to 3D space
- Can be done by *projecting* the 2D point to a 3D line
- Hit tests can then be performed to determine what was touched



https://medium.com/inborn-experience/the-essential-guide-to-mobile-ar-gestures-51906df56d3d

Inspirational Project - Portal

https://thumbs.gfycat.com/CautiousFirstFrilledlizard-small.gif

Inspirational Project - 3D Floor Plan

https://www.mountainranchapthome.com/Marketing/FloorPlans/Units/4ab751e8-25c1-469b-91b4-d323dad26771

What We Offer - 3D Model API

1. Go to the API page bit.ly/wayfair3dapi

2. Sign up for API Key at https://wayfair.com/3dapi

3. GET Request to https://wayfair.com/3dapi/models to get 3D models!

4. Code for Batch Processing 3D Models from API
   https://github.com/timzhang642/Hacking_Arts_2018

What We Offer - 3D Model API


```
[
  {
    "sku": "ZIPC4121",
    "product_name": "Liam Barrel Chair",
    "product_description": "<i>Mooove</i> on over to make room for your new favorite accent chair! This American-made design br
    "product_page_url": "https://www.wayfair.com/furniture/pdp/zipcode-design-liam-barrel-chair-zipc4121.html",
    "class_name": "Accent Chairs",
    "sale_price": 172.99,
    "thumbnail_image_url": "https://secure.img1.wfcdn.com/lf/43/hash/2664/59803713/1/custom_image.jpg",
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        "x": 34.29,
        "y": 27.86,
        "z": 32.46
      },
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      "obj": "http://img.wfrcdn.com/docresources/37311/101/1014484.zip"
    }
  }
]
```

Prizes

Best Use of the Wayfair 3D API: Oculus Go

Prizes

Best Hack for Housing Inequality Prize:

$500 donation to the charity of their choice, $100 Wayfair gift card per team member, and additional Wayfair swag

Judging Criteria

Innovation
The idea can demonstrate originality, or unique use of innovative technologies. It also demonstrates how it was developed, and the basis for its conceptualization.

Impact
The idea can demonstrate the potential for impact and a high rate of success for effectiveness. It has the potential of making a difference in the target users' life and a likelihood that it will bring real value and solutions.

Artistic Awesomeness
Everyone's definition of awesomeness will be different, but ultimately it boils down to creativity, depth, and wow factor.

Resources

- Contact
  jospina@wayfair.com

- 3D Model API
  bit.ly/wayfair3dapi

- Code for Batch Processing 3D Models from API
  https://github.com/timzhang642/Hacking_Arts_2018
  https://github.com/WayfairAPI/Wayfair