

Web-Based Virtual Reality

made terribly easy !

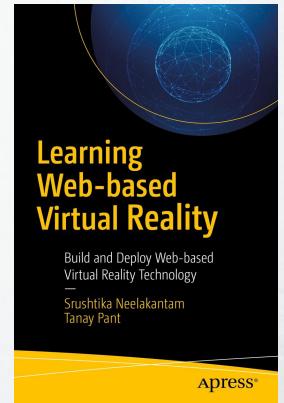


Srushtika Neelakantam

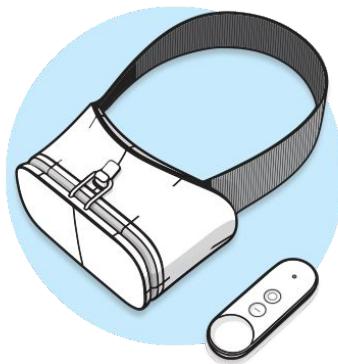
 @Srushtika

Mozilla Rep, Techspeaker,
Campus Advisory Committee
member

Co-Author
*Learning
Web-based
Virtual Reality*



Virtual Reality

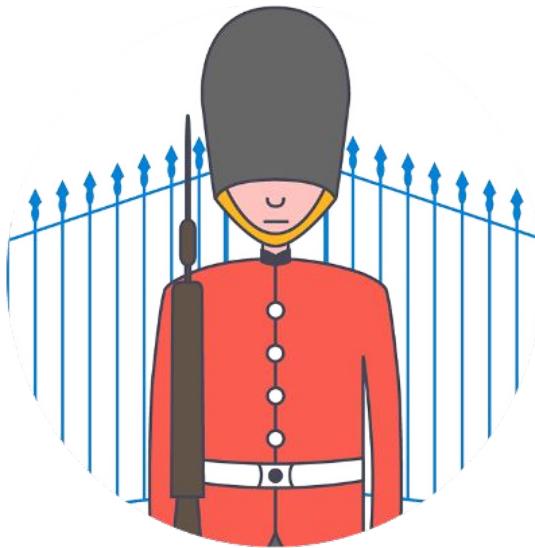


VR HEADSETS



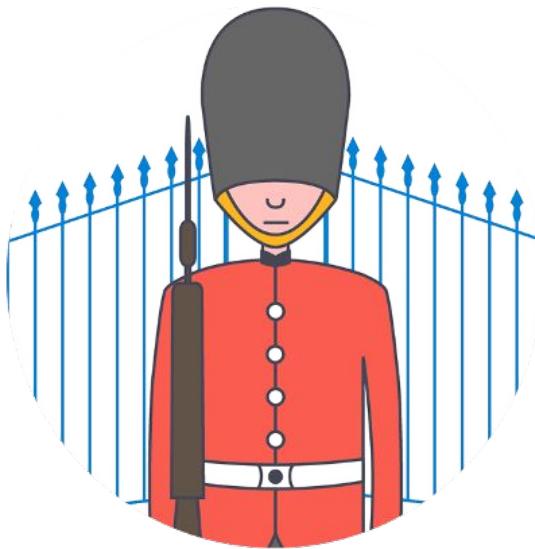
Friction in VR Ecosystems

Friction in VR Ecosystems



Gatekeepers

Friction in VR Ecosystems

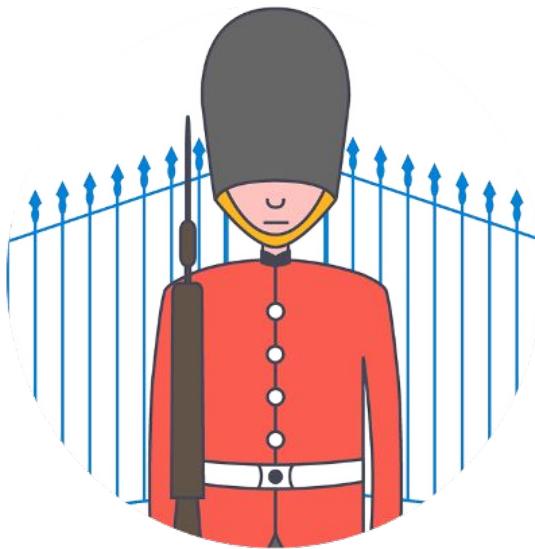


Gatekeepers

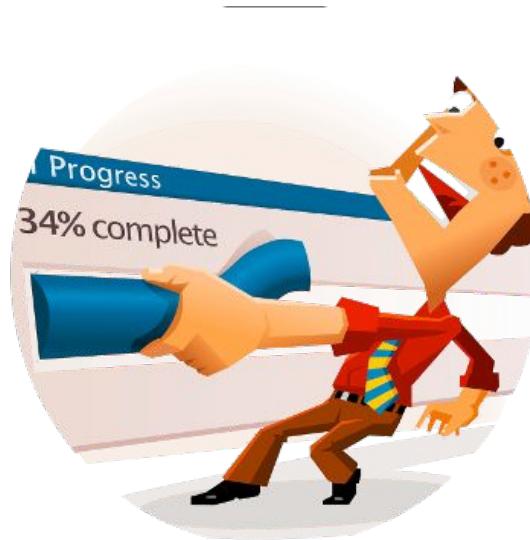


Installs

Friction in VR Ecosystems



Gatekeepers



Installs



Closed

WebVR

An open Virtual Reality platform with the advantages of
the WEB

WebVR

An open Virtual Reality platform with the advantages of
the WEB



Open

WebVR

An open Virtual Reality platform with the advantages of
the WEB



Open



Connected

WebVR

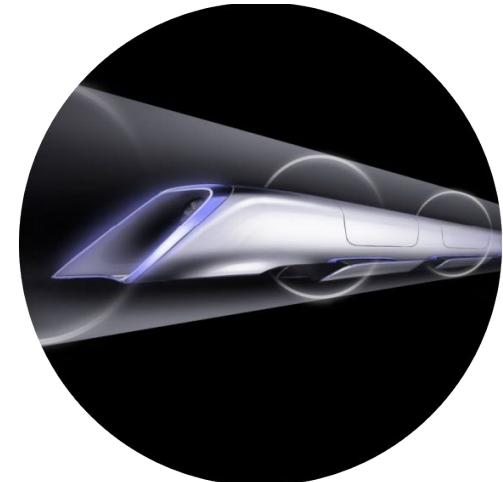
An open Virtual Reality platform with the advantages of
the WEB



Open



Connected



Instant



Browser APIs that enable WebGL rendering to headsets
and access to VR sensors

<https://w3c.github.io/webvr/>

Support

<https://webvr.rocks>



*Firefox
Nightly*



*Chromium
(Experimental)*



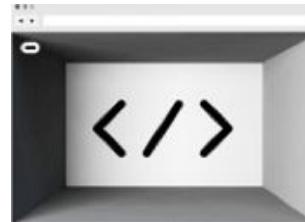
*Samsung
Internet*



*Mobile
Polyfill*



*Chrome
For Android*



*Oculus
Carmel*



*Microsoft
Edge*

Too hard to create WebVR
experiences?

```
27
28   &:hover{
29     color:#fff;
30     opacity:1;
31   }
32   &:text{
33     width:35px;
34     height:35px;
35   }
36   &:img{
37     width:35px;
38     height:35px;
39   }
40   </style>
41 </head>
42 <body>
```

IMPORT WEBVR POLYFILL

SET UP CAMERA

SET UP LIGHTS

INITIALIZE SCENE

DECLARE AND PASS CANVAS

LISTEN TO WINDOW RESIZE

INSTALL VR EFFECT

INSTANTIATE RENDER

CREATE RENDER LOOP

PRELOAD ASSETS

FIGURE OUT RESPONSIVENESS

DEAL WITH METATAGS AND MOBILE

```
43
44
45   <div id="links">
46     <a href="http://leapmotion.com">LEAP MOTION</a>
47     <a href="http://webvr.info/">WEBVR</a><br>
48     <a href="http://cabbi.bo/">CABBI BO</a><br>
49     <a href="https://www.leapmotion.com">LEAP MOTION</a>
50   </div> INSTANTIATE RENDER
51
52   <script src = "lib/leap.min.js" ></script>
53   <script src = "lib/three.min.js" ></script>
54   <script src = "lib/universalcontrols.js" ></script>
55   <script src = "lib/ThreeOrbitControls.js" ></script>
56   <script src = "lib/SubdivisionModifier.js" ></script>
57   <script src = "lib/OrbitControls.js" ></script>
58   <script src = "lib/SubdivisionModifier.js" ></script>
59   <script src = "lib/PhysicsRender.js" ></script>
60   <script src = "lib/VREffects.js" ></script>
61   <script src = "lib/VRControls.js" ></script>
62
63   <script src = "lib/ShaderForge.js" ></script>
```

Introducing A-Frame

A declarative framework that allows you to get unlimited access to Javascript and three.js while limiting the code to just HTML

A-Frame

It wraps the power of WebGL in HTML custom elements, so creating a high performance VR experience becomes extremely simple.

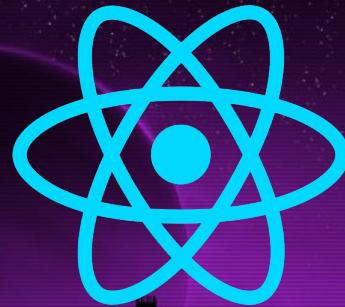
Works with everything !



d3.js



Vue.js



React



Redux



Angular



jQuery

A-FRAME

Examples

[Hello WebVR](#)

[Hello Metaverse](#)

[360° Image](#)

[360° Image Gallery](#)

[360° Video](#)

[Animation](#)

[Anime UI](#)

[Audio Visualization](#)

[Lights](#)

[Shopping](#)

[Spheres & Fog](#)

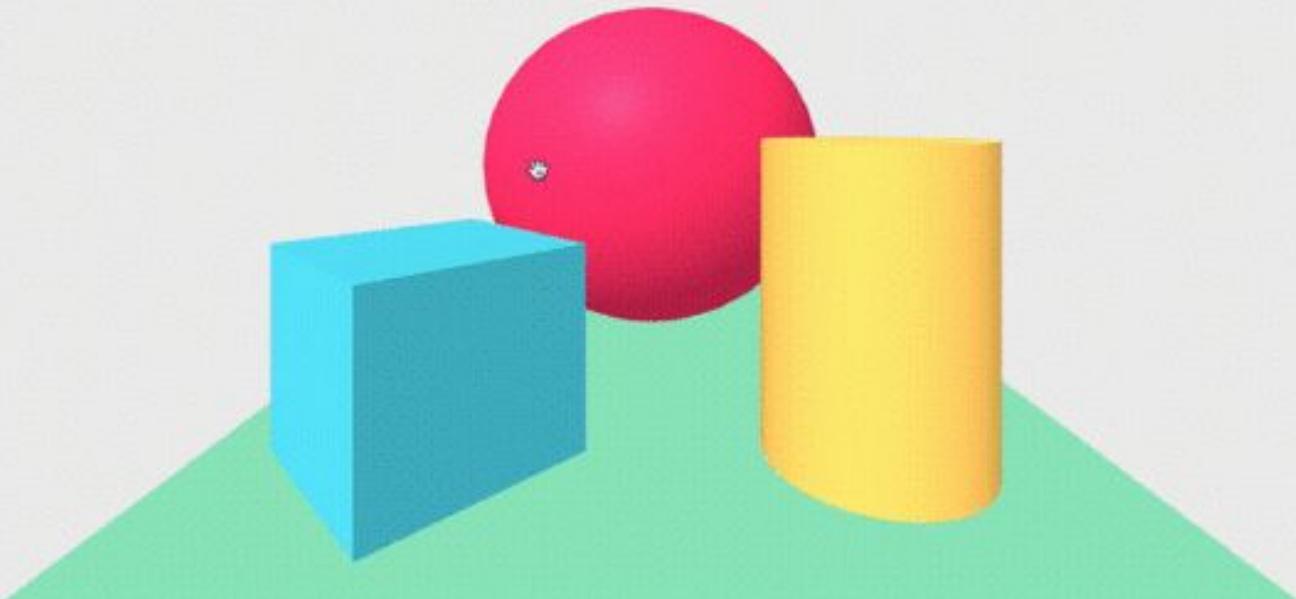
[Tracked Controllers](#) ↗

[A-Blast](#) ↗

[A-Painter](#) ↗

[City Builder](#) ↗

[Museum](#) ↗



Talk is cheap

Show me the

CODE

Hello World !

```
<html>
  <script src="https://aframe.io/releases/0.3.2/aframe.min.js"></script>

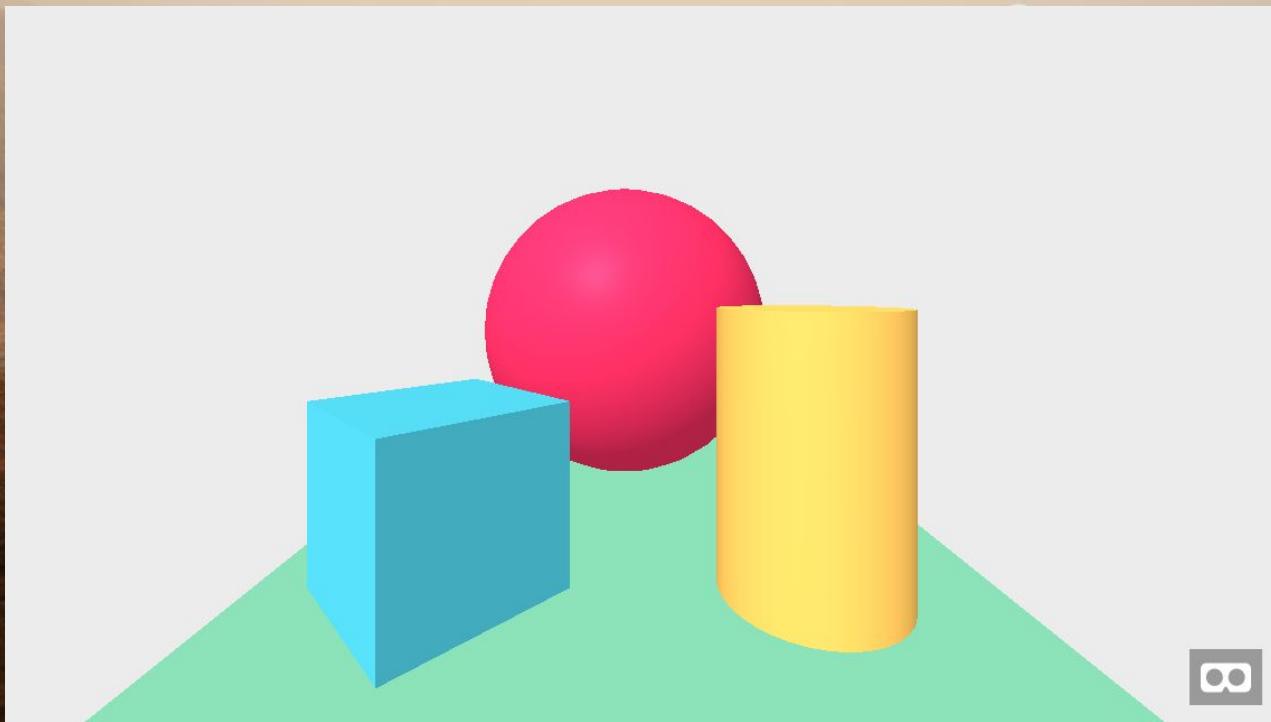
  <a-scene>
    <ambient-light color="#fff">
    <box position="0 0 0" color="#4CAF50" size="1 1 1" >
    <box position="0 0 0" color="#FF9800" size="0.9 0.9 0.9" >
    <box position="0 0 0" color="#FF9800" size="0.8 0.8 0.8" >
    <box position="0 0 0" color="#FF9800" size="0.7 0.7 0.7" >
    <box position="0 0 0" color="#FF9800" size="0.6 0.6 0.6" >
    <box position="0 0 0" color="#FF9800" size="0.5 0.5 0.5" >
    <box position="0 0 0" color="#FF9800" size="0.4 0.4 0.4" >
    <box position="0 0 0" color="#FF9800" size="0.3 0.3 0.3" >
    <box position="0 0 0" color="#FF9800" size="0.2 0.2 0.2" >
    <box position="0 0 0" color="#FF9800" size="0.1 0.1 0.1" >
    <box position="0 0 0" color="#FF9800" size="0.05 0.05 0.05" >
    <box position="0 0 0" color="#FF9800" size="0.02 0.02 0.02" >
    <box position="0 0 0" color="#FF9800" size="0.01 0.01 0.01" >
  </a-scene>
</html>
```

Hello World !

```
<html>
  <script src="https://aframe.io/releases/0.3.2/aframe.min.js"></script>

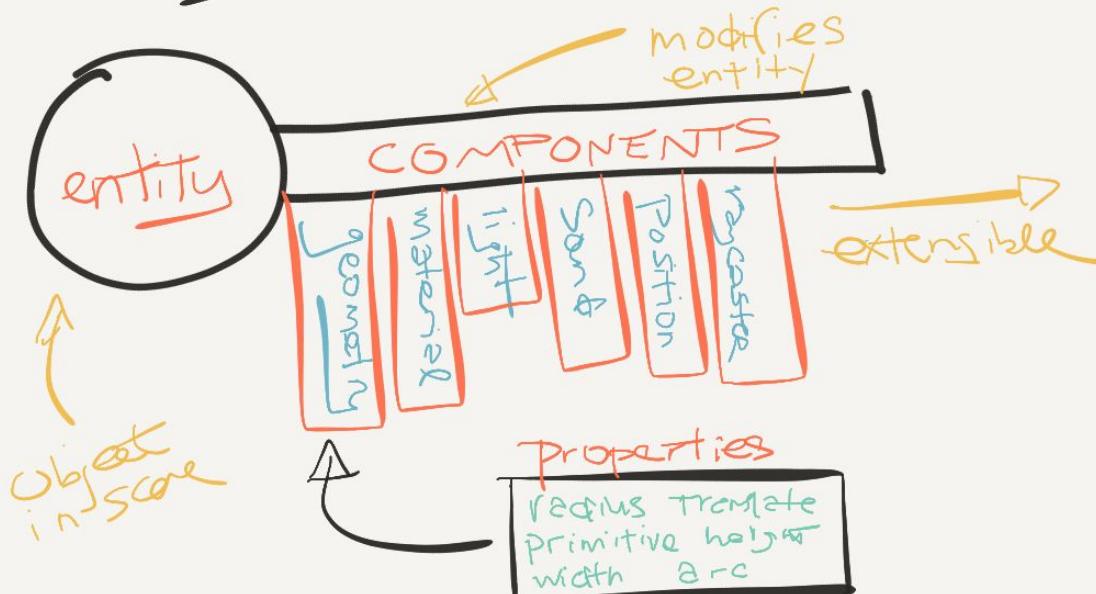
  <a-scene>
    <a-box color="#4CC3D9" position="-1 0.5 -3" rotation="0 45  0"></a-box>
    <a-cylinder color="#FFC65D" position="1 0.75 -3" radius="0.5" height="1.5"></a-cylinder>
    <a-sphere color="#EF2D5E" position="0 1.25 -5" radius="1.25"></a-sphere>
    <a-plane color="#7BC8A4" position="0 0 -4" rotation="-90 0 0" width="4"
      height="4"></a-plane>
    <a-sky color="#ECECEC"></a-sky>
  </a-scene>
</html>
```

How it looks in the browser:



Entity - Component - System

A-FRAME
ENTITY-COMPONENT MODEL



How about a more real
example !?



Registry

Curated collection of A-Frame components/ shaders !



Components



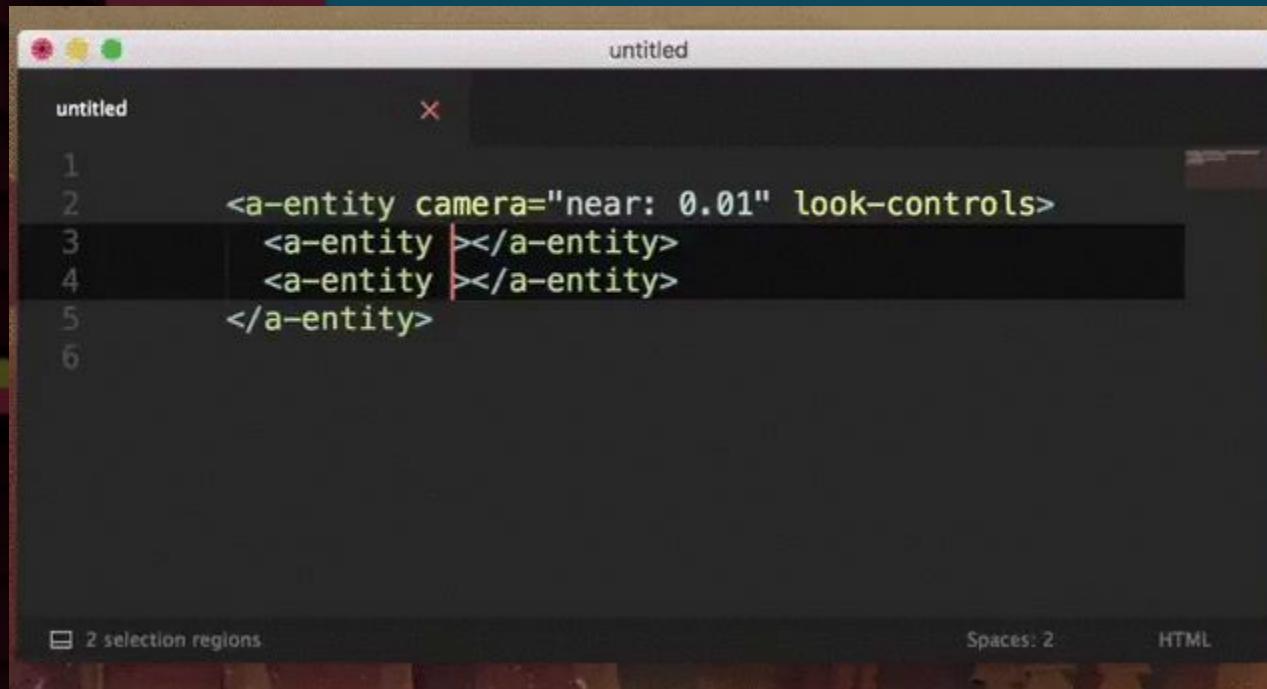
aframe-animation-component
@ Kevin Ngo · ↑ June 1st 2016 - © MIT - ★ 52
Animations in A-Frame using anime.js
↳ [aframe-animation-component.min.js](#)

create your own components



Registry

Curated collection of A-Frame components/ shaders !



A screenshot of a code editor window titled "untitled". The code editor displays the following A-Frame component code:

```
1 <a-entity camera="near: 0.01" look-controls>
2   <a-entity |></a-entity>
3   <a-entity |></a-entity>
4 </a-entity>
5
6
```

The code editor interface includes standard window controls (minimize, maximize, close) at the top. At the bottom, there are status indicators: "2 selection regions", "Spaces: 2", and "HTML".

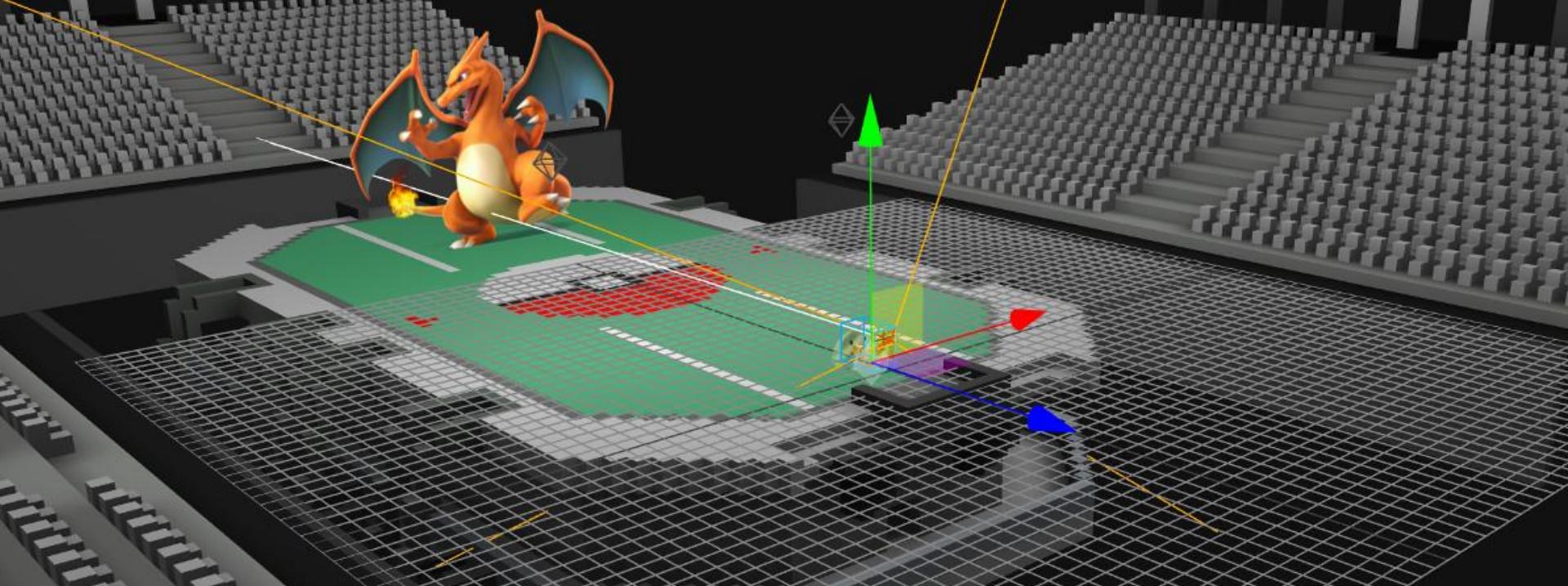
create your own components

position rotation hand-controls
controls scale light material
cursor fog geometry sound
raycaster obj-model collada-model

explore terrain particle-system hud selectable altspace
no-click-look-controls look-at gif-shader draw noise
orbit-controls crease firebase mouse-cursor html-shader
meshline grab cubemap shadow
template physics layout audio-visualization
leap-motion-controls position rotation hand-controls randomizer
collider gltf controls scale light material along-path
video-controls cursor fog geometry sound gamepad-controls
bmfont-text raycaster obj-model collada-model fbx
lathe-geometry proxy-controls extrude-geometry
stereo fence href gITF entity-generator ocean
fit-texture interpolation mesh-line grid-helper draggable
universal-controls mouse-cursor ply-model

Inspector

A visual tool for A-Frame
`<ctrl> + <alt> + i`



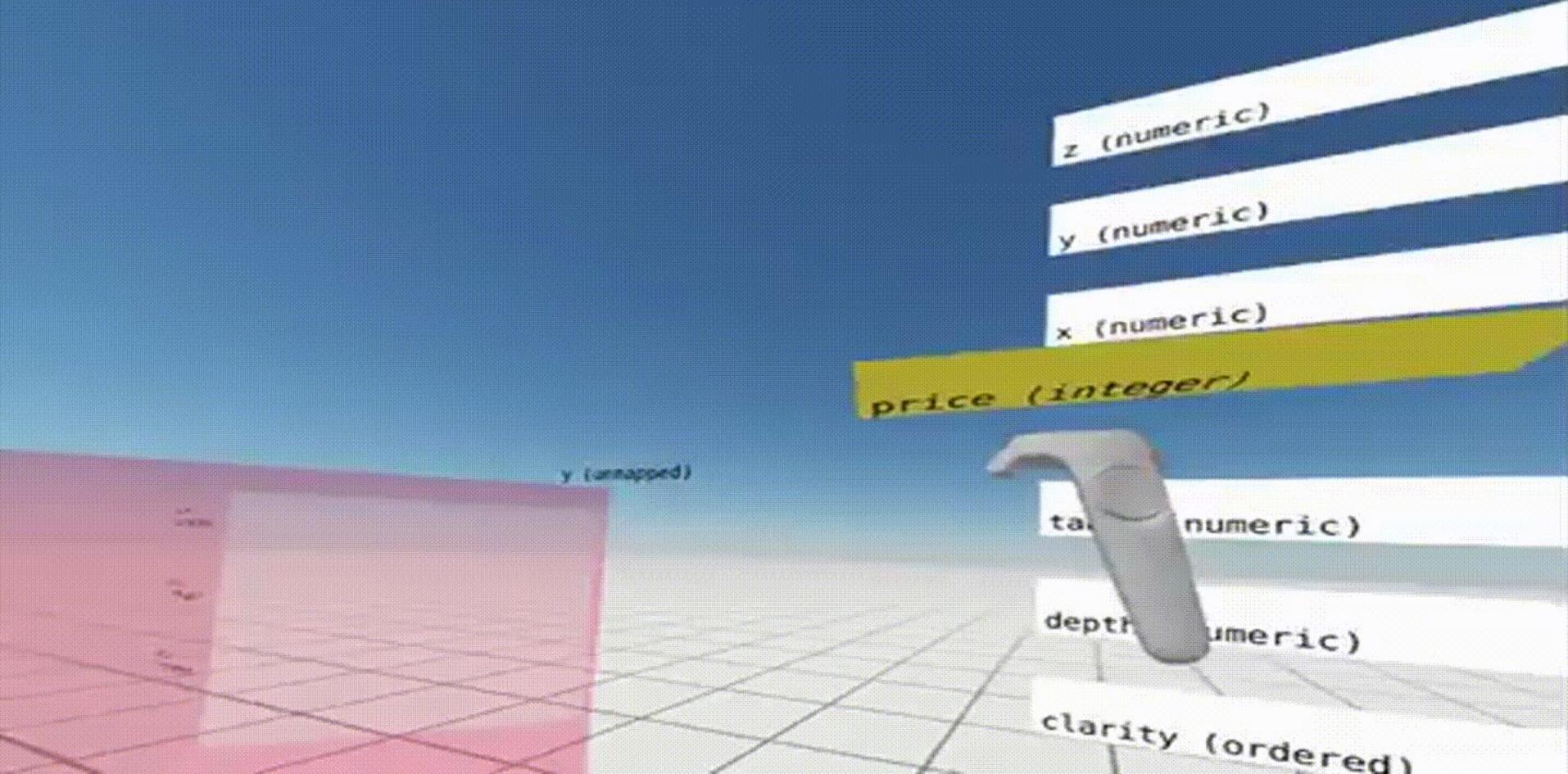
Applications...

A-Painter

moz://a



Data visualization



Medical Education

Remove the wall of the heart.

Pin the pulmonary valve.

Done

the rest.

moz://a

Once in resize mode,

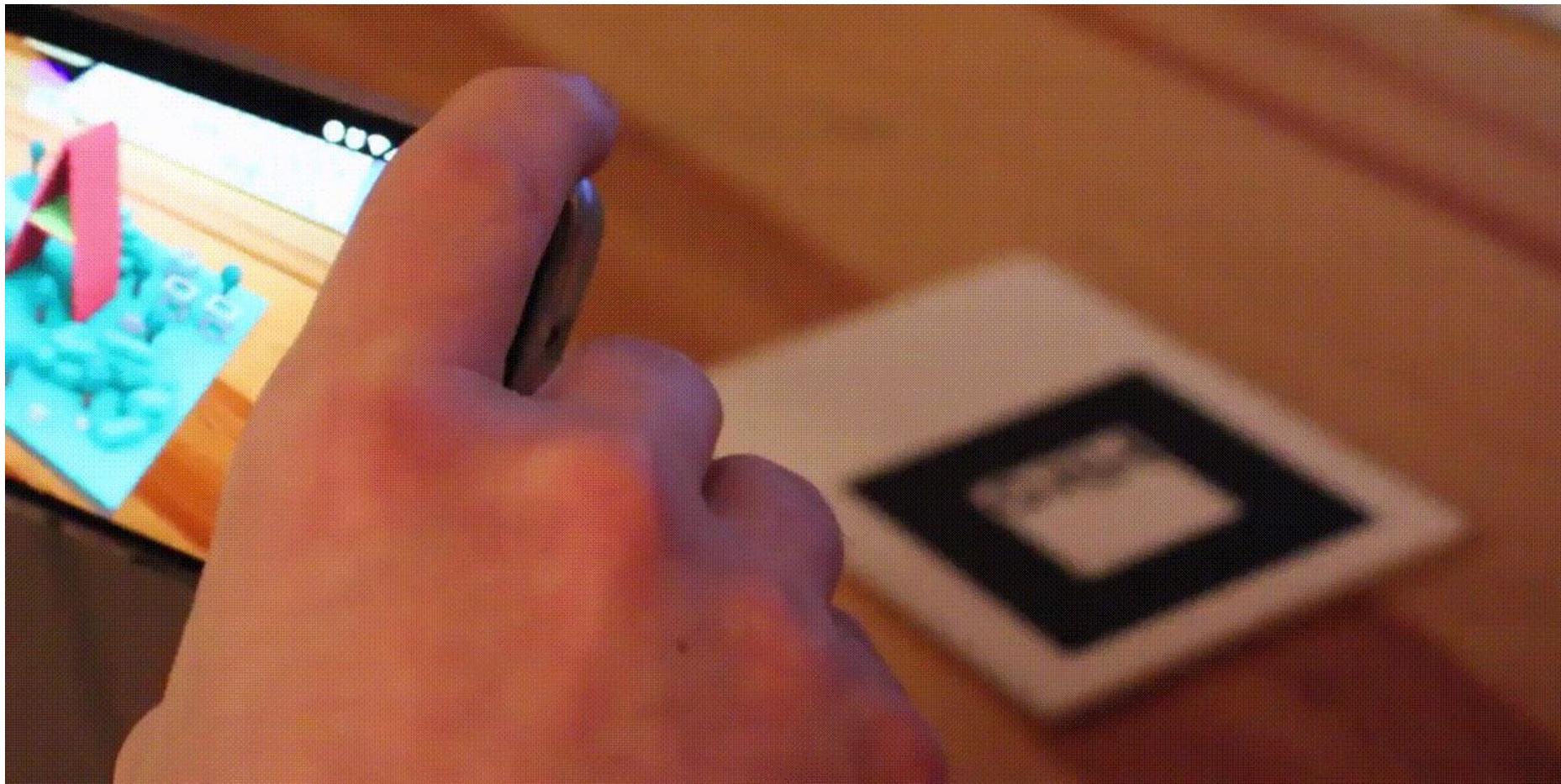
as big as you can, then let

both hands.

But, what about
Augmented Reality ?

AR.js + A-Frame

moz://a



Community

<https://aframe.io/blog>



125 contributors
5000 stargazers

3000 members
On slack

100s of featured
projects



thanks!

ANY
QUESTIONS?

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n.srushtika@gmail.com

