



Total wins

	Constructor	Seasons	Wins
1	Ferrari	1950–2013	221
2	McLaren	1966–2013	182
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8	Benetton ^[3]	1986–2001	27
9	Ferrari	1971–1998	23
9	BRM	1951–1956, 1977	17

SurroundWeb:

Mitigating Privacy Concerns in a 3D Web Browser

McLaren P1
916 PS (903 bhp) & 978 Nm (722 lb ft)
3.8-litre twin-turbocharged V8 engine
727 bhp (542 kW) & 719 Nm (531 lb ft)
electric motor:
176 bhp (131 kW) & 190 Nm (192 lb ft)

John Vilks
University of Massachusetts, Amherst

David Molnar, Benjamin Livshits, Eyal Ofek,
Helen J. Wang, Ran Gal
Microsoft Research

Alexander Moshchuk
Google

Chris Rossbach
VMWare Research

SurroundWeb: A 3D Web Browser

Immersive Experiences  Web

Immersive Experiences

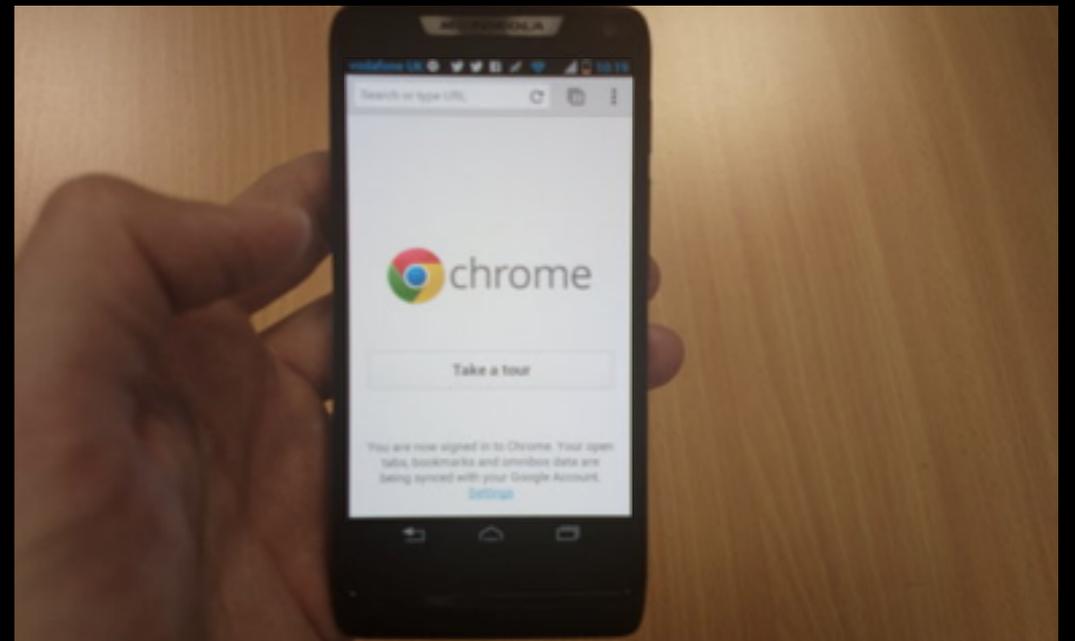


Immersive Web Browser



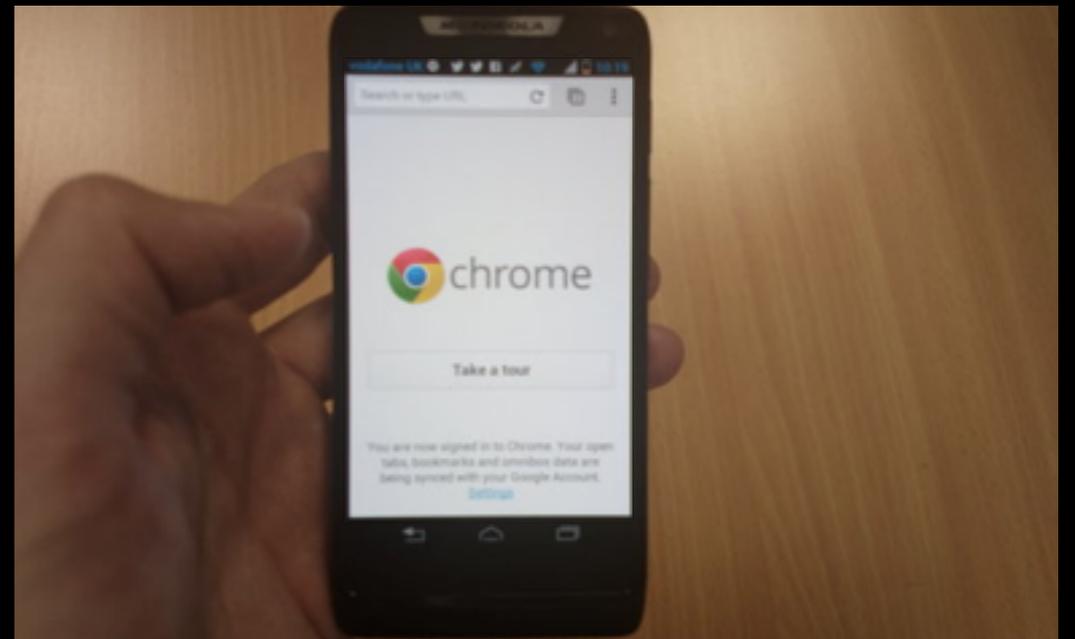
Immersive Web Browser

Immersive Internet Explorer



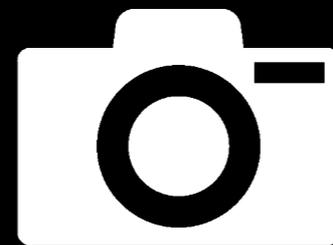
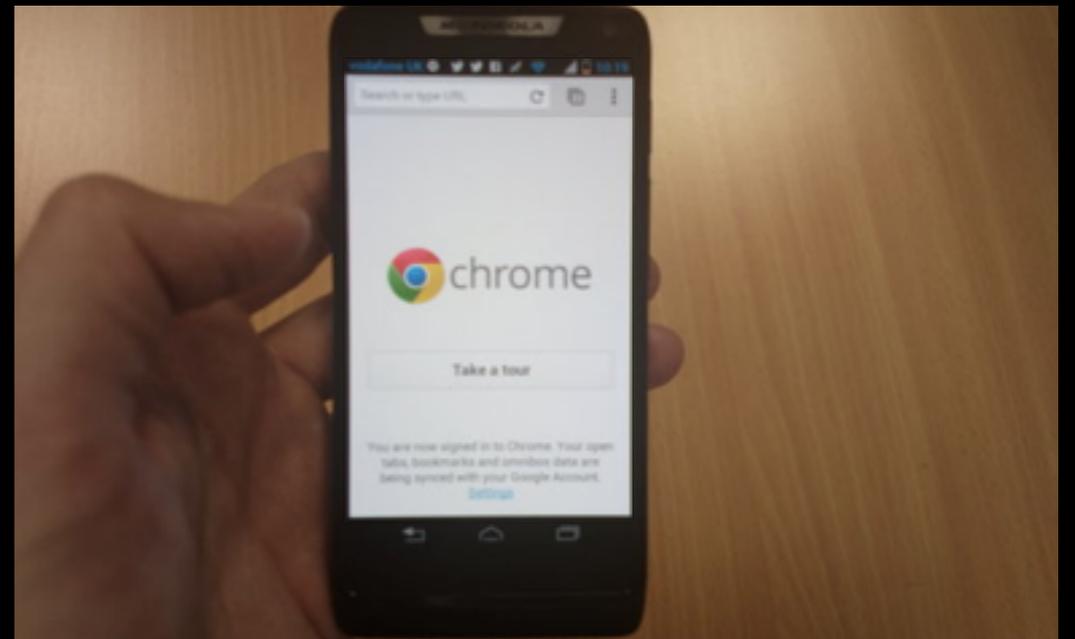
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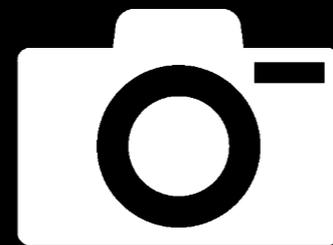
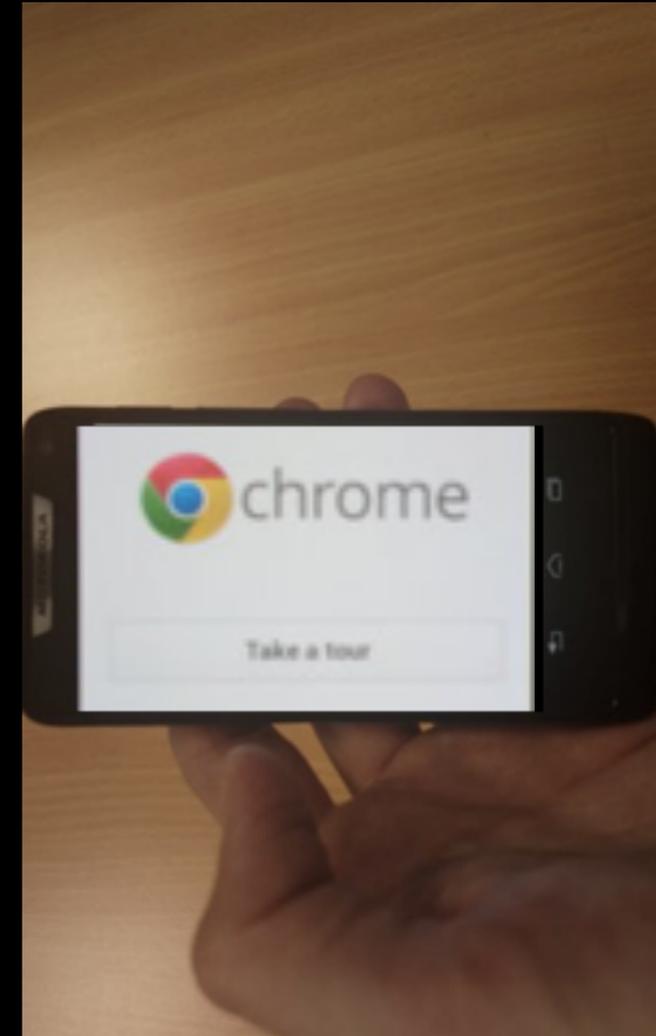
Immersive Web Browser

Immersive Internet Explorer



Immersive Web Browser

Immersive Internet Explorer



Immersive Web Browser

Immersive Internet Explorer



Immersive Web Browser

Immersive Internet Explorer



Immersive Web Browser

Immersive Internet Explorer



I know nothing about HoloLens.



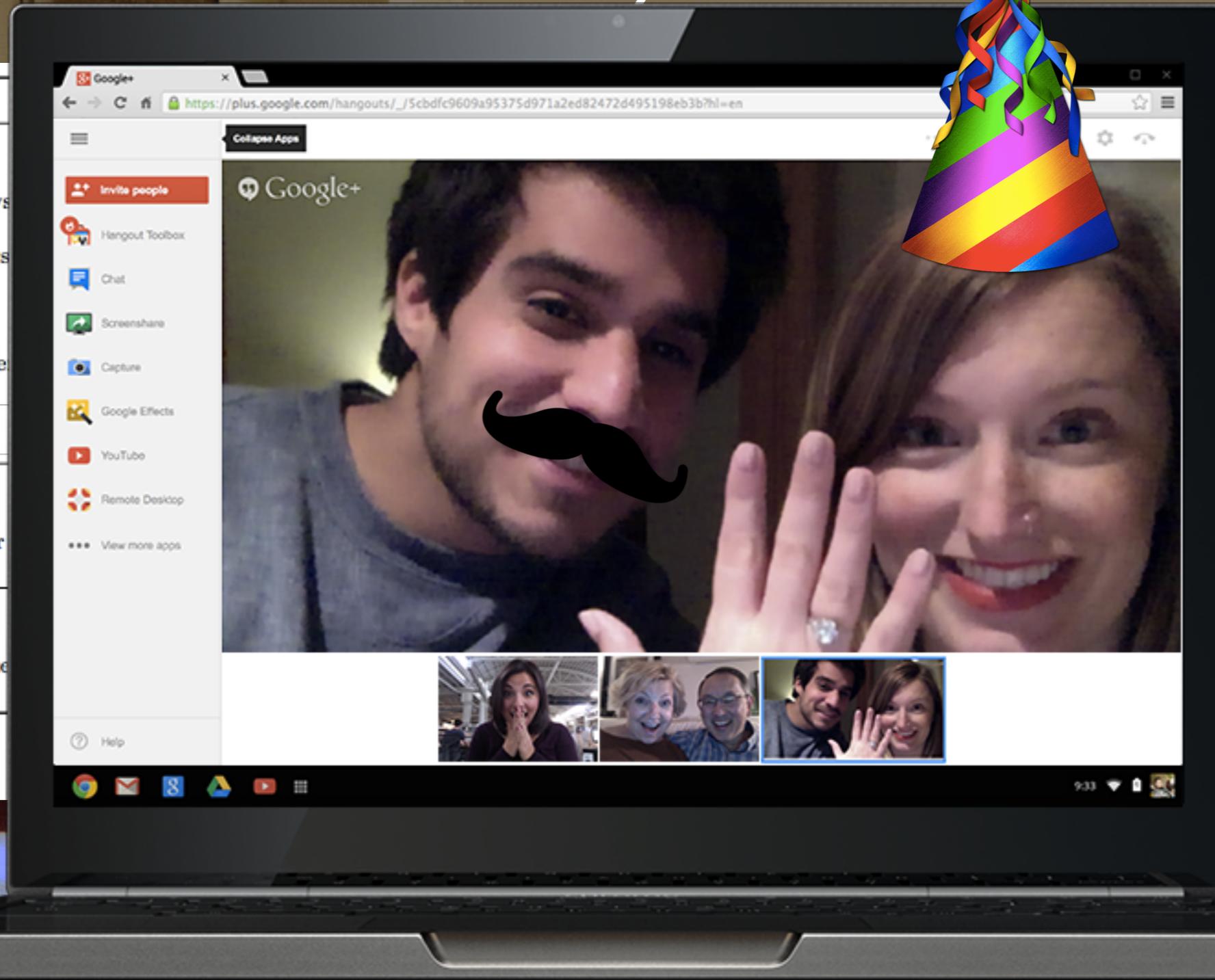
karaoke.html





Applications considered in paper

Application
SurroundPoint
Car Racing News
Virtual Windows
Road Maps
Projected Awareness
Karaoke
Advertisements
Calorie Informer
SmartGlass [20]
Multiplayer Pokeno



resentation (see
d around it (see
ry from distant
ected around it
ected above (see
d the room (see
detected by the
recognized food
web page can use
with the public







It's late, it's late,
it's late, but not
too late

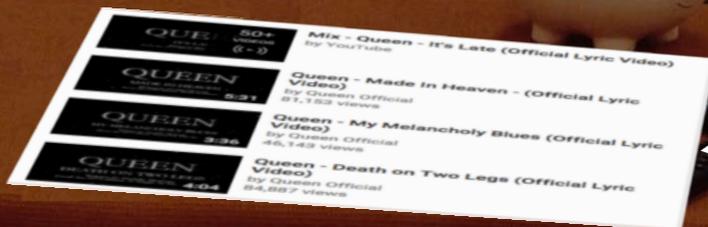




It's late, it's late,
it's late, but not
too late



Interactive via
gestures

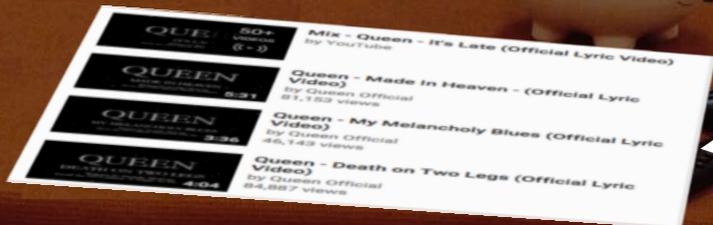




It's late, it's late,
it's late, but not
too late

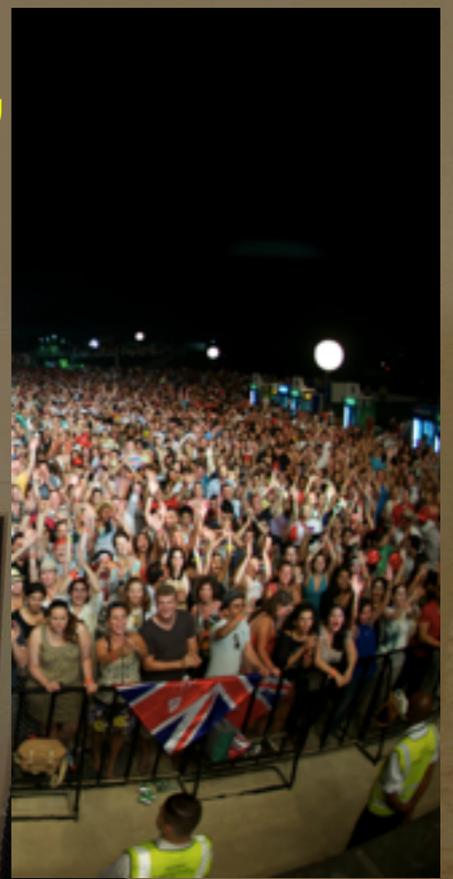


Interactive via
gestures





It's late, it's late,
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Interactive via
gestures

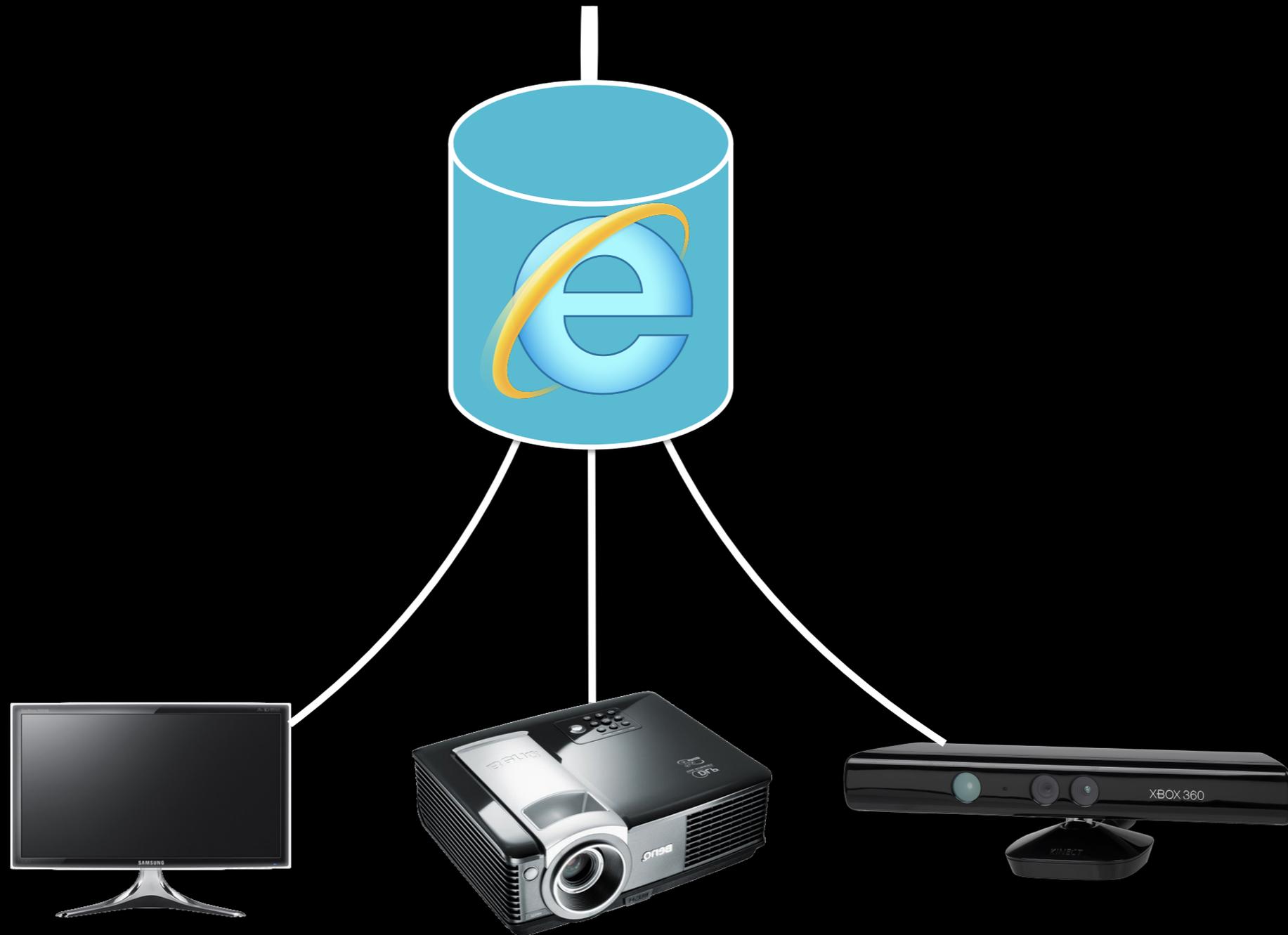
Calories: 140

QUEEN 50+ views (6-8)	Mix - Queen - It's Late (Official Lyric Video) By YouTube
QUEEN 531 views (6-8)	Queen - Made In Heaven - (Official Lyric Video) By Queen Official 81,168 views
QUEEN 336 views (6-8)	Queen - My Melancholy Blues (Official Lyric Video) By Queen Official 46,143 views
QUEEN 404 views (6-8)	Queen - Death on Two Legs (Official Lyric Video) By Queen Official 84,887 views



Immersive Web Browser

Immersive Karaoke
(JS/HTML/CSS)



Immersive Web Browser

Prescription Drugs



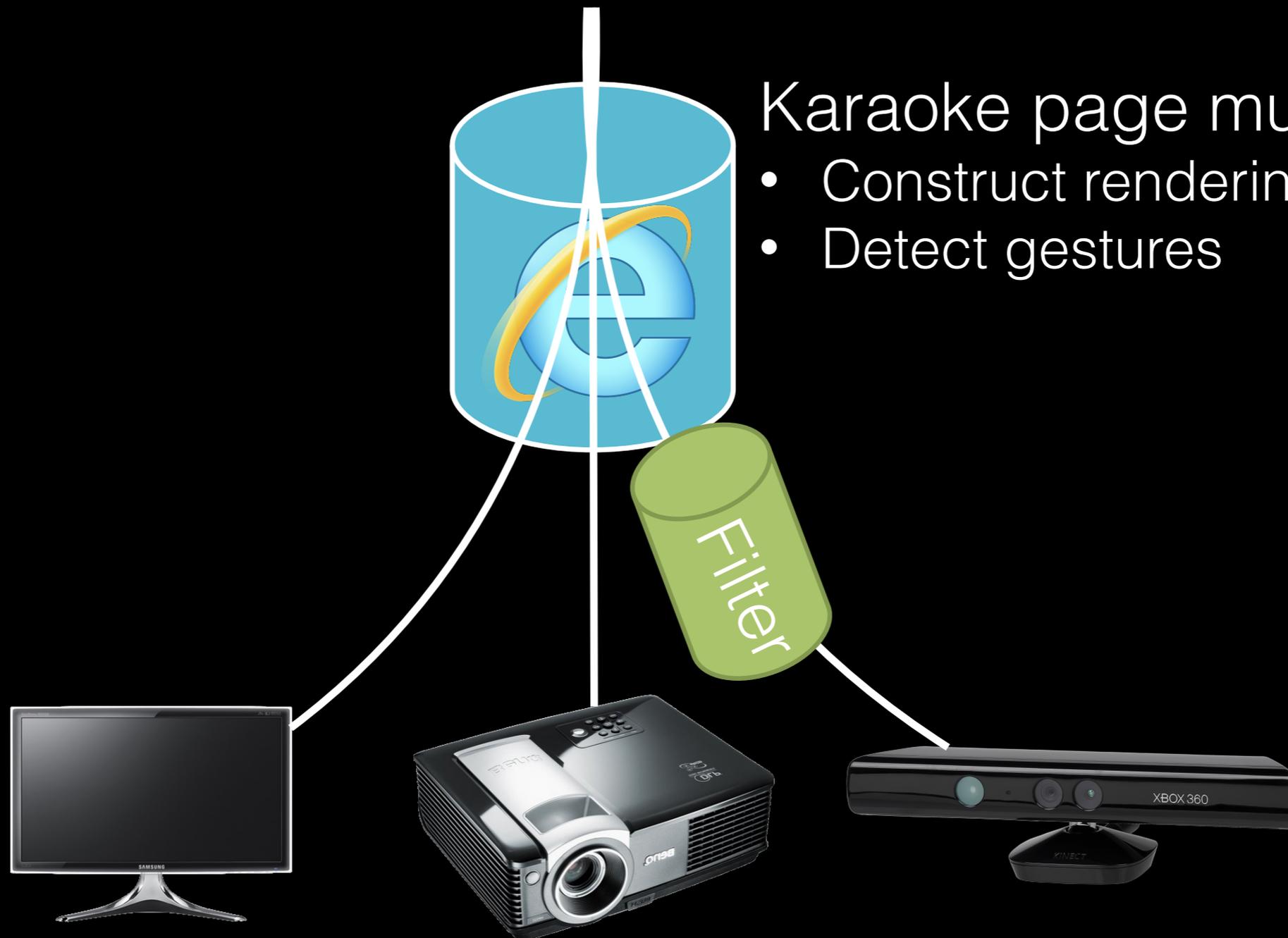
**Embarrassing
Mug**

Immersive Karaoke
(JS/HTML/CSS)



Immersive Web Browser

Immersive Karaoke
(JS/HTML/CSS)



Karaoke page must:

- Construct rendering support
- Detect gestures

Balancing Privacy and Functionality

How?

Abstractions

What are users' privacy attitudes?

Balancing Privacy and Functionality

What information would you be comfortable sharing with each application?

- Online survey via instant.ly
- Sample size: 50 people



Dance Game



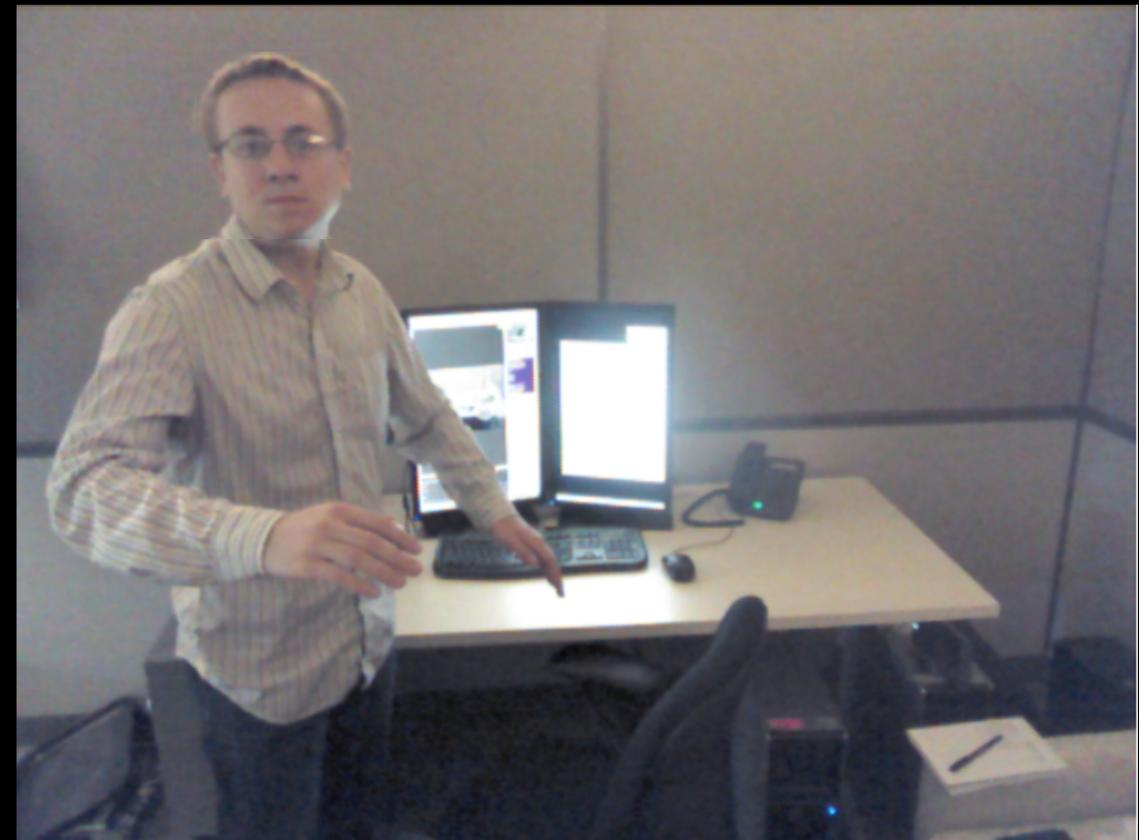
911 Assist



Media Player

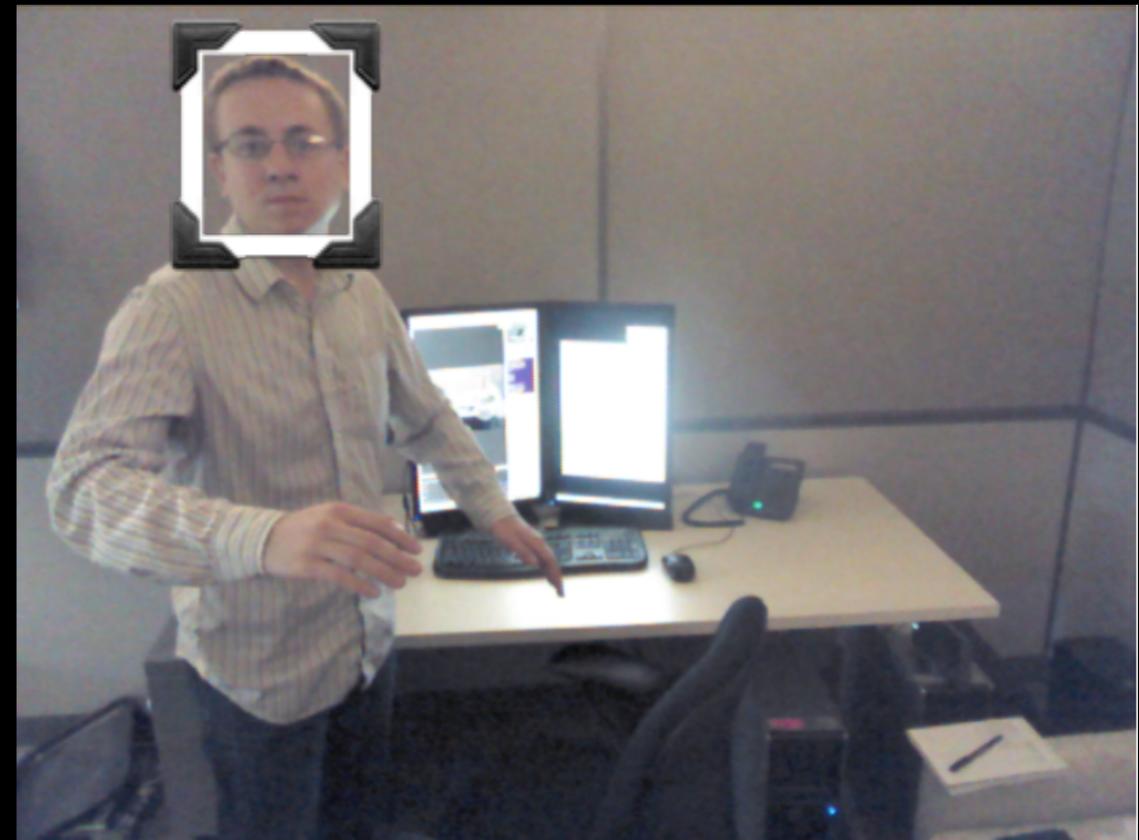
Balancing Privacy and Functionality

What information would you be comfortable sharing with each application?



Balancing Privacy and Functionality

What information would you be comfortable sharing with each application?

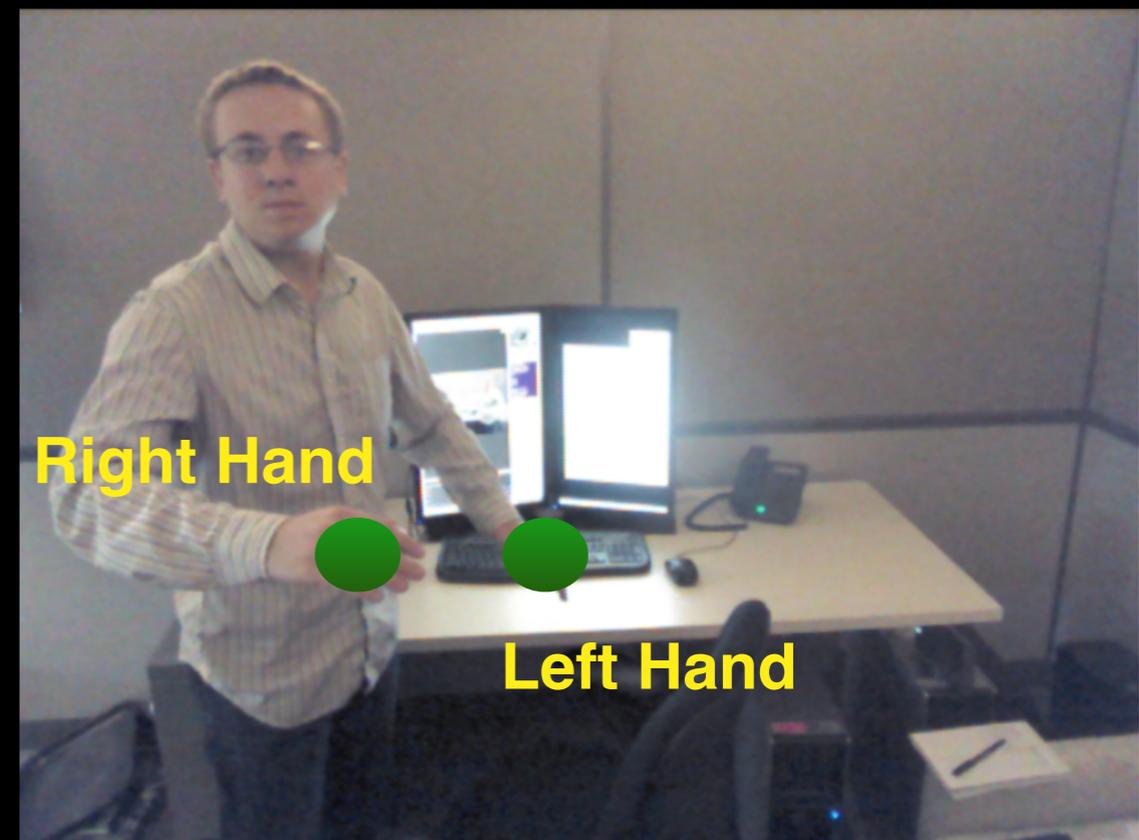


Face

Balancing Privacy and Functionality

What information would you be comfortable sharing with each application?

Face

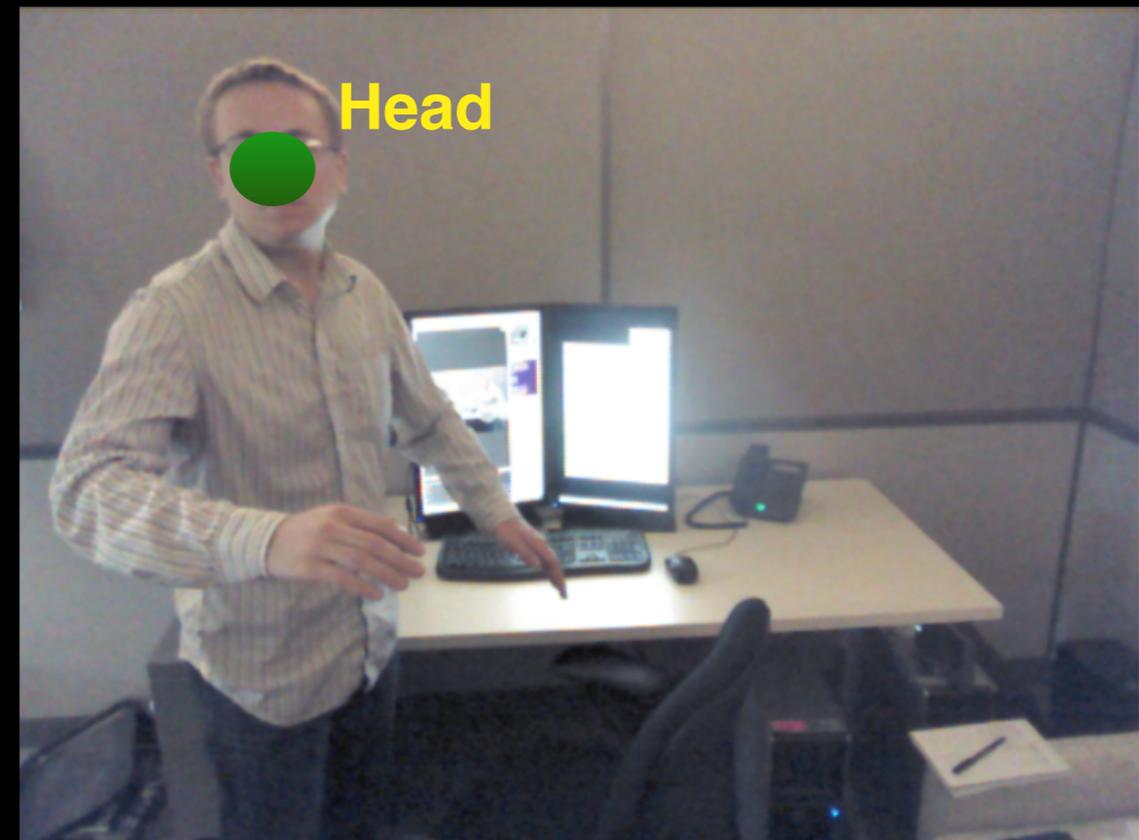


Hand Positions

Balancing Privacy and Functionality

What information would you be comfortable sharing with each application?

- Face
- Hand Positions

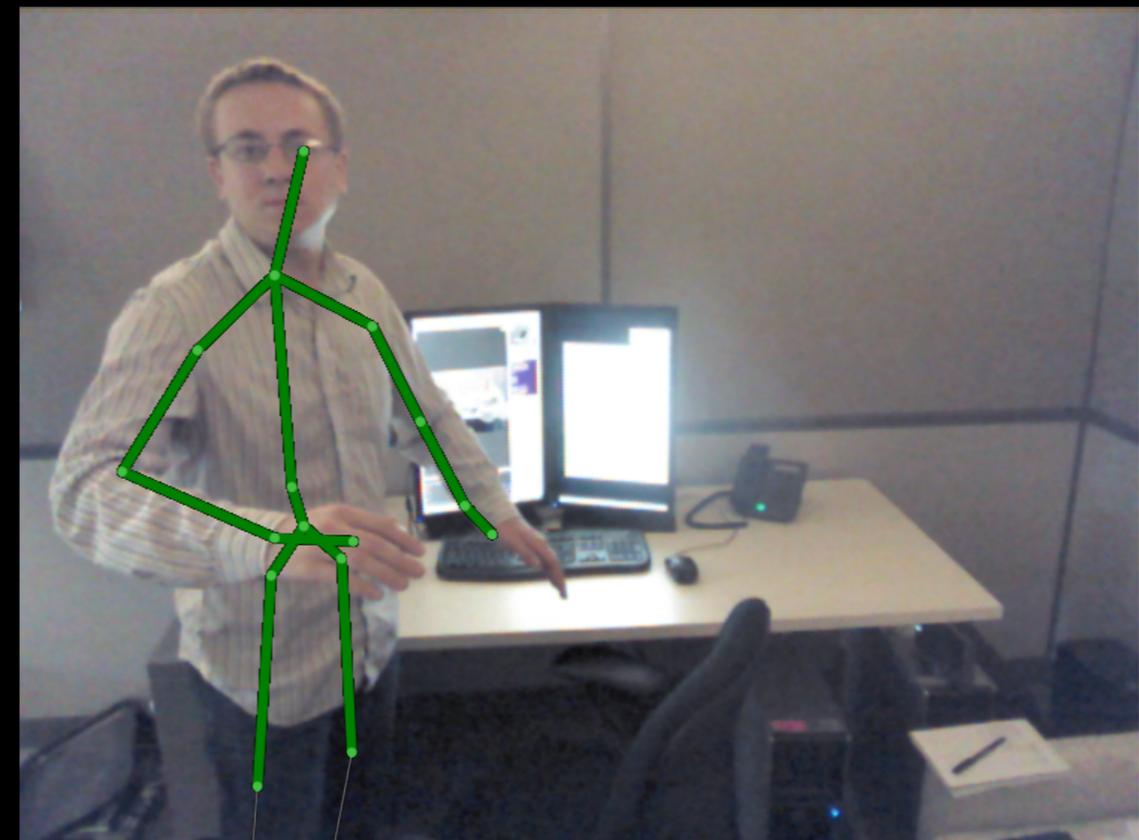


Head Position

Balancing Privacy and Functionality

What information would you be comfortable sharing with each application?

- ✓ Face
- ✓ Hand Positions
- ✓ Head Position



Body Position

Balancing Privacy and Functionality

What information would you be comfortable sharing with each application?

- ✓ Face
- ✓ Hand Positions
- ✓ Head Position
- ✓ Body Position



Location of Large Flat Surfaces

Balancing Privacy and Functionality

What information would you be comfortable sharing with each application?

- Face
- Hand Positions
- Head Position
- Body Position
- Location of Large Flat Surfaces



Large Flat Surfaces:
Size & Orientation

Balancing Privacy and Functionality

What information would you be comfortable sharing with each application?

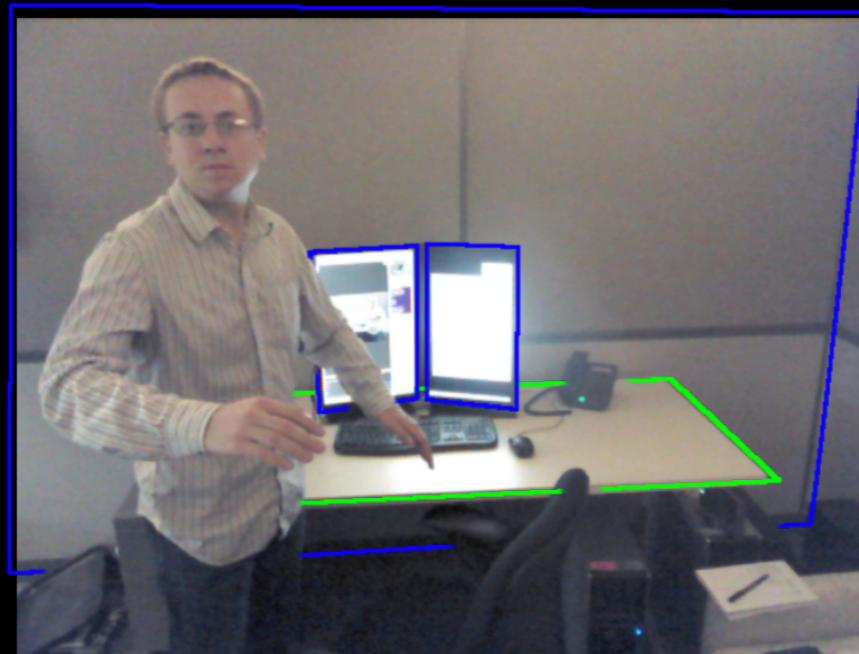
- ✓ Face
- ✓ Hand Positions
- ✓ Head Position
- ✓ Body Position
- ✓ Location of Large Flat Surfaces
- ✓ Large Flat Surfaces:
Size & Orientation



Balancing Privacy and Functionality

Discoveries:

- Users have different privacy attitudes toward different apps.
- Users view the location of large flat surfaces to be less sensitive than raw data.

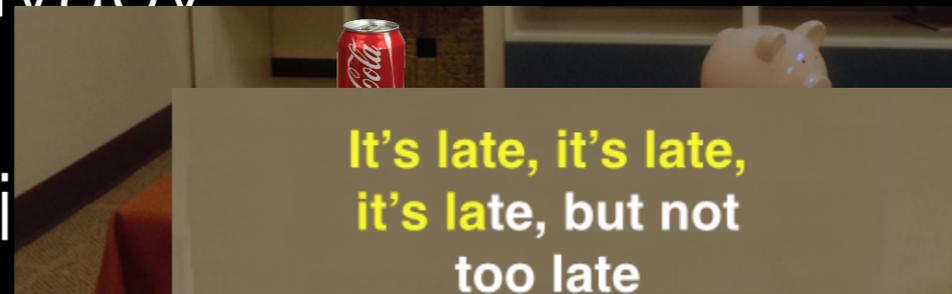


Location of Large Flat Surfaces

Balancing Privacy and Functionality

Privacy Properties:

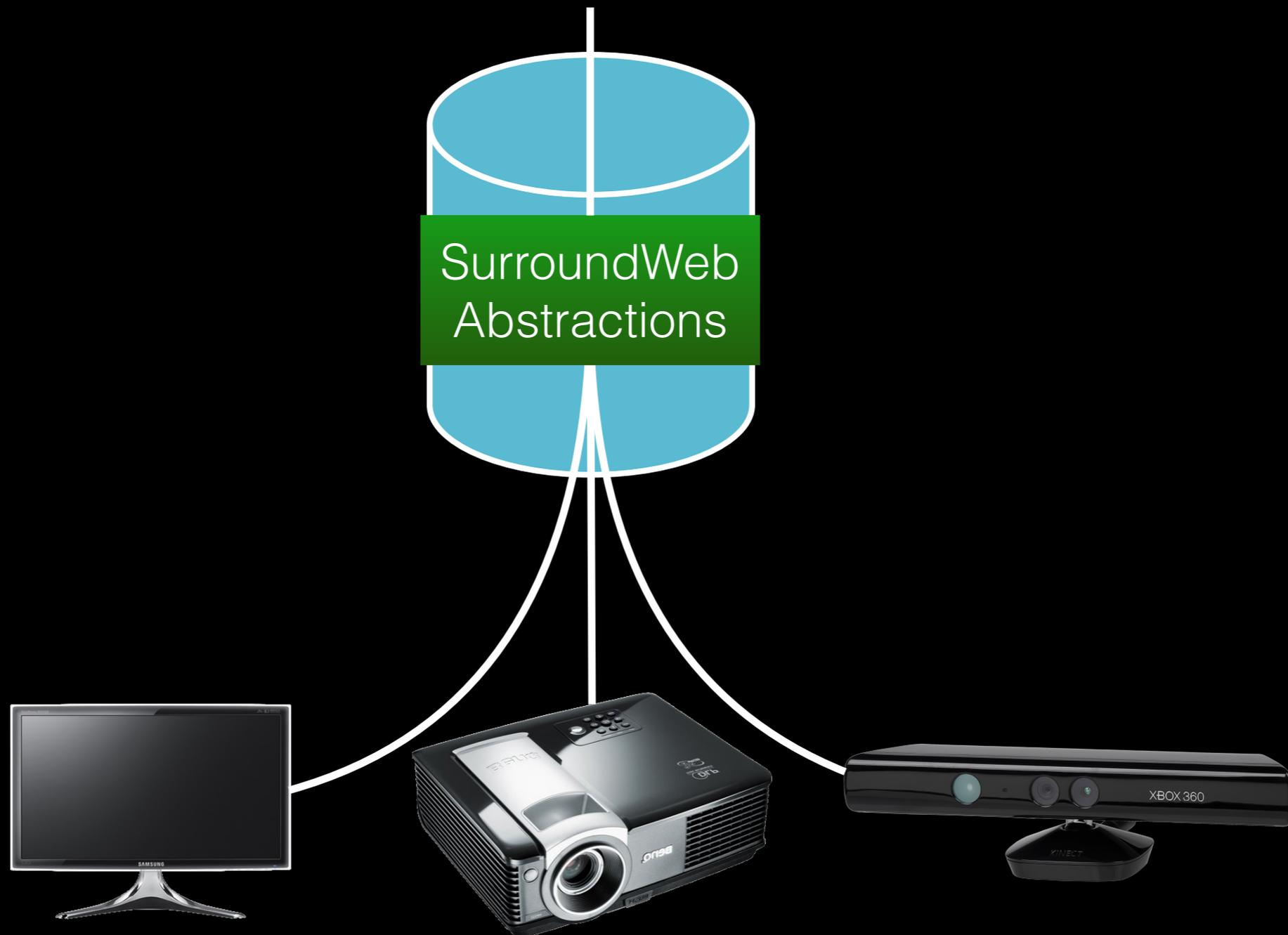
- Detection Privacy
- Rendering Privacy
- Interaction Privacy



SurroundWeb: A 3D Web Browser

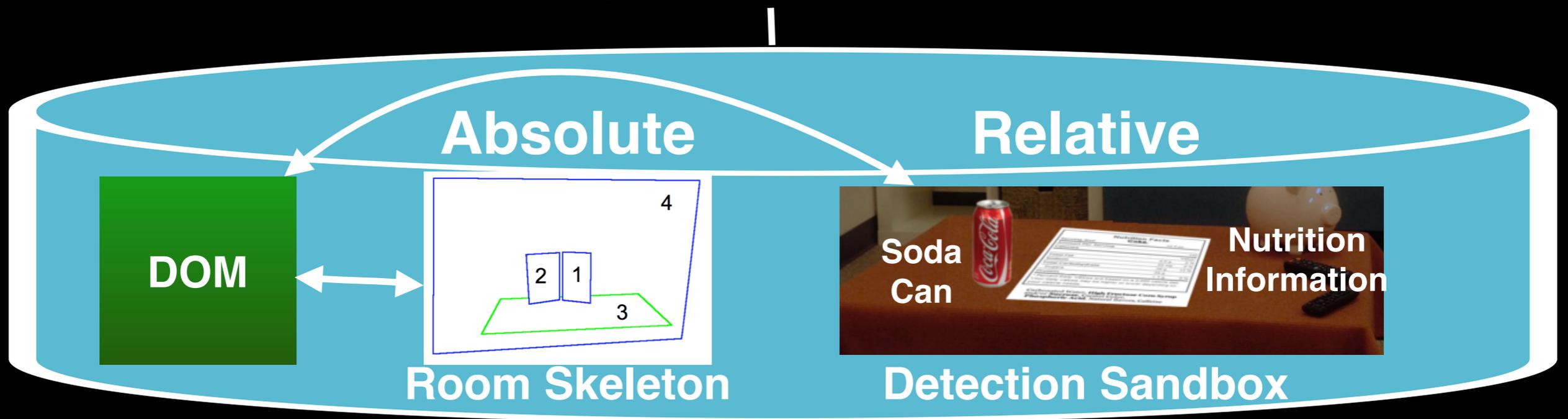
SurroundWeb: A 3D Web Browser

Immersive Web Application
(JS/HTML/CSS)



SurroundWeb: A 3D Web Browser

Immersive Web Application
(JS/HTML/CSS)

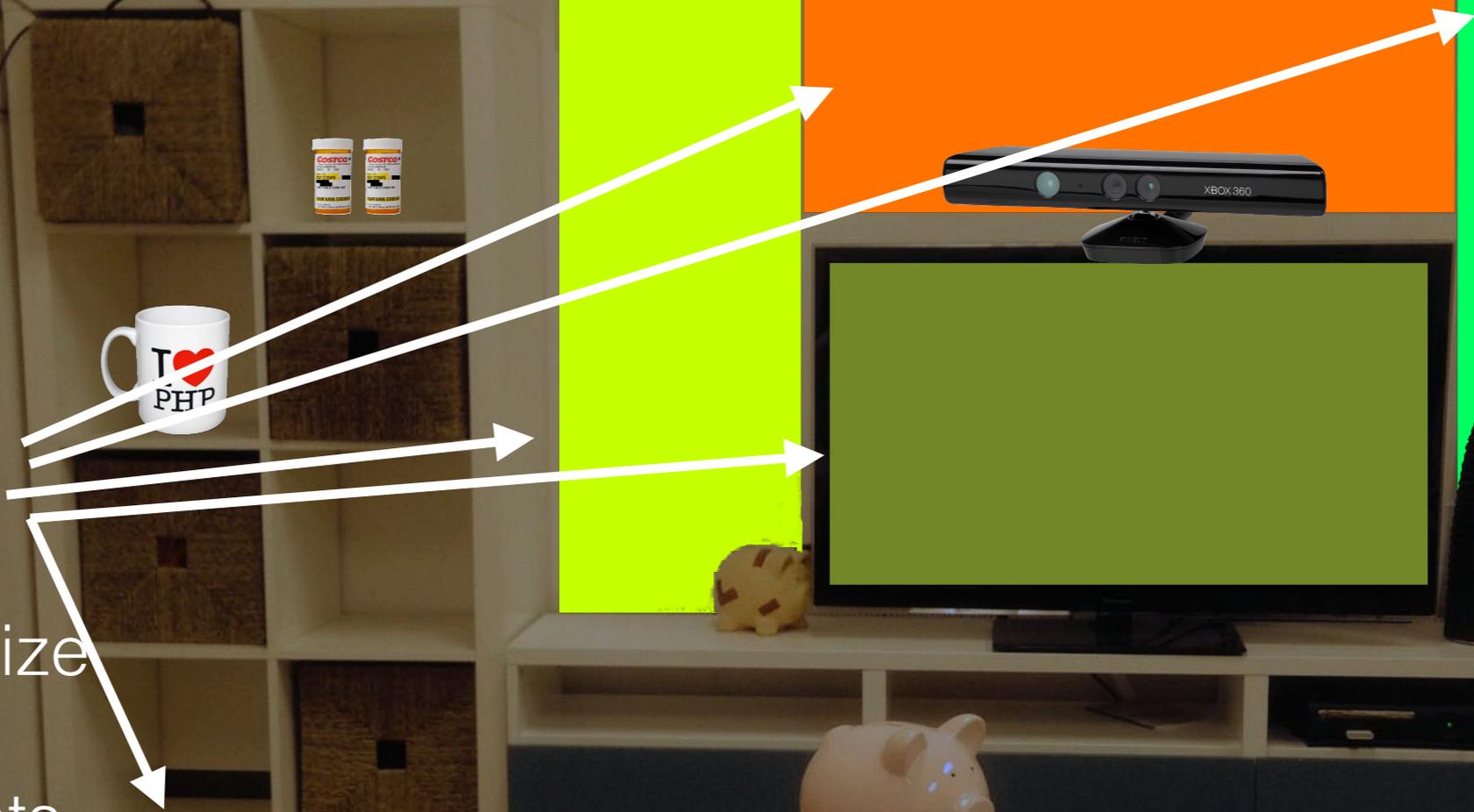




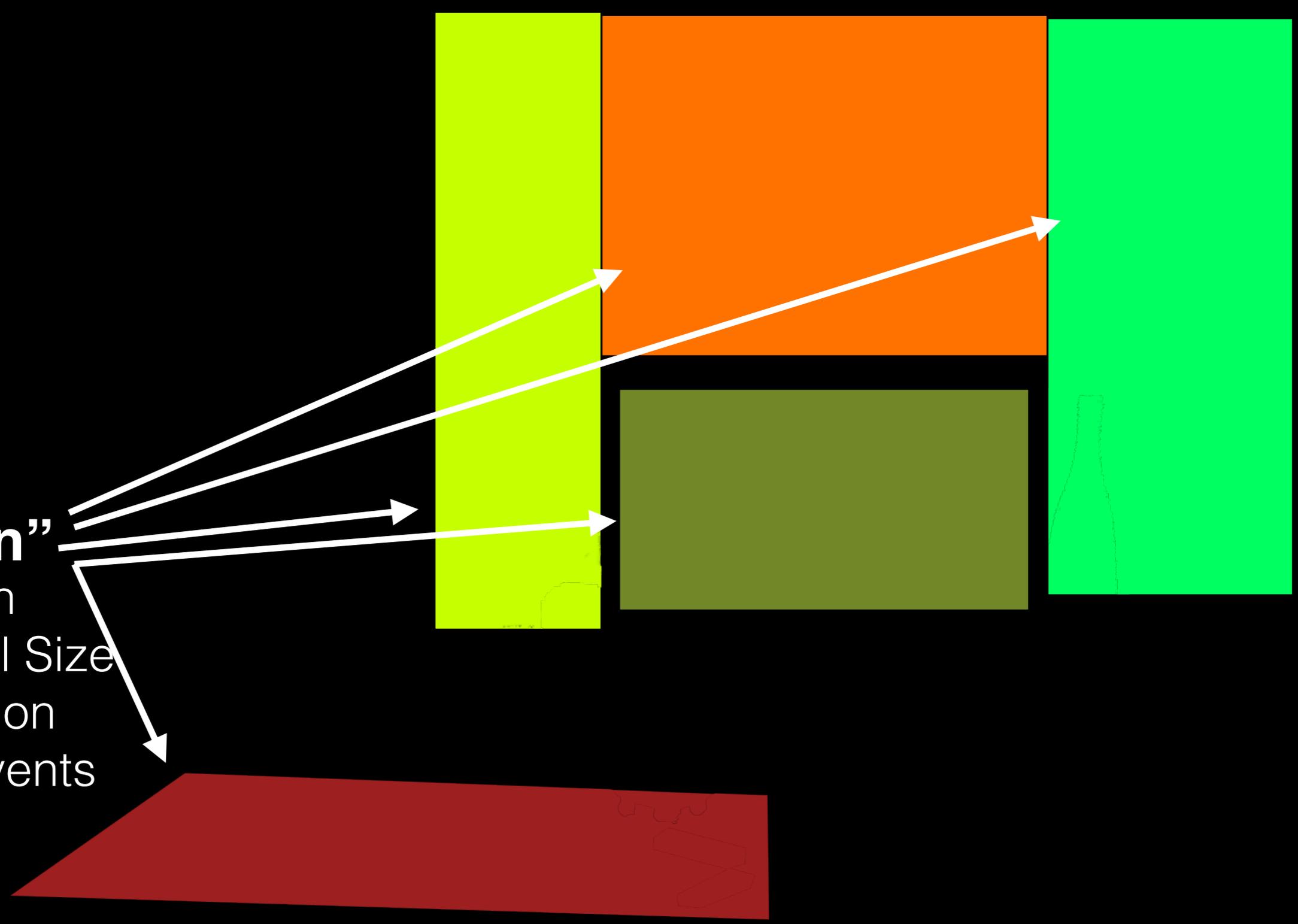


“Screen”

- Location
- Physical Size
- Resolution
- Input events



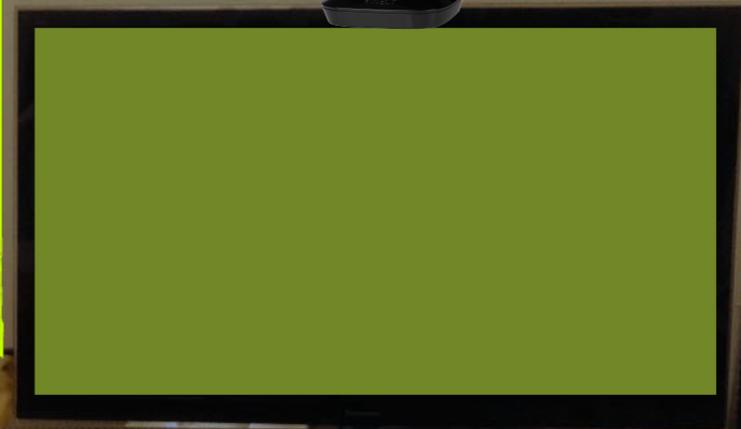
- “Screen”**
- Location
 - Physical Size
 - Resolution
 - Input events



Room Skeleton



Music Video





Music Video



231x
364

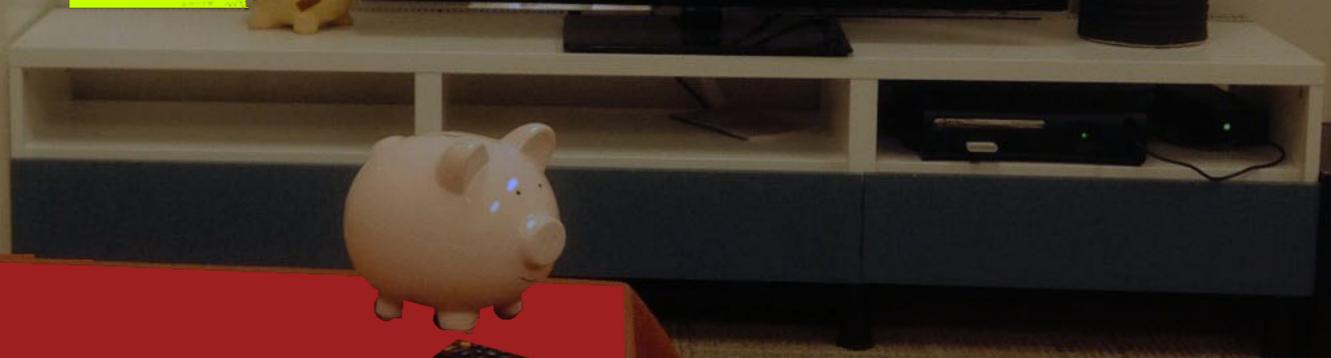
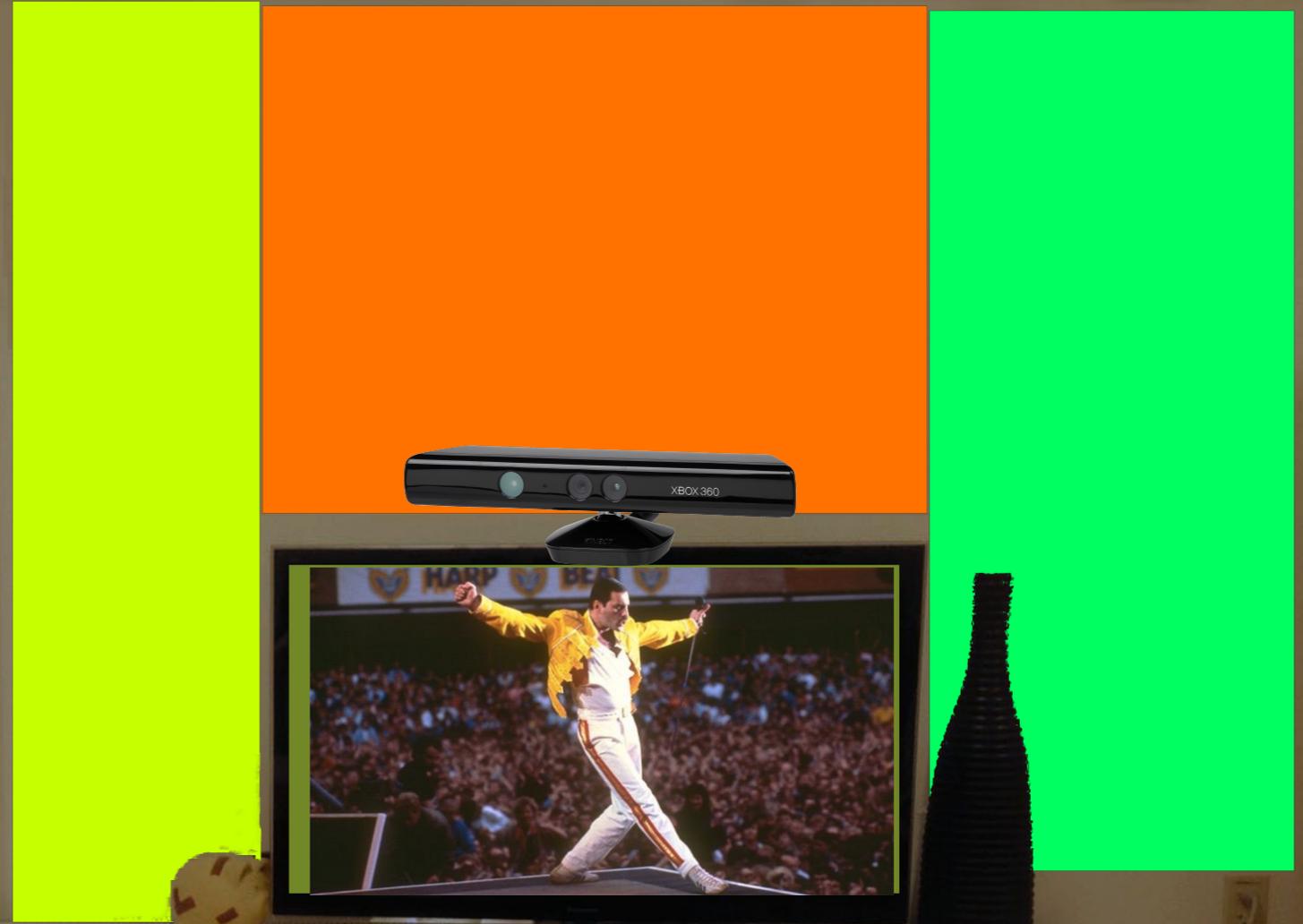
294x215

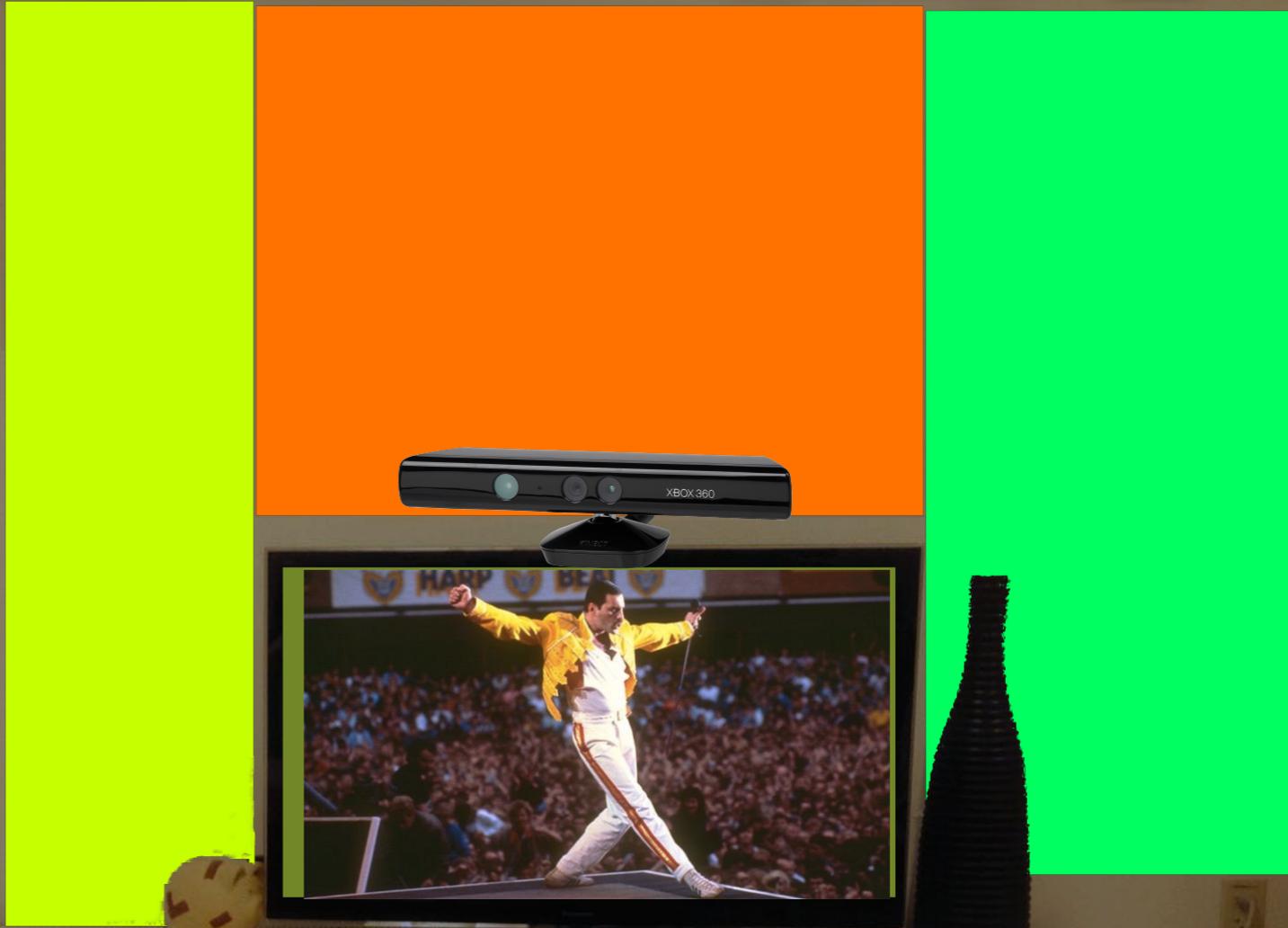


240x340

1920x1080







Lyrics

It's late, it's late,
it's late, but not
too late





It's late, it's late,
it's late, but not
too late



Interactive Playlist

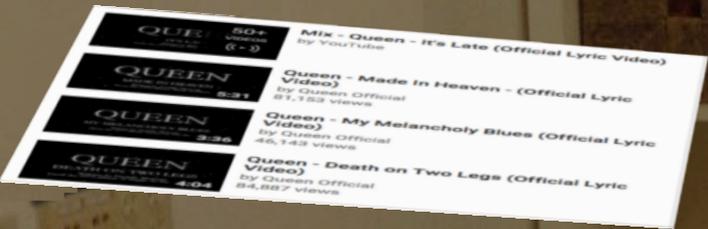


QUEEN 50+ views (-)	Mix - Queen - It's Late (Official Lyric Video) By YouTube
QUEEN 531 views	Queen - Made In Heaven - (Official Lyric Video) By Queen Official 81,153 views
QUEEN 236 views	Queen - My Melancholy Blues (Official Lyric Video) By Queen Official 46,143 views
QUEEN 404 views	Queen - Death on Two Legs (Official Lyric Video) By Queen Official 84,887 views





Interactive
Playlist



No
events

It's late, it's late,
it's late, but not
too late



No
events



Mouse events





It's late, it's late,
it's late, but not
too late



QUEEN 50+ views (6-9)	Mix - Queen - It's Late (Official Lyric Video) By YouTube
QUEEN 8:31	Queen - Made in Heaven - (Official Lyric Video) By Queen Official 81,782 views
QUEEN 2:36	Queen - My Melancholy Blues (Official Lyric Video) By Queen Official 46,143 views
QUEEN 4:04	Queen - Death on Two Legs (Official Lyric Video) By Queen Official 84,887 views



Karaoke Rendering Code

```
<html><head>
<script type="text/javascript">
  // Wait for HTML to load before running code.
  window.onload = function() {
    var screens = Screen.getAll(), bigVScn, maxPpi = 0;
    function isVertical(scn) {
      var scnLoc=scn.location,ul=scnLoc.ul,lr=scnLoc.lr,
          zDelta = Math.abs(ul.z - lr.z),
          xDelta = Math.abs(ul.x - lr.x),
          yDelta = Math.abs(ul.y - lr.y);
      return zDelta > xDelta || zDelta > yDelta;
    }
    // Find the highest resolution vertical screen
    screens.forEach(function(scn) {
      if (isVertical(scn) && scn.ppi > maxPpi)
        bigVScn = scn;
      maxPpi = bigVScn.ppi;
    });
    // Assign video to screen.
    document.getElementById('video')
      .setAttribute('screen', bigVScn.id);

    var aboveScn, bigLoc = bigVScn.location;
    screens.forEach(function(scn) {
      if (!isVertical(scn) || scn === bigVScn) return;
      var scnLoc=scn.location,ul=scnLoc.ul,lr=scnLoc.lr;
      if (lr.z > bigLoc.ul.z) {
        // scn is above bigVScn
        if (aboveScn) {
          // Is scn closer to bigVScn than aboveScn?
          if (aboveScn.location.lr.z > lr.z)
            aboveScn = scn;
        }
        else aboveScn = scn;
      }
    });

    // Assign lyrics to screen.
    document.getElementById('lyrics')
      .setAttribute('screen', aboveScn.id);

    var bigHScn, maxArea = 0;
    screens.forEach(function(scn) {
      var area = scn.height*scn.width;
      if (!isVertical(scn) && area > maxArea) {
        maxArea = area; bigHScn = scn;
      }
    });
    // Assign related videos to screen.
    document.getElementById('related')
      .setAttribute('screen', aboveScn.id);

    // Assign random related media to other screens.
    screens.forEach(function(scn) {
      if (scn !== aboveScn && scn !== bigHScn && scn !== bigVScn)
        renderMedia(scn);
    });
    function renderMedia(scn) {
      var newSgm = document.createElement('segment');
      newSgm.setAttribute('screen', scn.id);
      newSgm.appendChild(constructRandomMedia());
      document.body.appendChild(newSgm);
    }
  };
</script></head>
<body>
  <segment id="lyrics"><!--Lyrics HTML--></segment>
  <segment id="video"><!--Video HTML--></segment>
  <segment id="related"><!--Related songs HTML-->
  </segment>
</body></html>
```

Screen 2
Size: 231x364

Screen 3
Size: 294x215
It's late, it's
late, it's late but
not too late

Screen 4
Size: 233x340

Screen 0
Size: 1920x1080

Screen 1
Size: 205x320
Queen
The Queen of the Damned
LIVE! - Part 2 (EPK)



It's late, it's late,
it's late, but not
too late



QUEEN 50+ views (6-9)	Mix - Queen - It's Late (Official Lyric Video) By YouTube
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Detection Sandbox

- Physical object-relative layout
- Does not reveal object presence or location
 - (Content is non-interactive)



Detection Sandbox

- Physical object-relative layout
- Does not reveal object presence or location
 - (Content is non-interactive)



```
#coke-calories {below: "coke-can";}
```

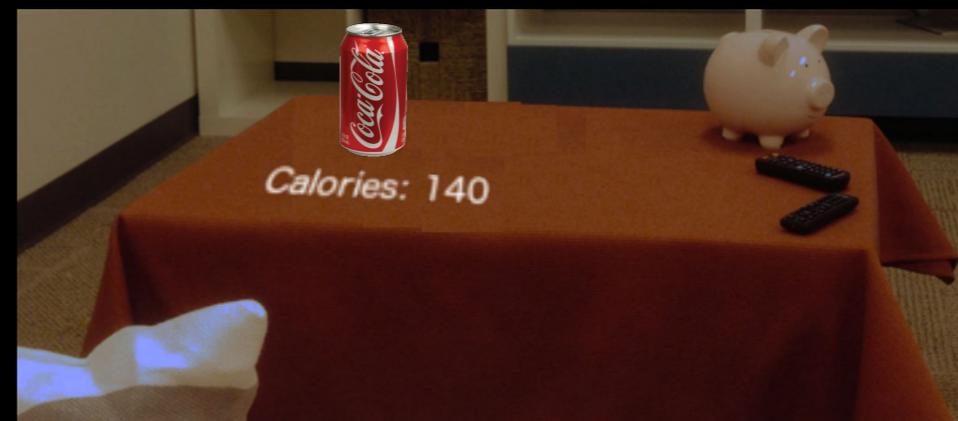
```
<segment id="coke-calories">  
  Calories: 140  
</segment>
```

Detection Sandbox

- Physical object-relative layout
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 - (Content is non-interactive)

```
#coke-calories {below: "coke-can";}
```

```
<segment id="coke-calories">  
  Calories: 140  
</segment>
```



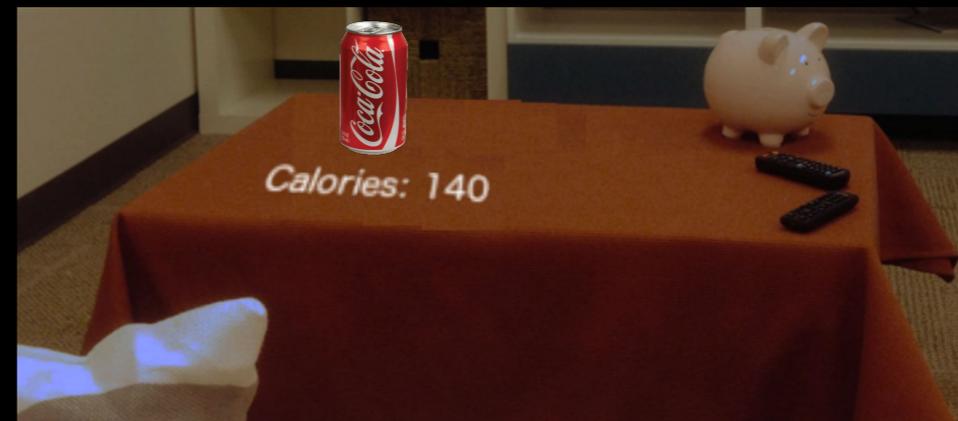
Detection Sandbox

See paper for details on side channel mitigation

- Physical object-relative layout
- Does not reveal object presence or location
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```
#coke-calories {below: "coke-can";}
```

```
<segment id="coke-calories">  
  Calories: 140  
</segment>
```





It's late, it's late,
it's late, but not
too late



Calories: 140

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Conclusion

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9	Tyrrell	1970–1998	23
10	BRM	1951, 1956–1977	17

- SurroundWeb: 3D Web Browser
- New rendering abstractions:
 - Room Skeleton
 - Detection Sandbox
- Paper has many more details!
 - Privacy properties, Satellite Screens, ...

McLaren P1
916 PS (903 bhp) & 678 Nm (722 lb ft)
3.8-litre twin-turbocharged V8 engine
727 bhp (542 kW) & 719 Nm (531 lb ft)
electric motor:
176 bhp (131 kW) & 260 Nm (192 lb ft)

SurroundWeb In Action



WHAT IS SURROUNDWEB?

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10	DFM	1951, 1956-1977	17



Robin 10, has been announced as the second driver. Robin is the son of John who drove Formula 1 and Le Mans.

I Hope All Teams, And Drivers, Mentioned Here A Good Run In 2014. Without Proper Competition, How Can We Measure Anything?

Where's Carlo has ended up with his team. Another sign that that team must have cash issues.

Carlo's is a fairly good driver, but his team could have picked up a better driver if they wanted to.

I think this was their last "glory" season.

