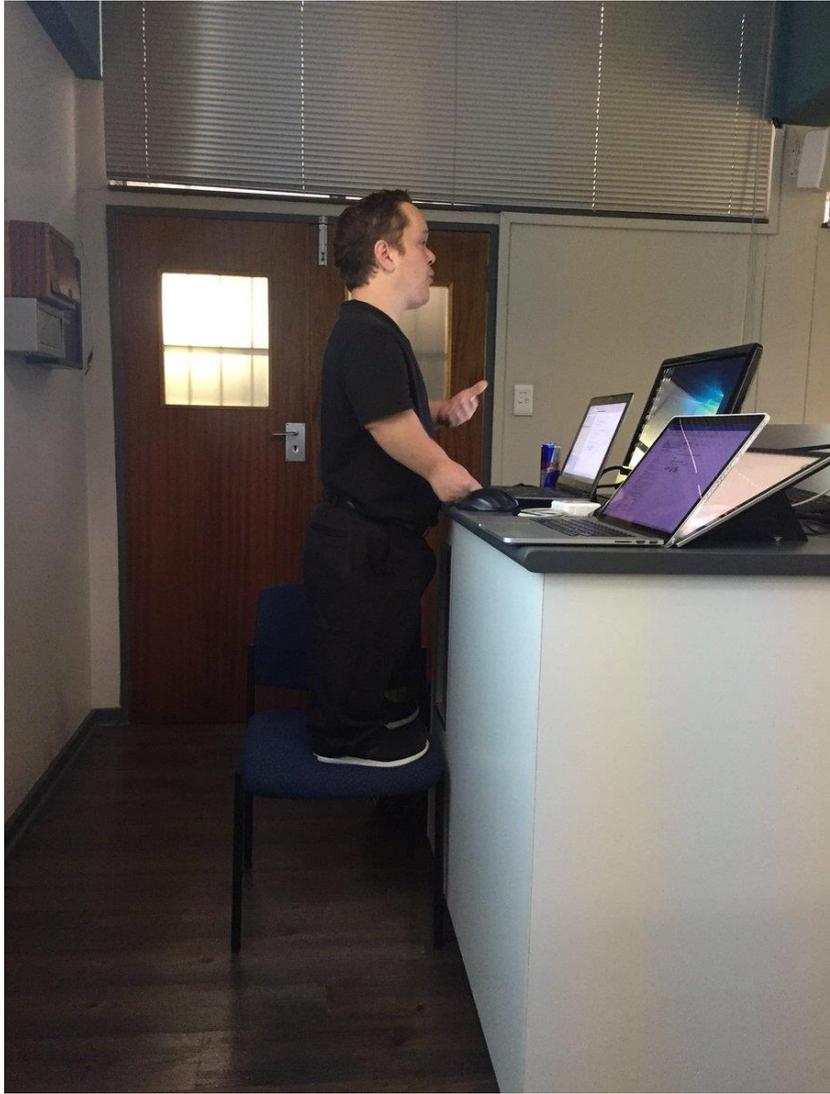


Programing for Accessibility

Making our world more inclusive







Assistive Technologies – Limited Movement



Sip and Puff Switch



Keyless Keyboard

Assistive Technologies – Vision Impairments



Refreshable Braille Display



Nnvaccess

Screen Reader Software



TOO MUCH



A close-up, low-angle shot of a character's face, likely Iron Man, looking upwards. The character is wearing a dark, metallic helmet with a blue visor. The background is a blurred, industrial-looking environment with a circular opening. The text "I'LL DO IT MYSELF" is overlaid in a bold, white, italicized font with a black outline.

I'LL DO IT MYSELF

Agenda

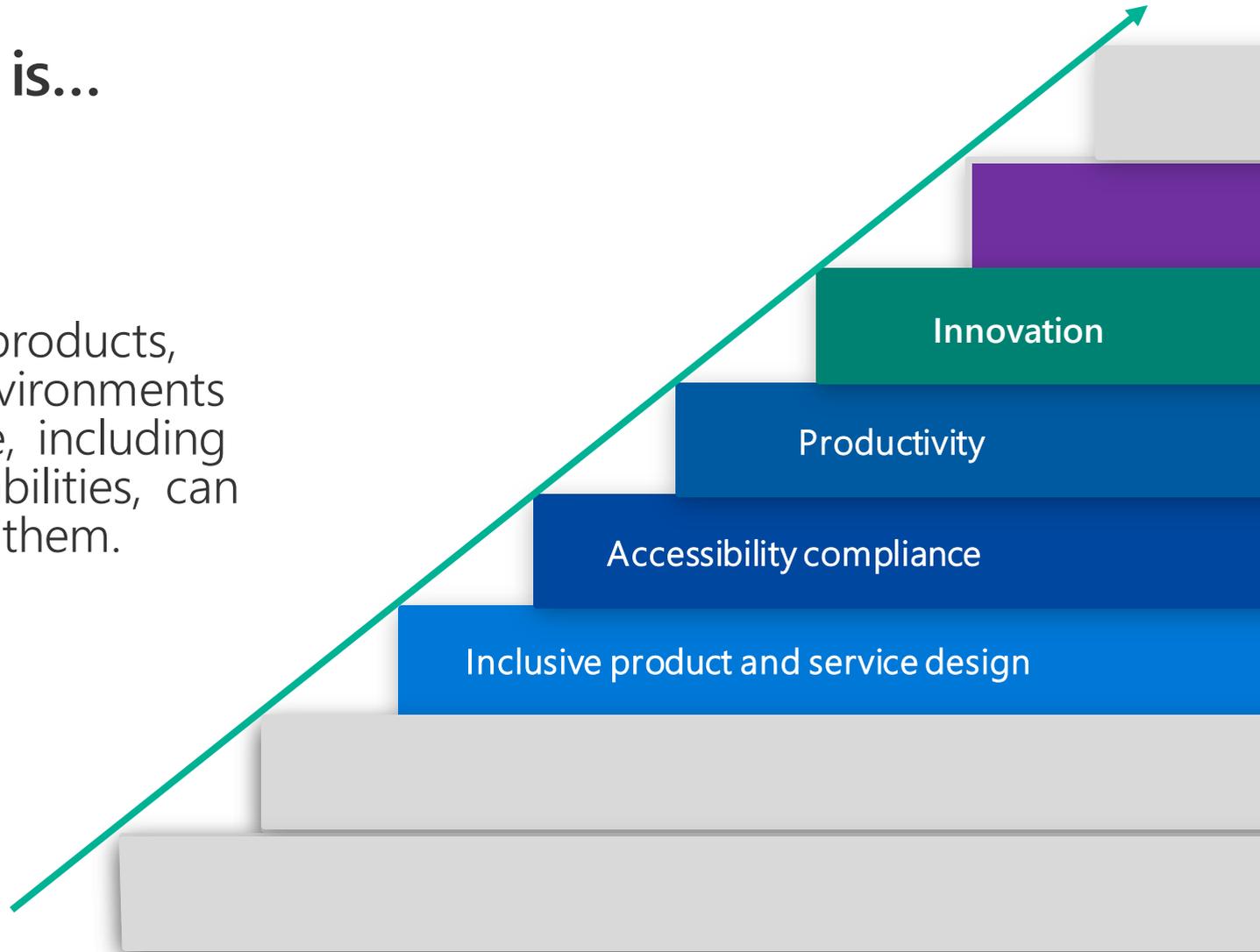
1. Inclusive design
2. Website Standards
3. AI



Inclusive Design

Accessibility is...

...the design of products, services, and environments so that everyone, including people with disabilities, can fully experience them.



Disability



Personal
Health
Condition

Disability



Mismatched
Human
Interactions

Inclusive design steps

1. Recognise exclusion
2. Solve for one, extend to many
3. Learn from diversity

Persona Spectrum



One arm



Arm injury



New parent



Permanent 26K



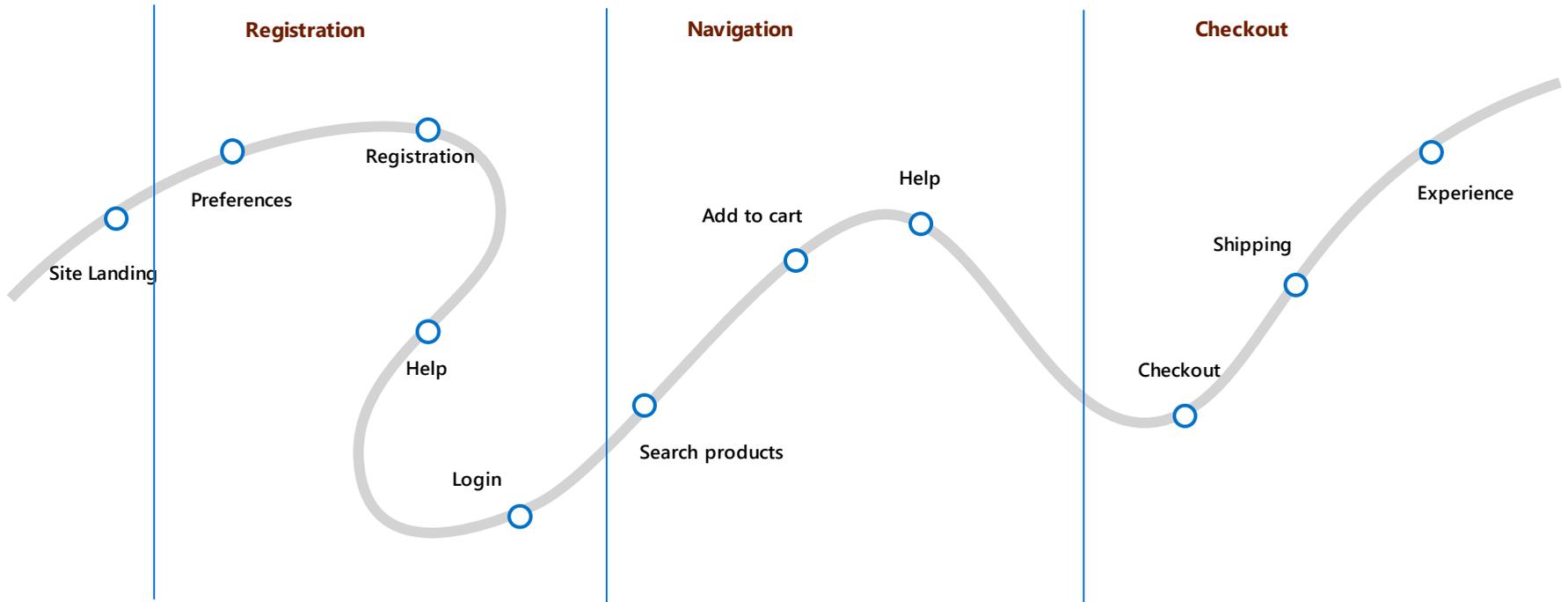
Temporary 13M



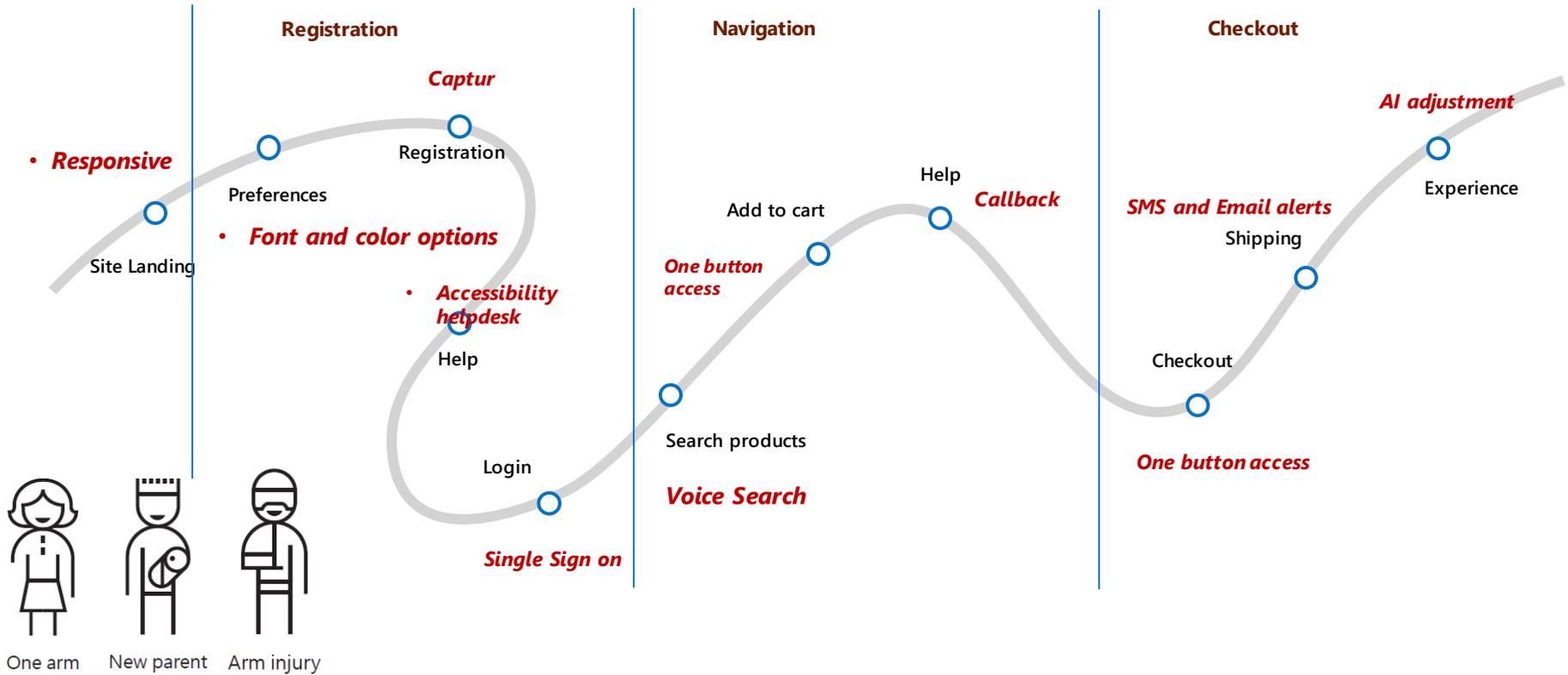
Situational 8M

Total: 21M+

Website shopping cart scenario



Apply Personas





Website Accessibility

For most of human history, we've put our innovative capacity into improving the quantity of life. Because we're living longer, our focus is starting to shift toward improving our quality of life

--Bill Gates



Legislation

One Hundred Fifteenth Congress
of the
United States of America



US 21st Century Integrated Digital Experience Act

EU parliament directive on digital accessibility



WCAG

- WCAG 1.0
 - Released 1999
 - 14 guidelines and 62 checkpoints
- WCAG 2.0
 - Released 2008
 - 4 principles, 12 guidelines, and 61 success criteria
- WCAG 2.1
 - Release June 2018
 - New Criteria for:
 - Mobile
 - Low-visibility
 - Learning disabilities



WCAG – Compliance levels

Level A—deals with the most basic web accessibility features

Level AA—signifies the biggest and most common barriers for disabled users

Level AAA—addresses the highest (and most complex) level of web accessibility

WCAG - 4 main accessibility principles

- Perceivable – *can you see it*
- Operable – *can you use it*
- Understandable – *can you understand it*
- Robust – *it won't break future technologies*





alt="Cute cat."

First Name

Last Name

Email

Password

Submit

First Name

Last Name

Email

Password

Submit

Perceivable – Color Contrast

<http://webaim.org/resources/contrastchecker/>

Normal Text

WCAG AA: **Pass**

WCAG AAA: **Pass**

The five boxing wizards jump quickly.

Large Text

WCAG AA: **Pass**

WCAG AAA: **Pass**

The five boxing wizards jump quickly.

Graphical Objects and User Interface Components

WCAG AA: **Pass**

Text Input



Perceivable – Color Contrast (Bad)

<http://webaim.org/resources/contrastchecker/>

Normal Text

WCAG AA: **Fail**

WCAG AAA: **Fail**

The five boxing wizards jump quickly.

Large Text

WCAG AA: **Fail**

WCAG AAA: **Fail**

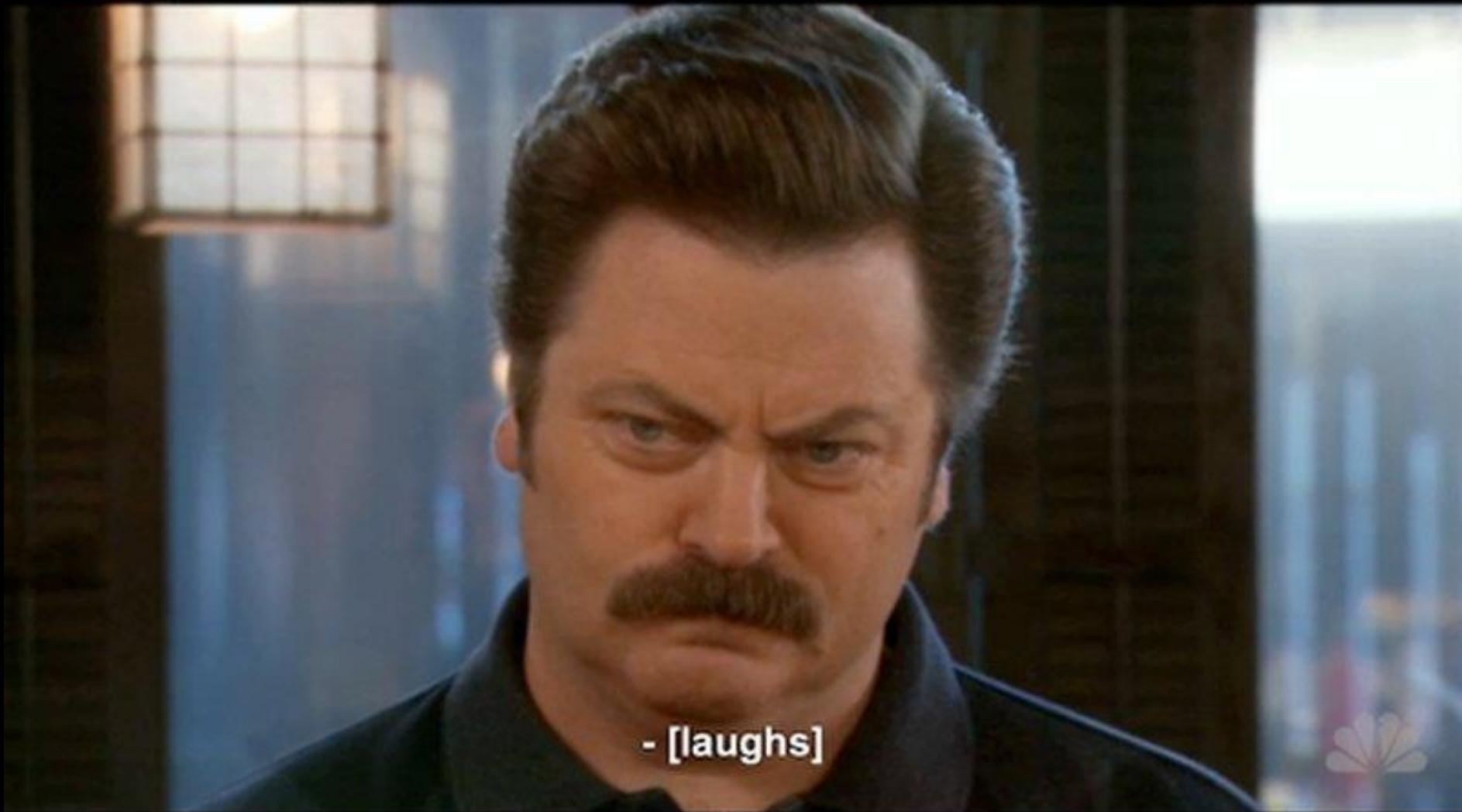
The five boxing wizards jump quickly.

Graphical Objects and User Interface Components

WCAG AA: **Fail**

Text Input





- [laughs]



BAD HYPERLINKS

ulu Advertiser
Advertiser.com

published every
Sunday in The

get a little more European automatic transmission, the front-wheel-drive Fiesta sedan comes as a sedan or hatchback. Sedan trims comprise the S, SE or SEL; the hatchback comes as an SE or SES. Click here to compare them.

Kinetic Styling

Another automaker, another buzzword. Hyundai calls its design ethos "fluidic scul- es a big deal
of the Fiesta's "kinetic

IN REAL LIFE



Ctrl

C

↵

Operable - Structure

```
<h1>My heading</h1>
```

```
<p>This is the first section of my document.</p>
```

```
<p>I'll add another paragraph here too.</p>
```

```
<ol>
```

```
  <li>Here is</li>
```

```
  <li>a list for</li>
```

```
  <li>you to read</li>
```

```
</ol>
```

Operable – Structure (Bad)

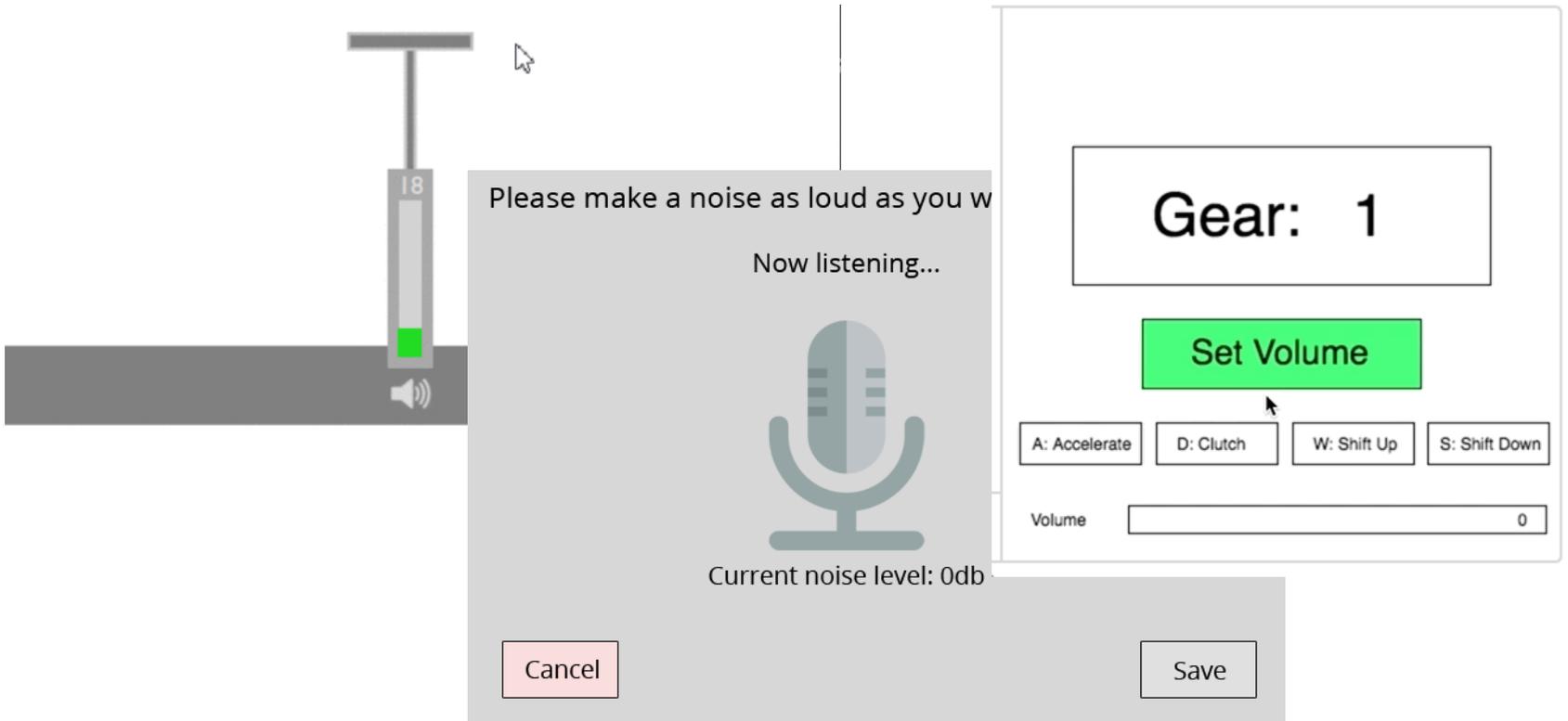
```
<font size="7">My heading</font>
```

```
<br><br> This is the first section of my  
document.
```

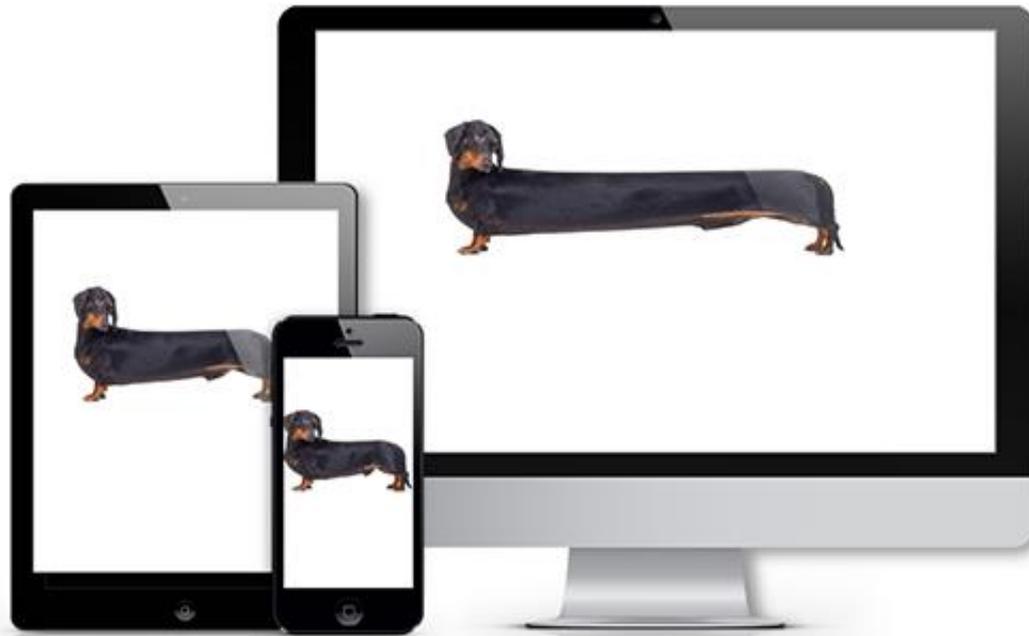
```
<br><br> I'll add another paragraph here too.
```

```
<br><br> 1. Here is  
<br><br> 2. a list for  
<br><br> 3. you to read  
<br><br>
```

Understandable

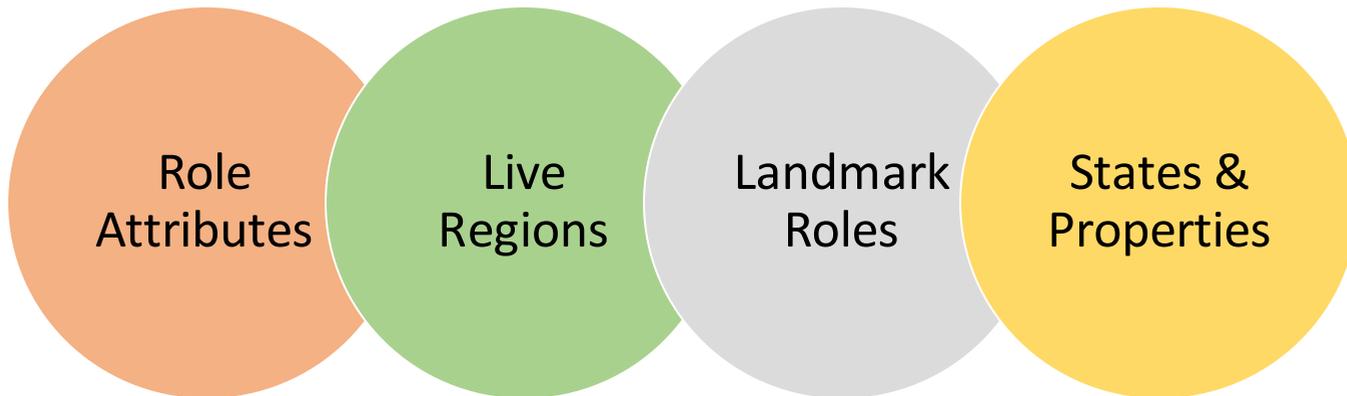


Robust - Scalable



WAI-ARIA

(Web Accessibility Initiative –
Accessible Rich Internet Applications)



ARIA is markup

Markup	Example
role	<code><main role="main"></code>
state	<code><input aria-invalid="true"></code>
property	<code><input id="firstName" type="text" aria-required="true" /></code>

ARIA is HTML5

ARIA	HTML5
article	<article>
header	<header>
navigation	<nav>
complementary	<aside>



The First Rule of ARIA

No ARIA is better than bad ARIA!

The Second Rule of ARIA

Do NOT use ARIA if existing HTML tags already provide the same functionality!!!

WAI-ARIA

Principle 1: A role is a promise

```
<button aria-pressed="false">Mute</button>
```

Principle 2: ARIA Can Both Cloak and Enhance, Creating Both Power and Danger

```
<a role="menuitem">Assistive tech users perceive  
this element as an item in a menu, not a link.</a>
```

```
<a aria-label="Assistive tech users can only perceive  
the contents of this aria-label, not the link text">Link  
Text</a>
```

<http://aka.ms/devconfdemo>



**KEEP
CALM
IT IS
DEMO
TIME**



AI for Accessibility

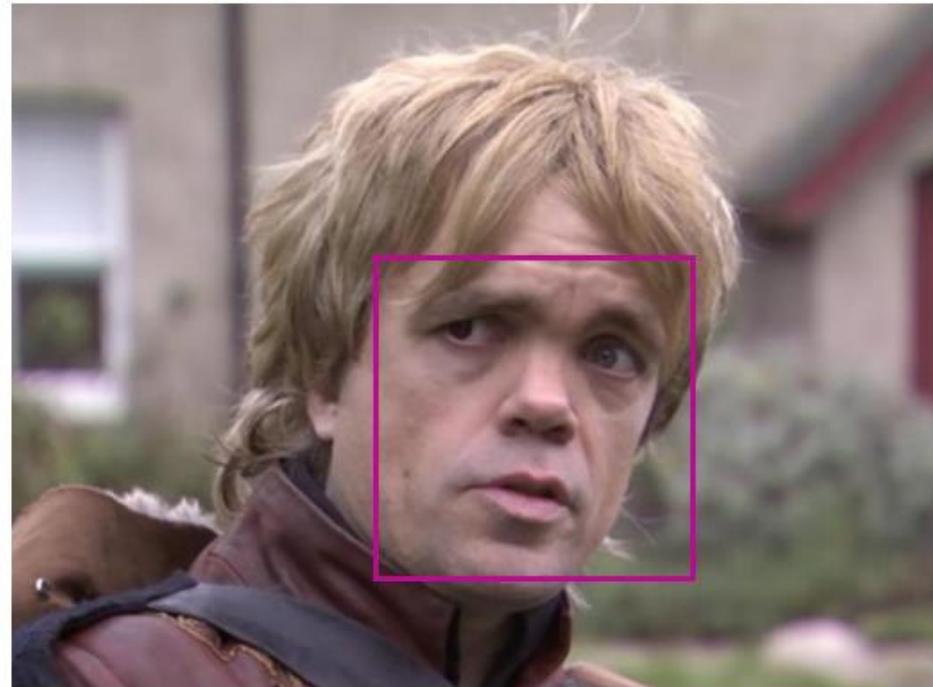
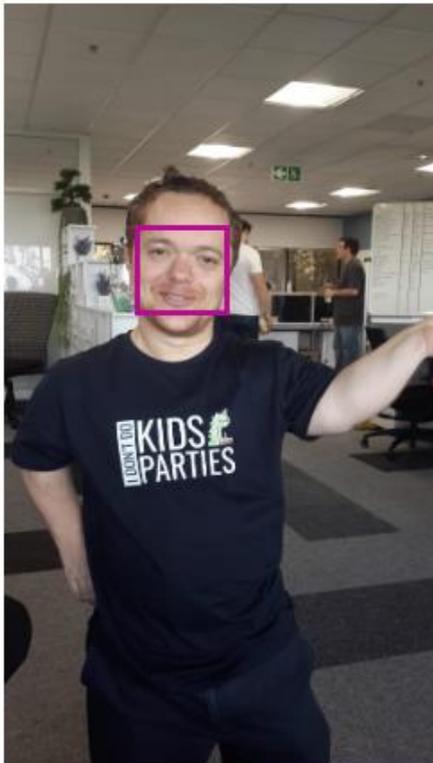


Image URL

Submit

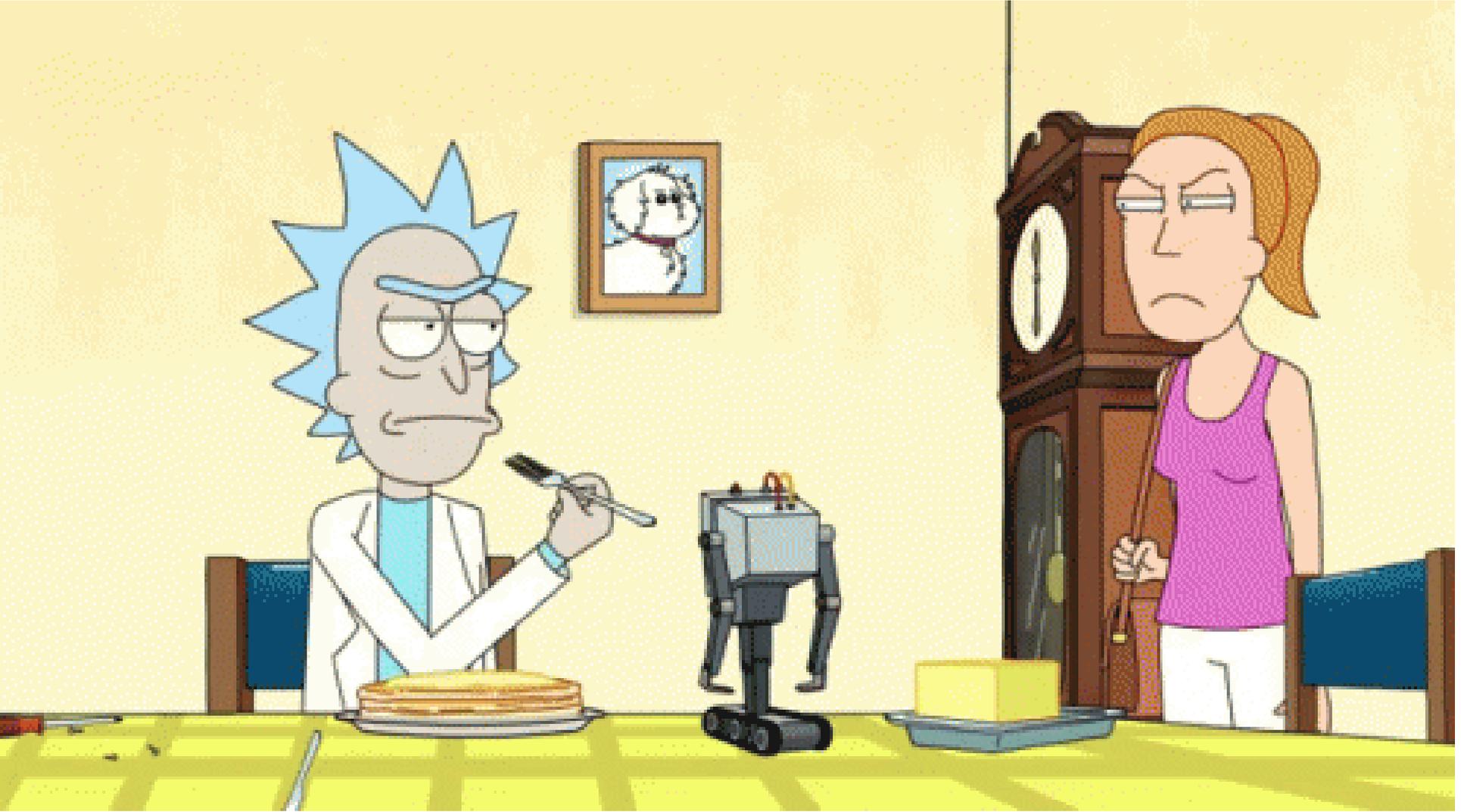
 Browse

Image URL

Submit

 Browse

Verification result: The two faces belong to different people. **Confidence is 0.46547.**





**In the past, you
had to adapt
to
the world.**

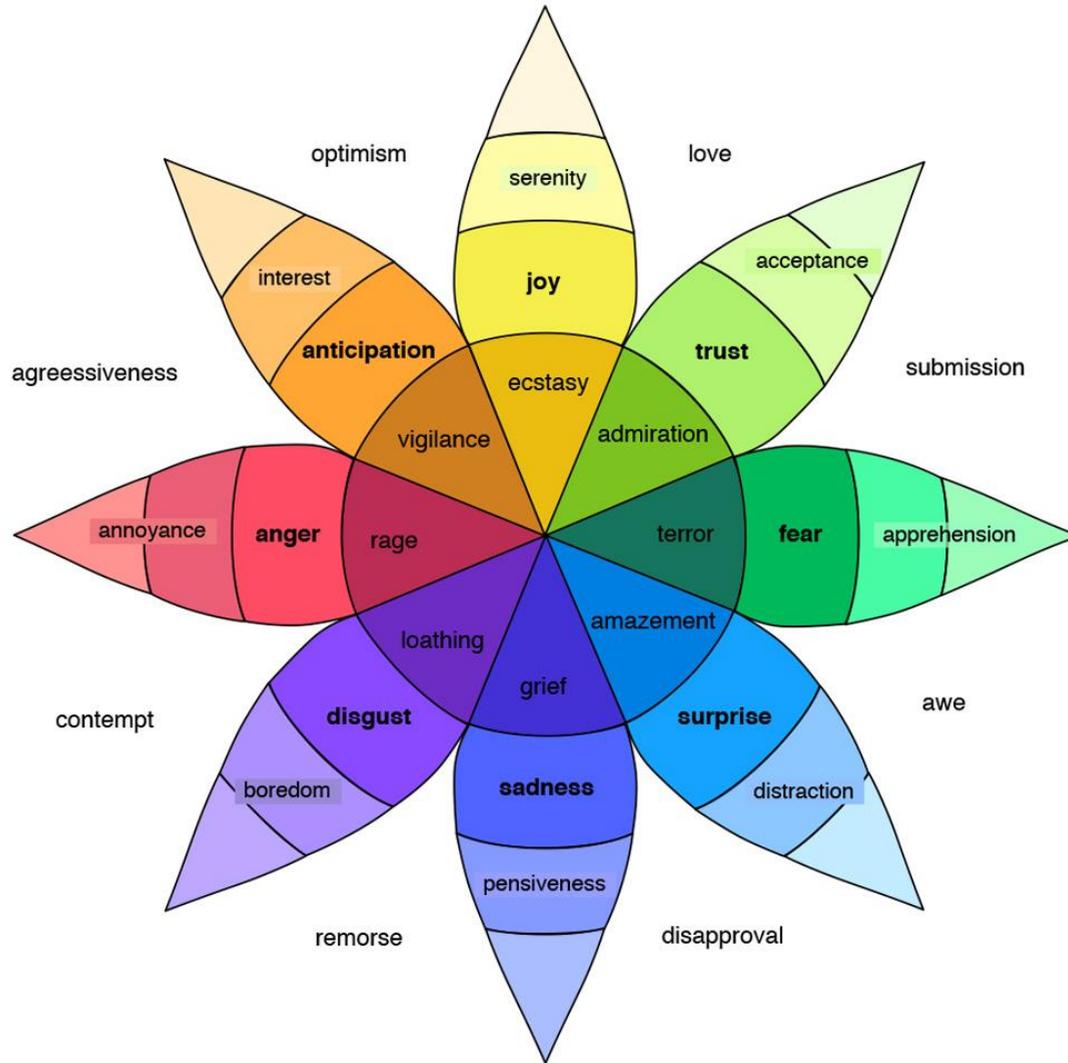
**In the future,
the world will
adapt to you.**



FAIL

failblog.org

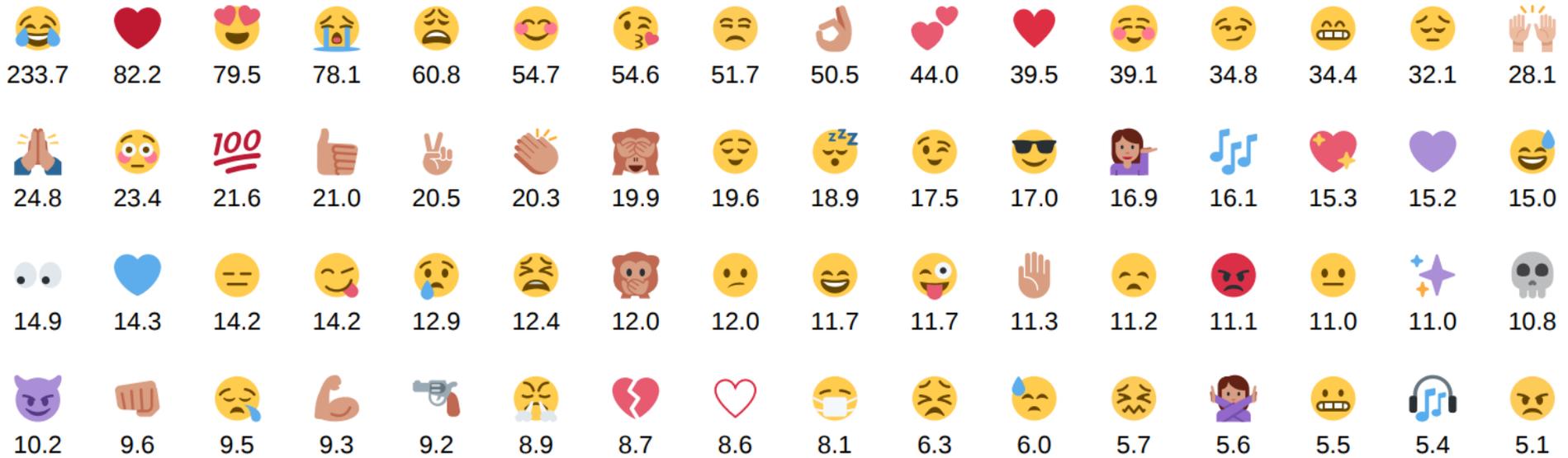




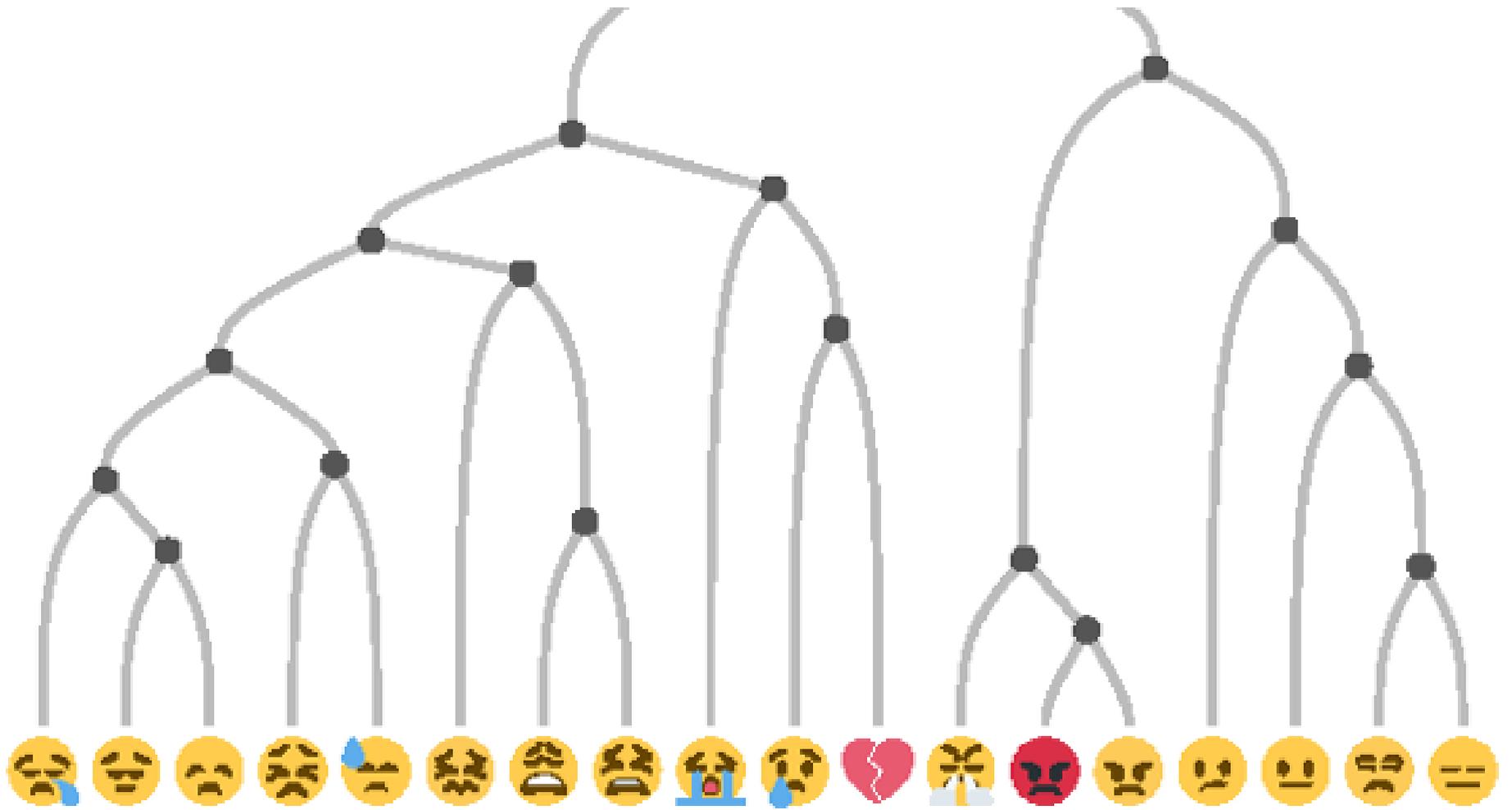
Artificial emotional intelligence



Training each emoji in millions



55 Billion → 1.6 Billion



<http://deepmoji.mit.edu>

The electricity is off again. Oh Joy!

Words are highlighted based on emotional impact. Click a word to turn it on/of

the electricity is off again . oh joy !



high confidence

Cortana emotions



Calm



Optimistic 1



Optimistic 2



Reminder



Sensitive 1



Sensitive 2



Abashed



Alert



Bouncy



Need More



Elated



Satisfied

<https://playground.tensorflow.org>

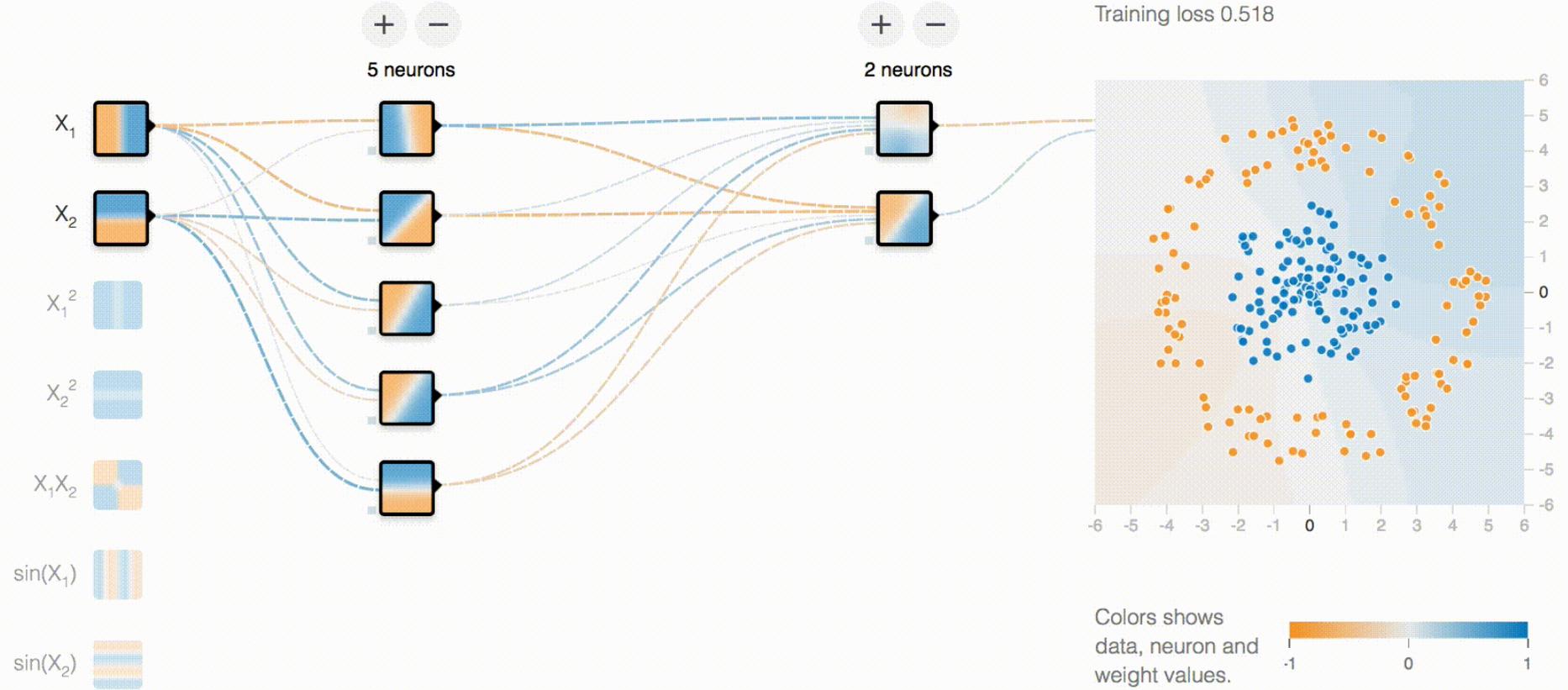
INPUT

2 HIDDEN LAYERS

OUTPUT

Test loss 0.510

Training loss 0.518

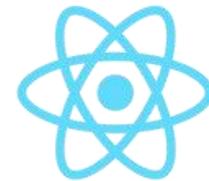


Show test data

Discretize output

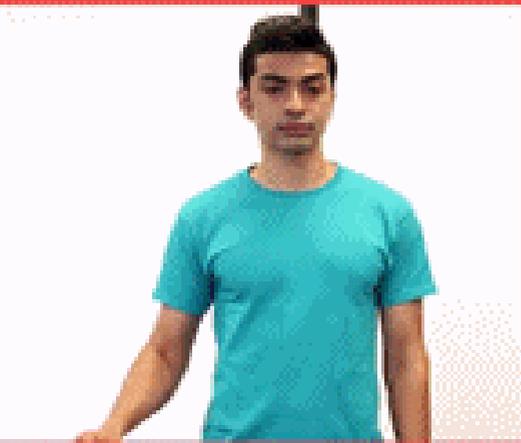


InBrowser.AI



<http://aka.ms/devconfASL>

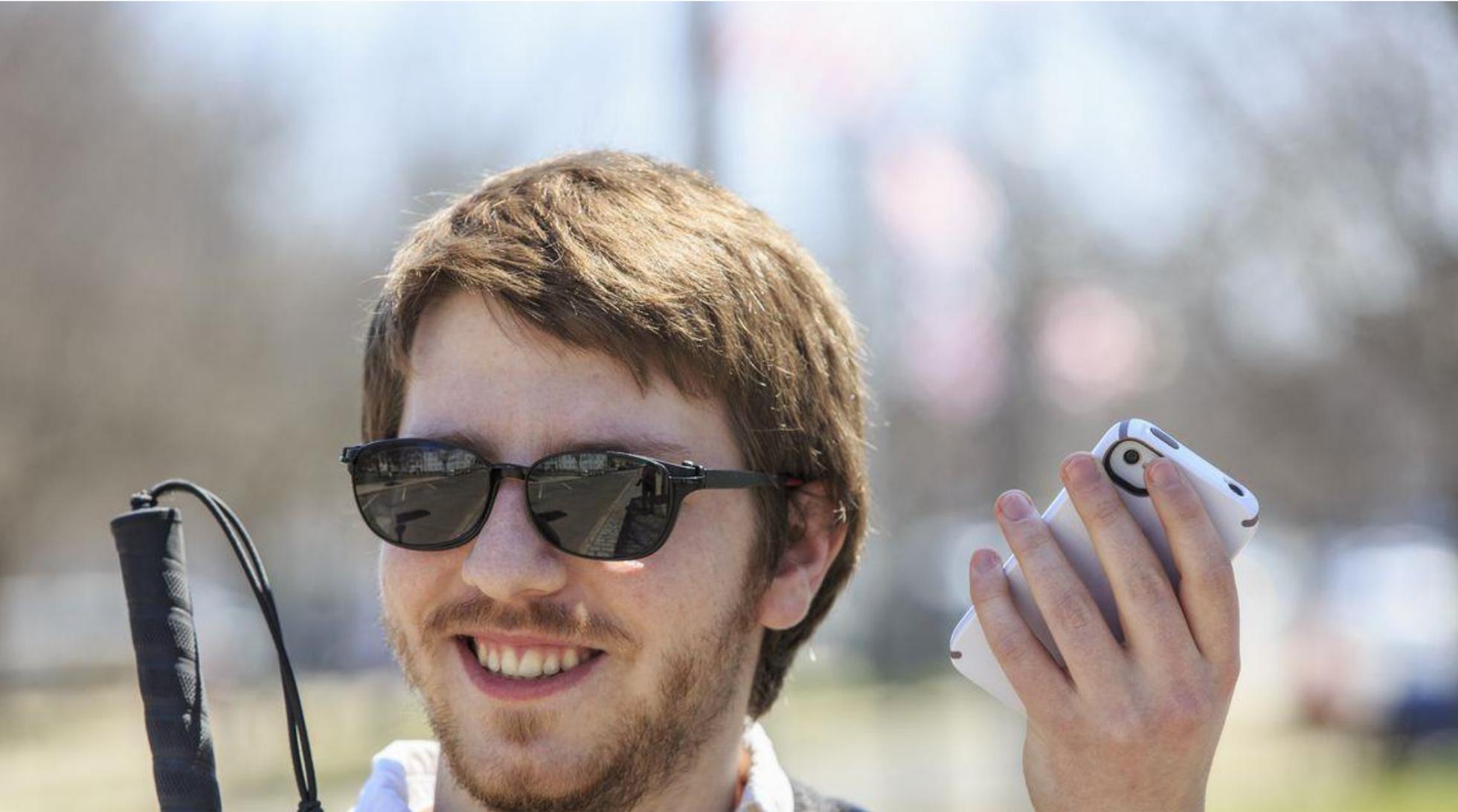
Smart Assistant with Sign-language



AI - Learn from diversity

1. Redefine **bias** as a spectrum
2. Enlist **customers** to correct bias
3. Cultivate **diversity** with privacy and consent
4. Balance **intelligence** with **discovery**
5. Build inclusive **AI** teams

<http://seeingai.com>





Conclusion

1. Inclusive design
2. Website Standards
3. AI

<http://aka.ms/devconf>



@rorypreddy