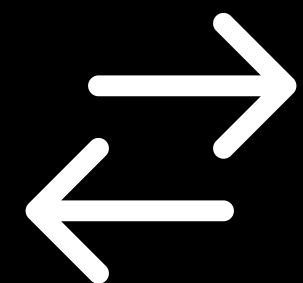


User Interfaces in a Bi-Directional Web



Matt Seccafien
React Summit USA
Nov 2025

Hi, I'm Matt!

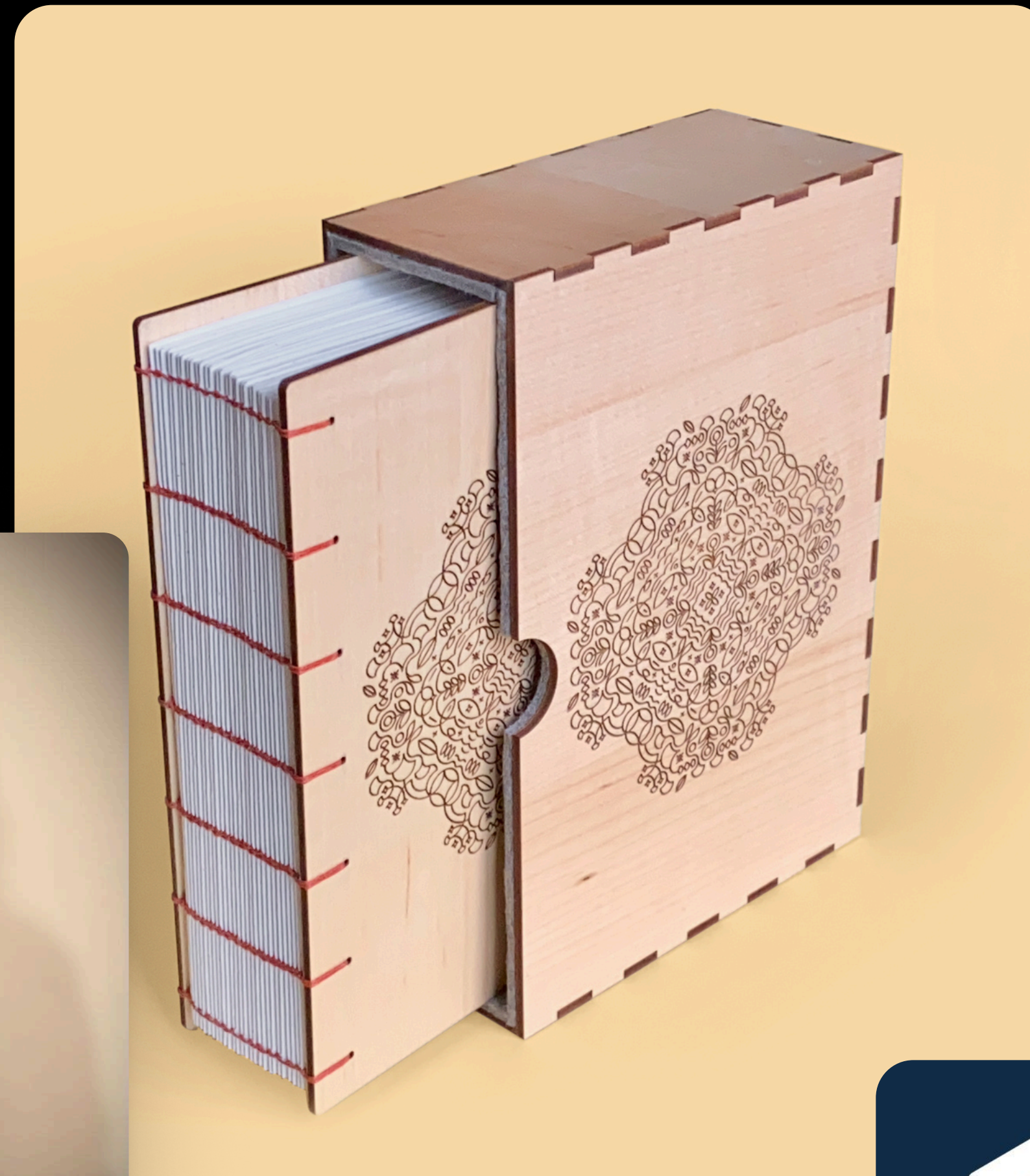


 Proudly Canadian

 Living in Berlin

 Talks about running

 Devoted cat dad

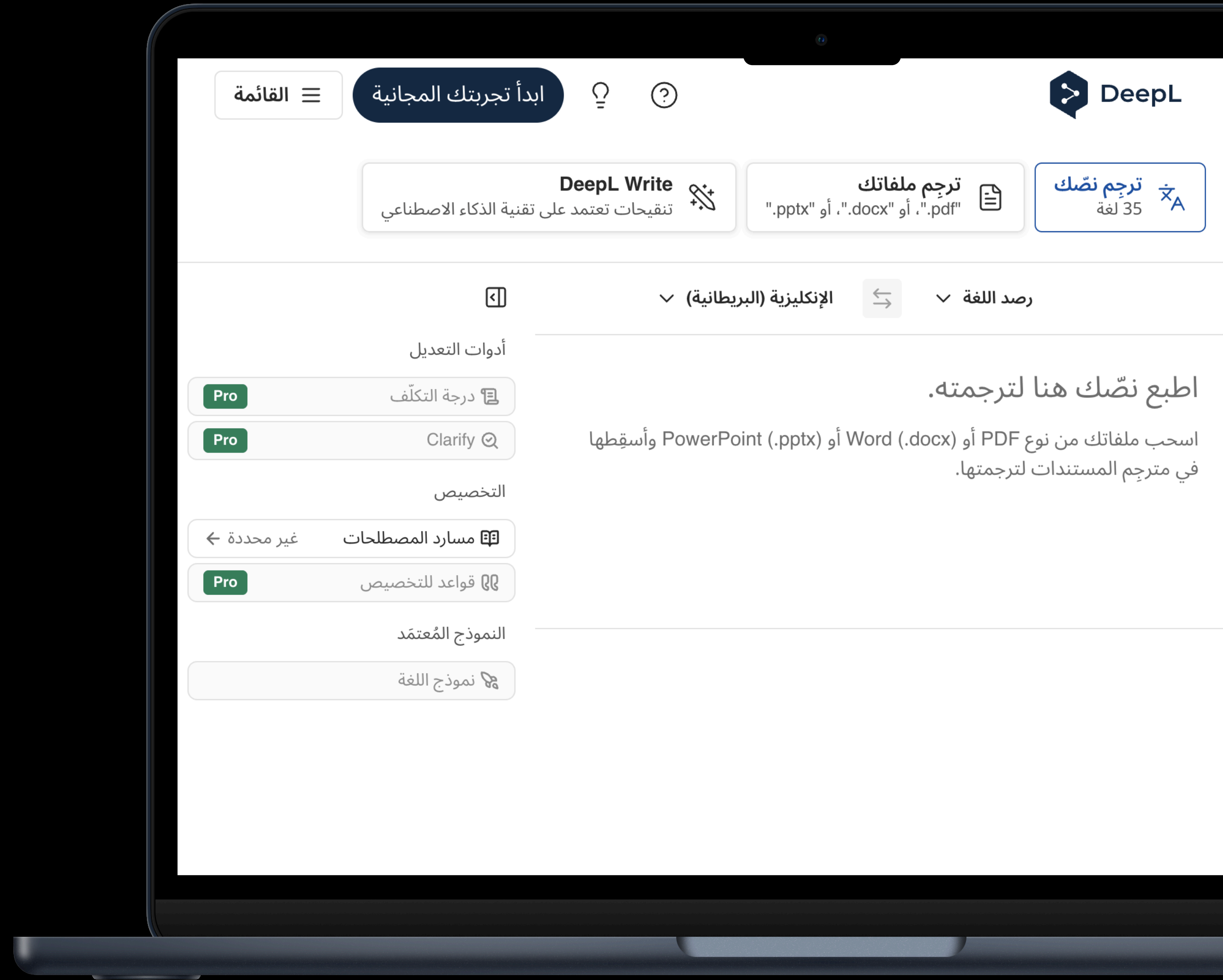


fondfolio.com
cartogram.ca



Agenda

1. Why BIDIUI?
2. Mirroring layout
3. Understanding Arabic
4. Getting Directional...
 - a. in the HTML
 - b. in the CSS
 - c. in components
 - d. in iconography
 - e. with tooling
5. The agentic future



bidui.com

Why bi-directional UI? Opportunity, importance and scale

One of six official languages

Used in the United Nations (UN)

+313M

People with Arabic as their first language

+400M

People who read from right to left everyday

3rd

Most widespread official language



<https://www.youtube.com/watch?v=X1ynZm1wI18>

Every other writing system is treated as an afterthought.

These are exactly the kinds of problems we wanted to avoid at DeepL.

Arabic in particular was one of the most requested of all languages on our platform.

(Not just right-to-left languages)

Opened DeepL to users in 22 new countries and serve markets that were largely underserved by quality translations.

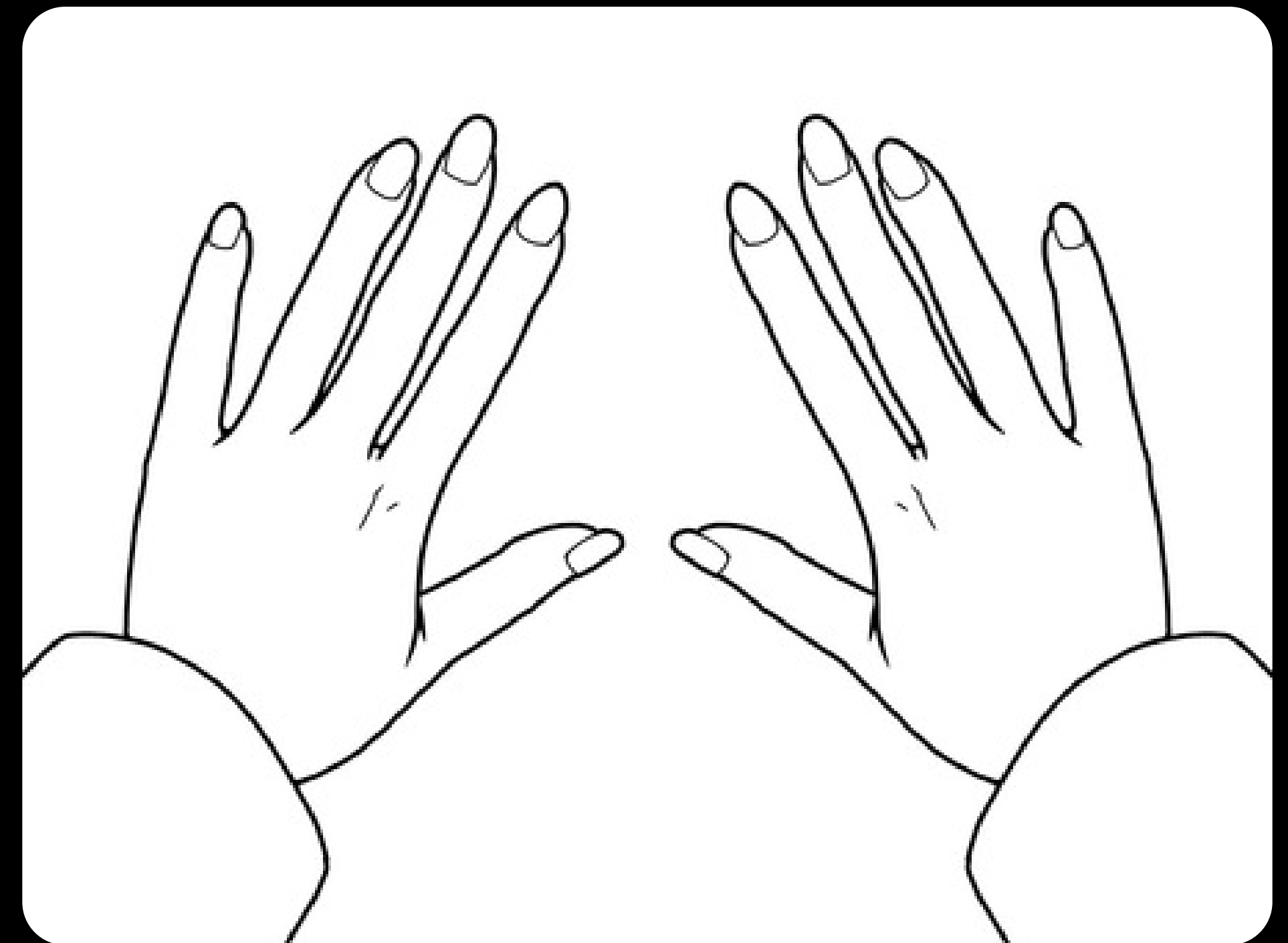
(Exactly what DeepL is known for providing)

The basics of mirroring layout

Right is not universally forward.

The motion of the document reverses.

(Like holding a mirror to the website)



Japanese can be read horizontally even if traditionally read vertically.

New CSS `writing-mode` sets whether lines of text are laid out horizontally or vertically.



Using multiple writing modes

Value	Vertical script	Horizontal (LTR) script	Horizontal (RTL) script	Mixed script
horizontal-tb	我家没有电脑。	Example text	מלל ארוך לדוגמא	1994年に至っては
vertical-lr	我家没有电脑。	Example text	מלל ארוך לדוגמא	1994年に至っては
vertical-rl	我家没有电脑。	Example text	מלל ארוך לדוגמא	1994年に至っては
sideways-lr	。圖甲身外筆筆筆	Example text	מלל ארוך לדוגמא	1994年に至っては
sideways-rl	我家没有电脑。	Example text	מלל ארוך לדוגמא	1994年に至っては

<https://developer.mozilla.org/en-US/docs/Web/CSS/writing-mode>

Understanding the visual qualities of Arabic text

Arabic is a cursive script and letters need to connect to each other.

Do not use `letter-spacing`.

```
1  /* ❌ DO NOT */  
2  letter-spacing: 0.5em;  
3  
4  /* ✅ DO */  
5  letter-spacing: 0;
```

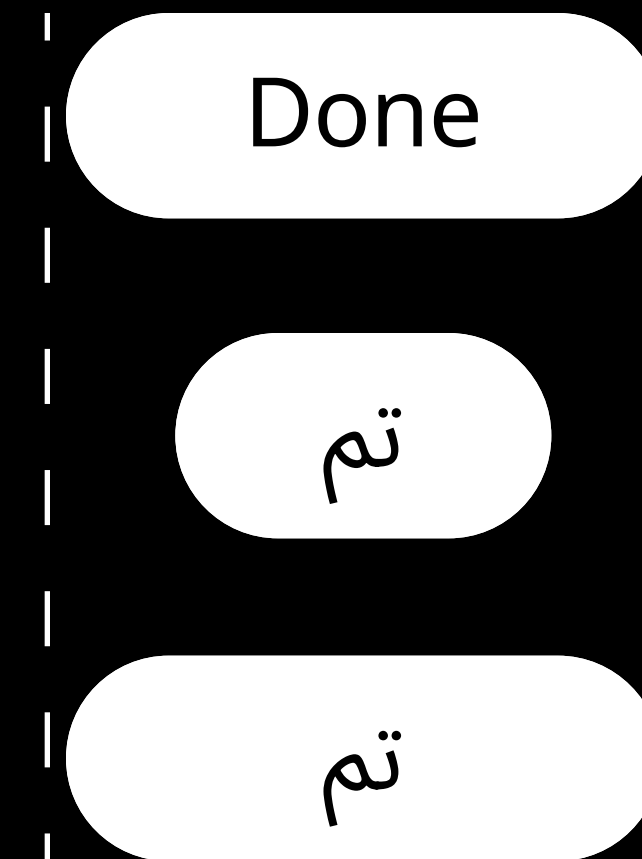
Arabic words are unbreakable units.

No hyphens across lines.

```
1  /* ❌ DO NOT */  
2  word-break: break-all;  
3  
4  /* ✅ DO */  
5  word-break: auto-phrase;
```

Arabic is more compact.

Connector words are single letters and attached, but language is more rigid overall.



```
1  /* ✓ DO */  
2  .button {  
3      min-width: 200px;  
4      min-inline-size: 200px;  
5  }
```

Numbers are the same.

Arabic numbers are used in both English and Arabic.

Hindi

१ २ ३ ४ ५ ६ ७ ८ ९ ०

Arabic

0 1 2 3 4 5 6 7 8 9

بعض أشكال الحروف
لن تكون قابلة للقراءة

Arabic is taller.

Diacritics need vertical space and may be hidden by text underlines.

```
1 /* ✓ DO */  
2 line-height: 1.6; /* +~25% */  
3 text-decoration-skip-ink: auto /* or "all" */
```

تسطير تسطير

Use a good font for Arabic.

We use Noto to handle nuances in punctuation and avoid potential readable issues.

```
1 /* ✓ DO */
2 :lang(ar) {
3     font-family: Noto Sans Arabic, sans-serif;
4 }
```



<https://fonts.google.com/noto/specimen/Noto+Sans+Arabic>

Getting directional in the HTML

Set the document direction `dir` & language `lang`.

Default text alignment changes to right.
Form elements also align to right.
Inline, flex, and grid reverse.

```
1  /* ✓ DO */  
2  <html dir="rtl" lang="ar">
```

Headings and text

This paragraph is not aligned in anyway.

The flow of elements



Form elements

Full Name

Message

Select a Choice

First Choice

Second Choice

Third Choice

Select a Choice

First Choice

Submit

Headings and text

This paragraph is not aligned in anyway

The flow of elements



Form elements

Full Name

Message

Select a Choice

First Choice

Second Choice

Third Choice

Select a Choice

First Choice


Submit

<https://codepen.io/cartogram/pen/PwZpPBz?editors=1100>

Direction is a content property.

Not a presentational concern.

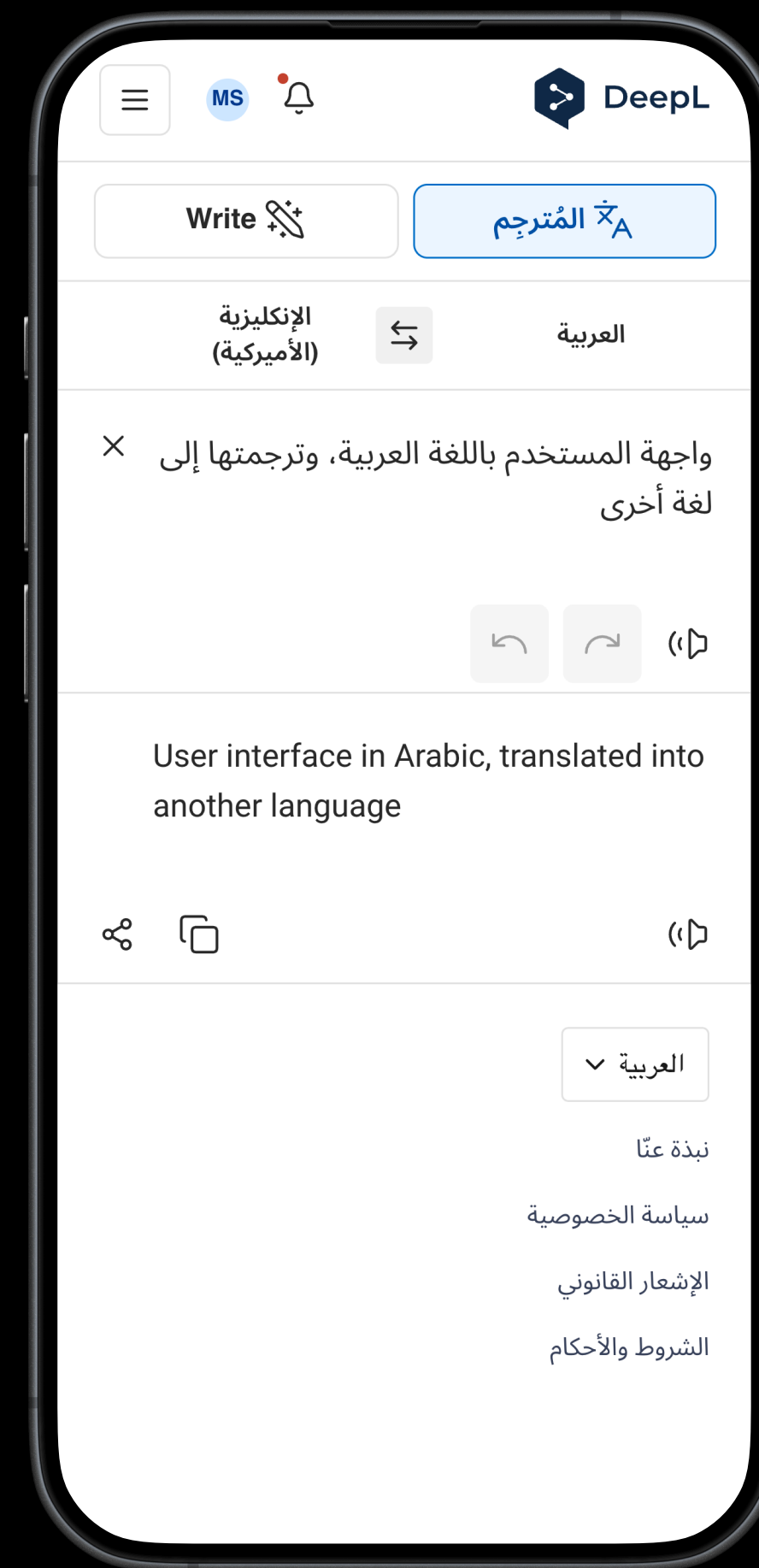
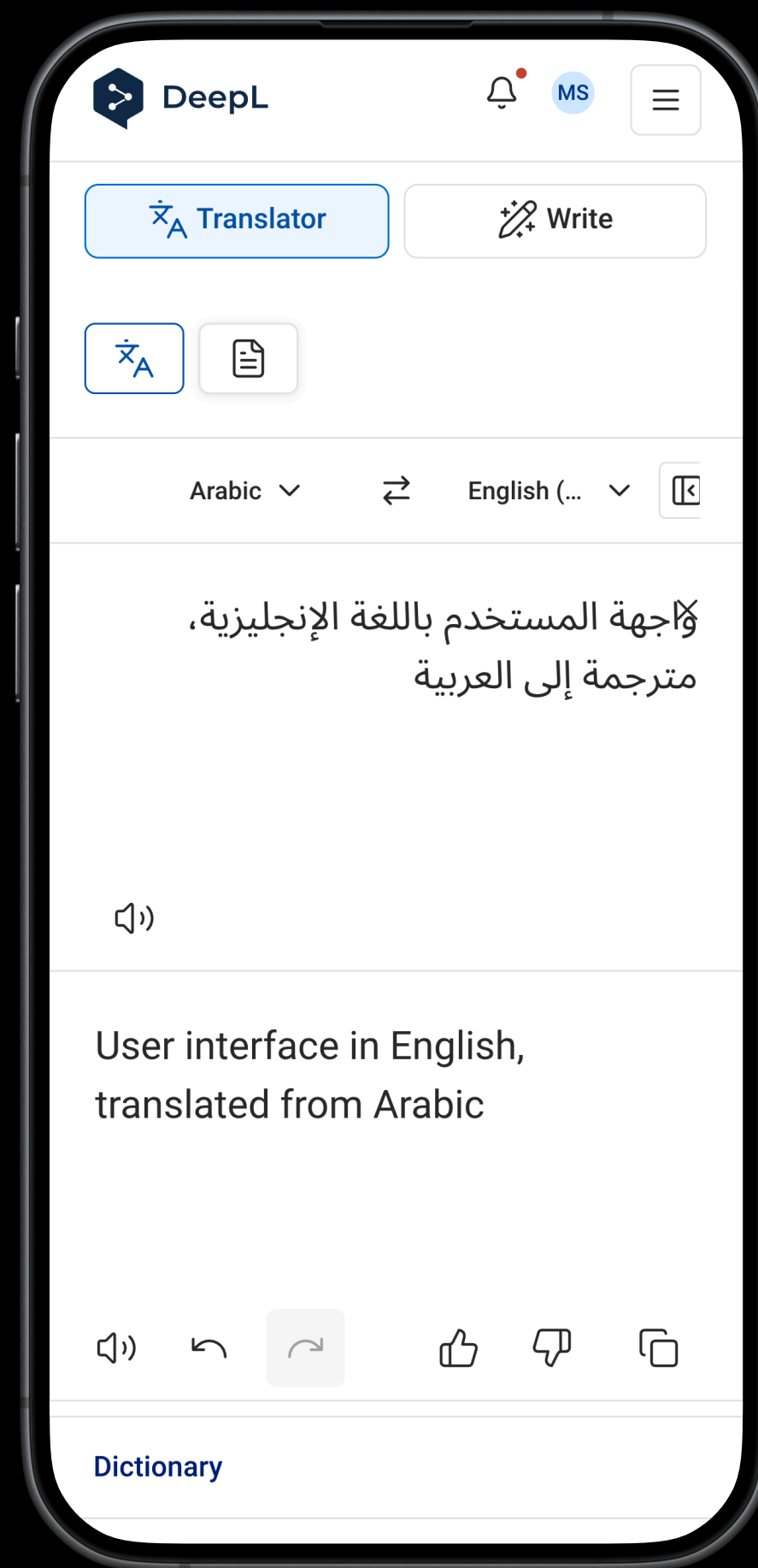
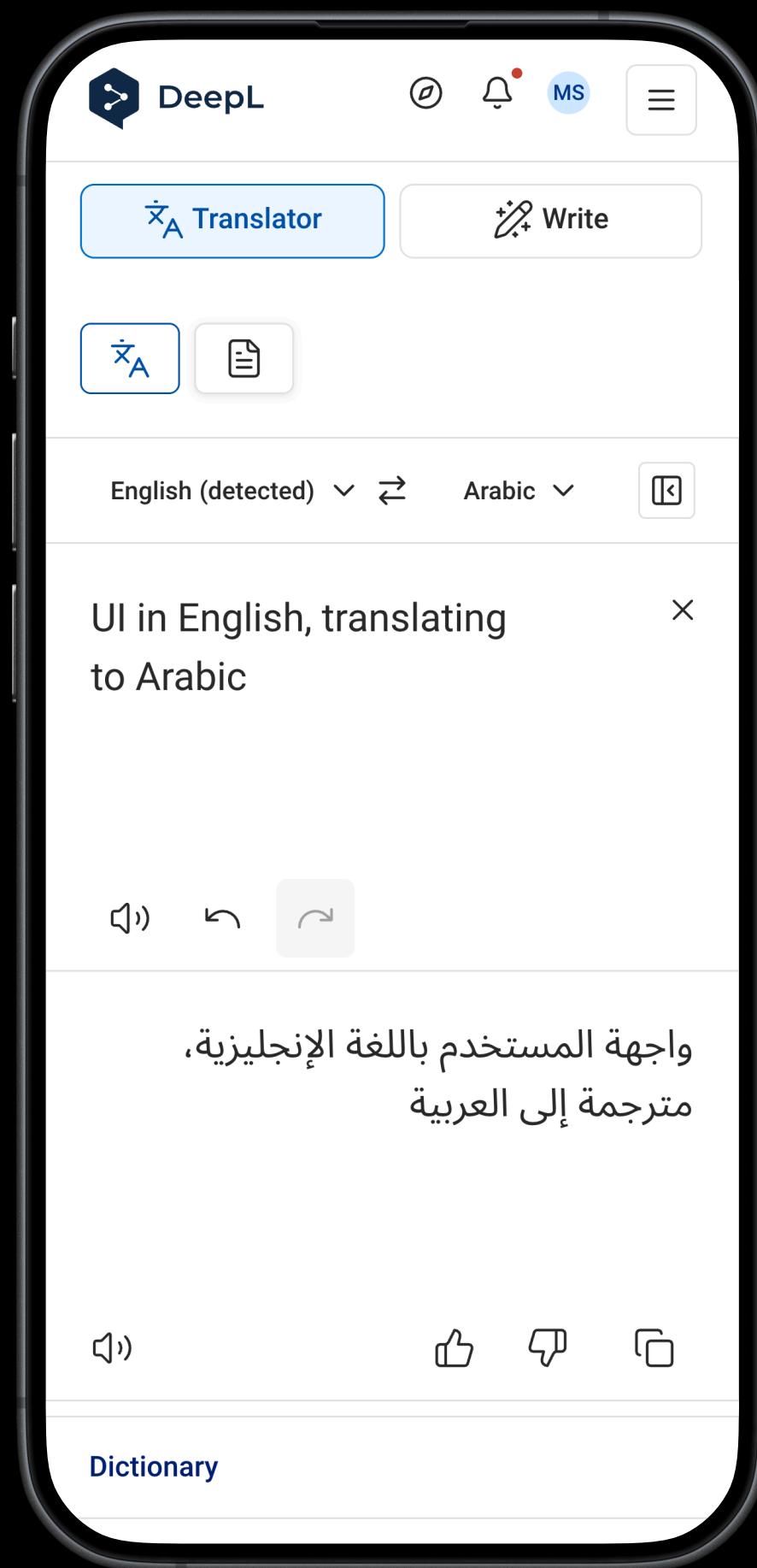
```
1  /* X DO NOT */  
2  .element {  
3      direction: rtl;  
4  }
```

 **Warning:** Where possible, authors are encouraged to avoid using the `direction` CSS property and use the HTML `dir` global attribute instead.

<https://developer.mozilla.org/en-US/docs/Web/CSS/direction>

Mixed content

Things get a bit more complicated at DeepL.



Getting directional in the CSS

CSS logical properties


left becomes **start**, **right** becomes **end**
and **inline** does both

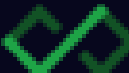
Physical	Logical
left & right	inset-inline
margin-left & margin-right	margin-inline
padding-left & padding-right	padding-inline
width	inline-size
height	block-size

Physical	Logical
left	inset-inline- start
right	inset-inline- end
margin-left	margin-inline- start
margin-right	margin-inline- end
padding-left	padding-inline- start
padding-right	padding-inline- end
border-right	border-inline- start
border-left	border-inline- end

A note on progressive enhancement

Browser support is good and older browsers ignore unsupported properties.

```
1  /*  DO */
2  .sidebar-start {
3      padding-left: 1rem; /* Fallback */
4      padding-inline-start: 1rem;
5  }
```

 **Baseline** Widely available




This feature is well established and works across many devices and browser versions. It's been available across browsers since September 2021

https://developer.mozilla.org/en-US/docs/Web/CSS/CSS_logical_properties_and_values

:dir(ltr | rtl)

The dir() pseudo selector to target elements based on directionality.

(Use sparingly.)

```
1  /*  DO */  
2  .Icon--directional:dir rtl) {  
3      transform: scaleX(-1);  
4  }
```

Getting directional in components

Buttons, Toasts & Pills

English



Arabic



Inputs & Textareas

English

Search for a glossary



Arabic



البحث عن مسرد مصطلحات

Checkboxes, Selects & Switches

English

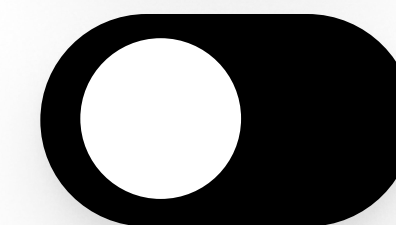
Arabic



التصحیحات فقط



التصحیحات فقط



Tables, Breadcrumbs & Tabs

English

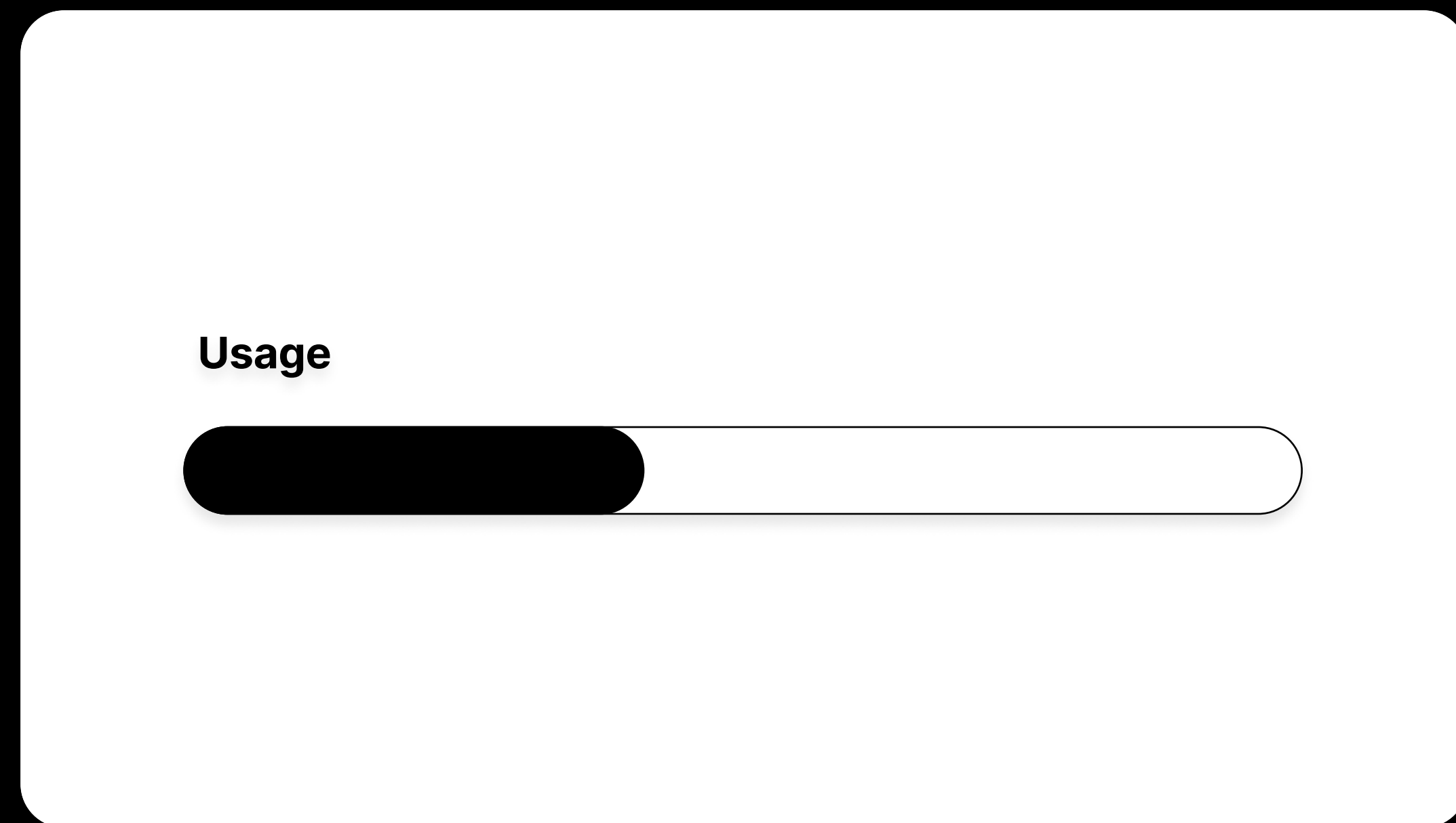
Arabic

Glossary name	Access role	Owned by
Default	Owner	Matt Seccafien

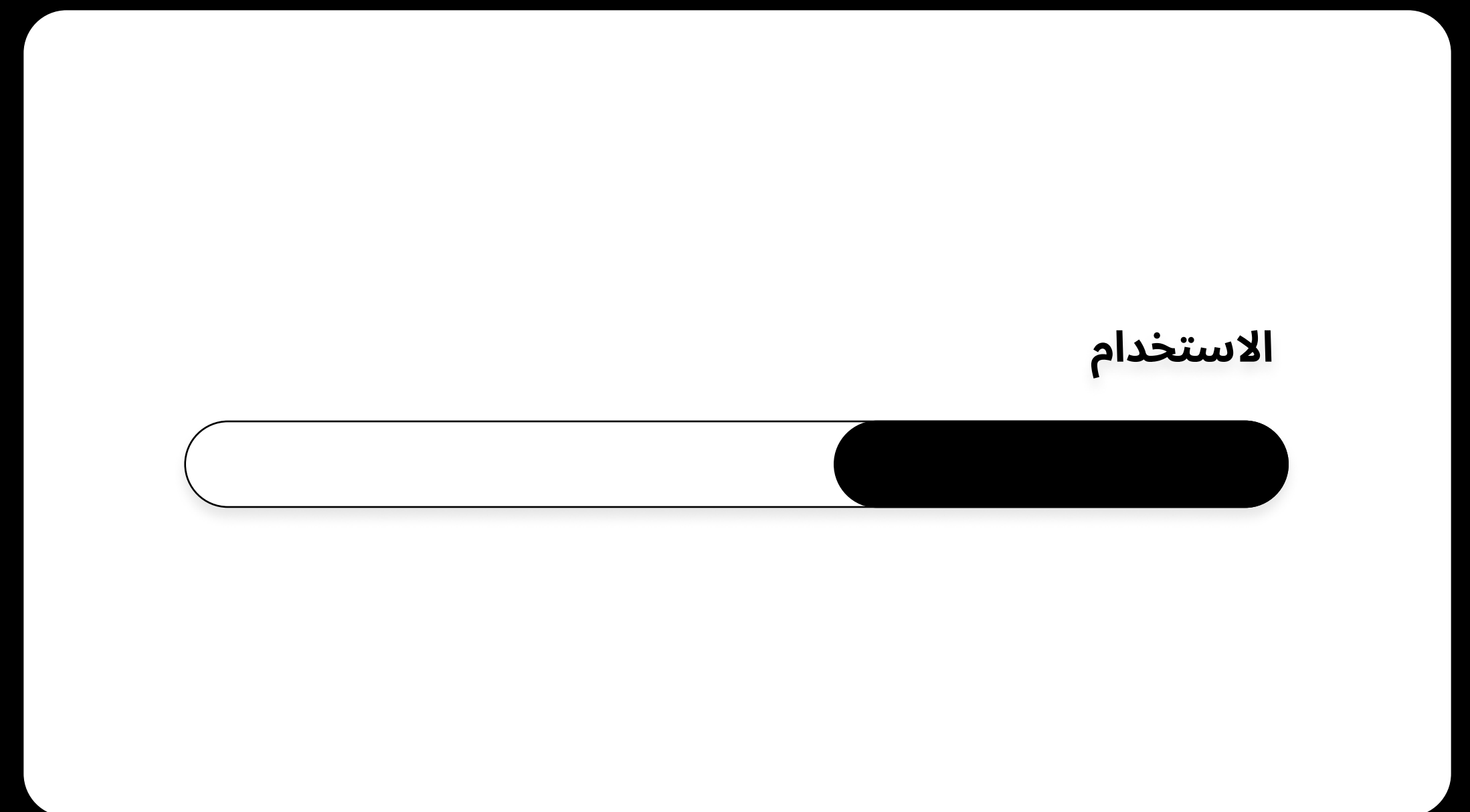
المالك	دور الوصول	اسم مسرد المصطلحات
Matt Seccafien	Owner	Default

Progress & Loading indicators

English



Arabic



React

We use a context value that is used in components to fine-tune interactions and anything that cannot be achieved with logical CSS.

```
1 // App.tsx
2 <DesignSystemProvider direction="rtl">
3   <App />
4 </DesignSystemProvider>
5
6
7 // Nav.tsx
8 const {direction} = useDesignSystem()
9
10 <Drawer direction={direction === "rtl" ? "right" : "left"}>
11 // Direction of the drawer adjusts to
12 // accomodate animations and the drag direction.
13 </Drawer>
```

Getting directional in the tooling

Stylelint

```
1 .element {  
2   padding-left: 10px;  
3 }
```

The physical property `padding-left` is invalid.
Replace it with the logical property: `padding-inline-start`

[Stylelint\(deep/prefer-logical-css\)](#)

Auto fix

Fix in Chat

ESLint

```
1 <div className="pl-2">  
2 // markup ...  
3 </div>
```

The className `pl-2` is invalid. Replace it with the logical property: `ps-2`

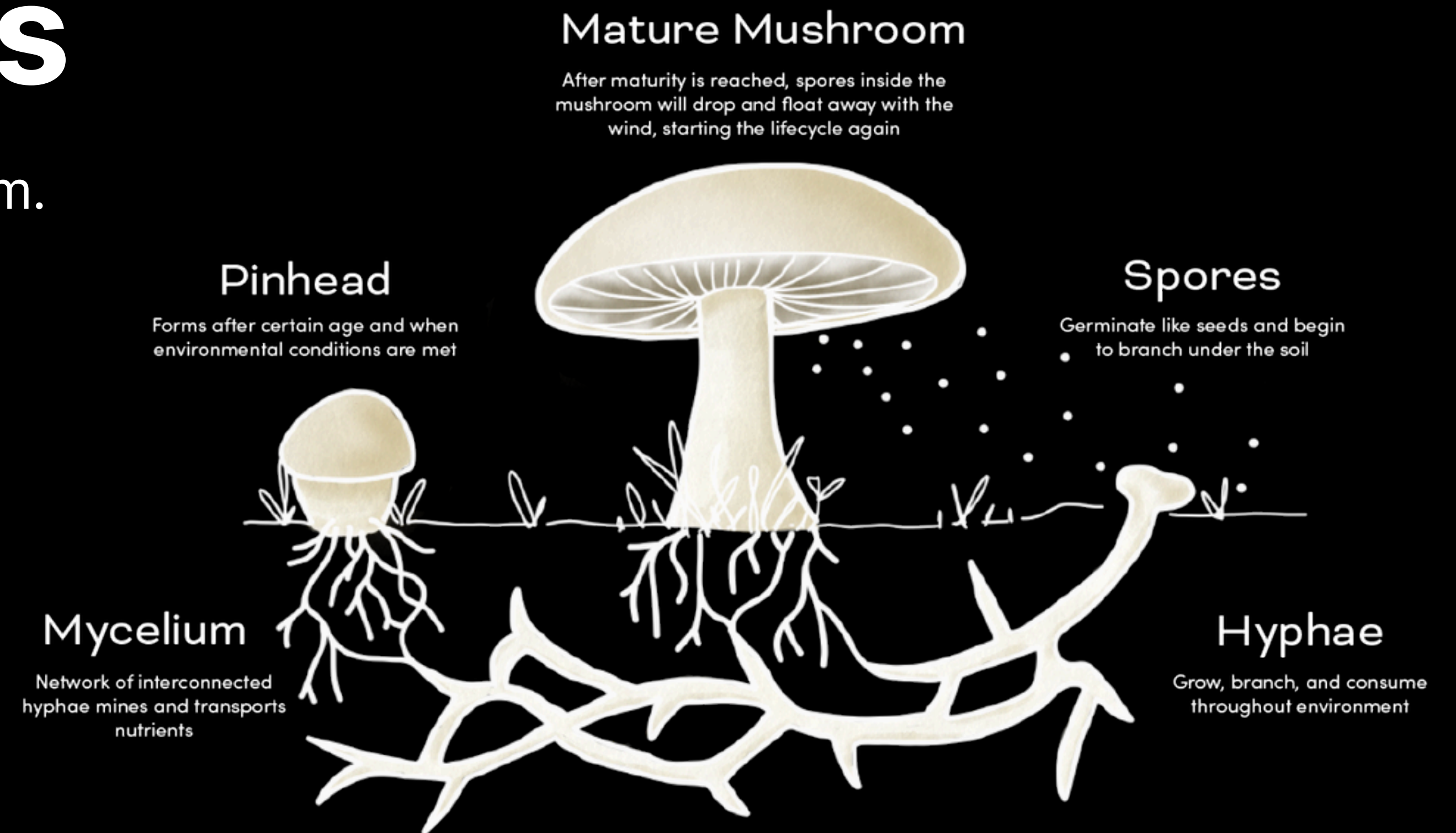
[ESLint\(deep/prefer-logical-classnames\)](#)

Auto fix

Fix in Chat

A design system isn't just components

It's the entire ecosystem that supports them.



<https://shop.ecovative.com/pages/mycelium-101>

Getting directional with iconography

Distinguish content from controls

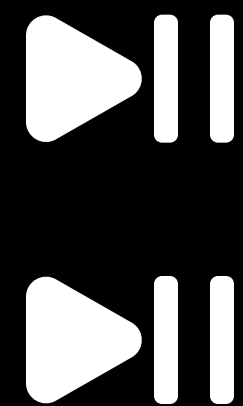
Navigation elements mirror because their semantic meaning depends on content flow direction.

(Remember, right is not universally forward.)

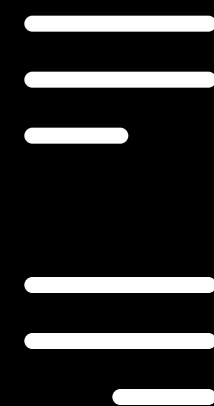
forward movement



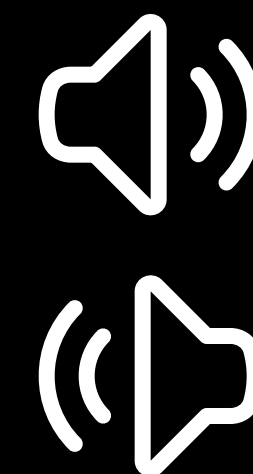
physical mechanism



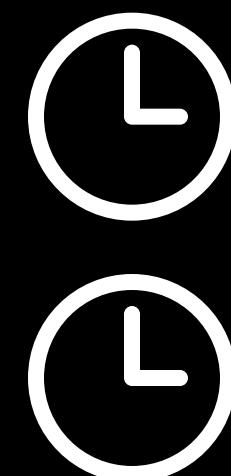
representing text



volume indicator



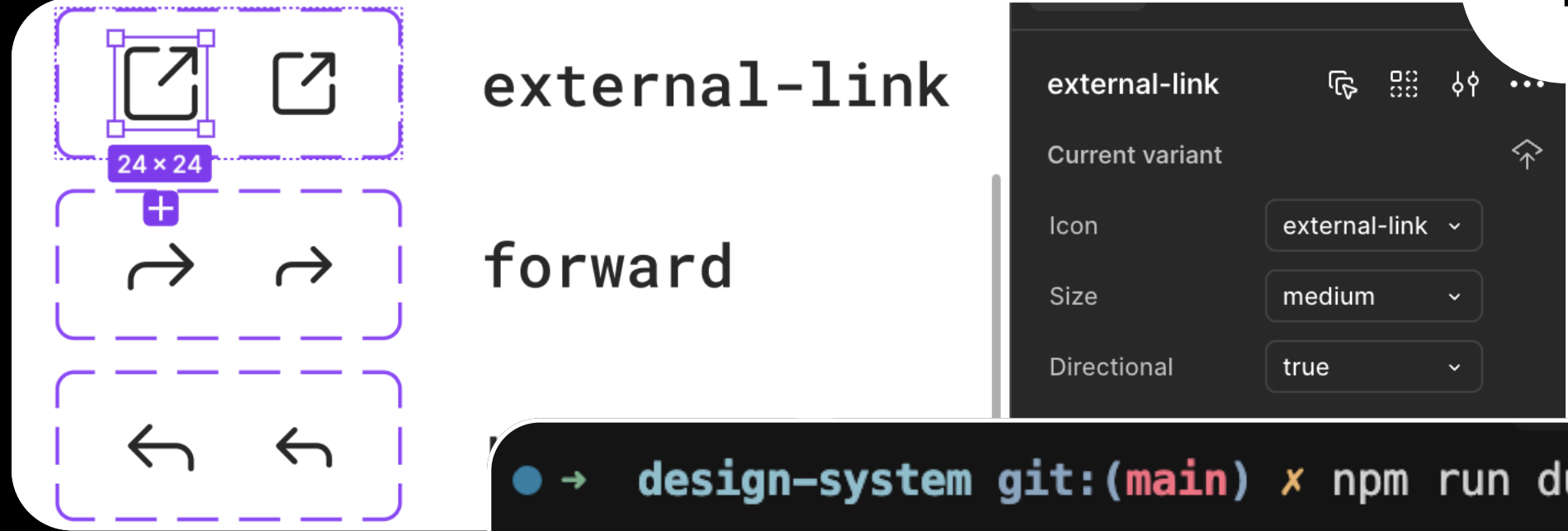
circular progress



Automated flow

1. Designer sets property in Figma
2. Build tool generates icon spirte sheet
3. Developer references icon name
4. Mirroring is reflected in the interface

1



2

```
● → design-system git:(main) x npm run dui -- icons
> dui
> npx tsx tools/cli/src/index.ts icons

[dotenv@17.2.2] injecting env (2) from .env -- tip:
Building icons with docs
↓ Figma's SVG icons are already up to date
✓ Fetching icons from Figma
  ↓ Downloading SVGs
✓ Creating React components
✓ Creating SVG sprite
✓ Creating Windows assets
✓ Creating MacOS assets
✓ Creating IOs assets
✓ Writing metadata
✓ Generating docs
○ → design-system git:(main) x
```

3

```
1 // Single shared and typed
2 // React component
3 <Icon name="external-link" />
4 <Icon name="not-a-valid-icon" />
```

4

Voice لمنصة Microsoft Teams 
DeepL ترجمة فورية لاجتماعاتك باستخدام تطبيق
Voice لمنصة Teams

The future (design) system

What we learned

How to survive as a design system engineer
without losing your soul.

1

**Design systems are an
interface to metadata**

2

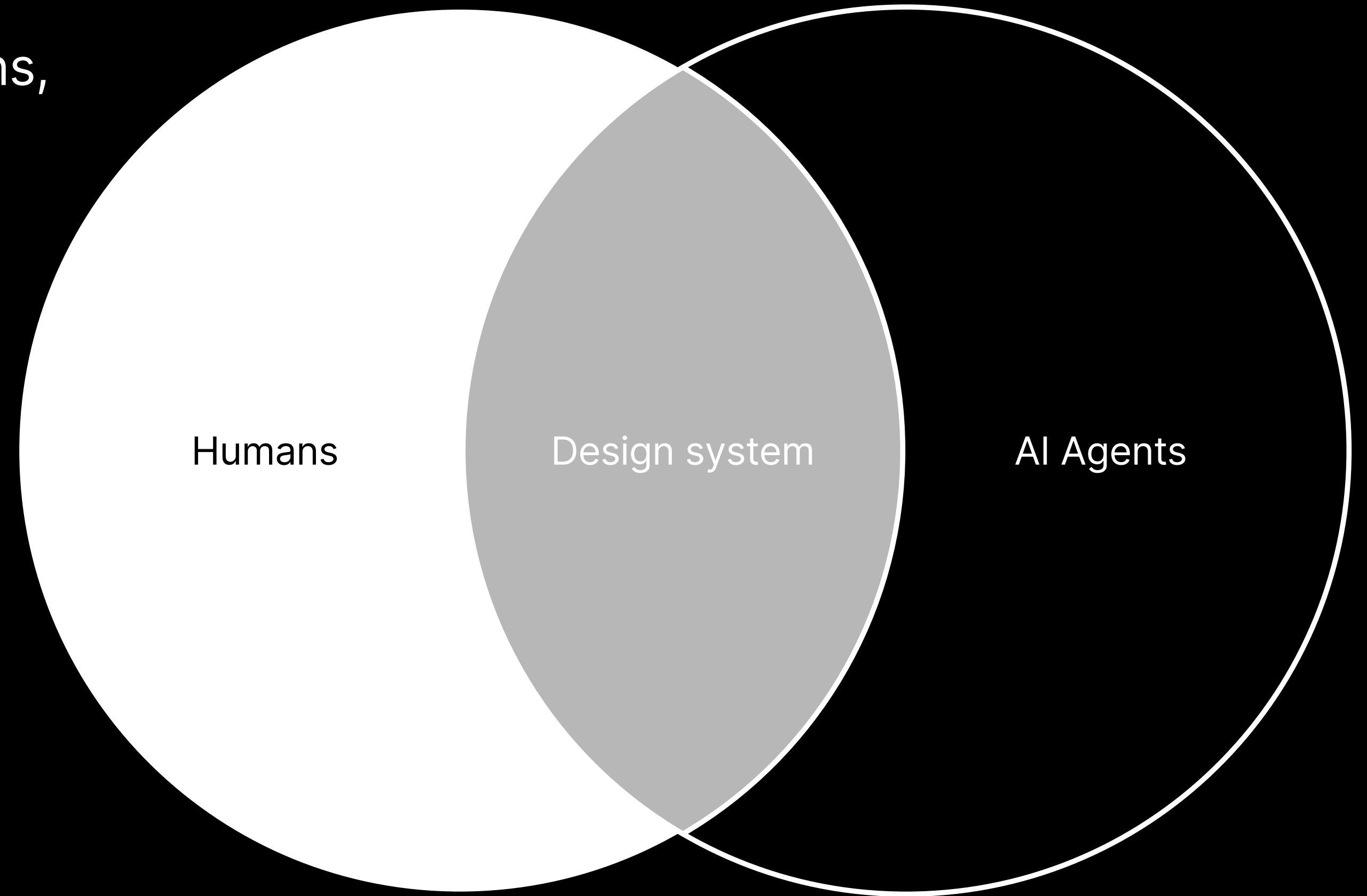
**A design token is a
design decision**

3

**Create systems for
humans and AI agents**

Build a design system for agentic input.

When you build a great interface for humans,
AI is just another user who benefits.



Thanks!

bidiui.com
cartogram.ca