

Programming for Accessibility with AI

@rorypreddy



My car pedals





Bolt on



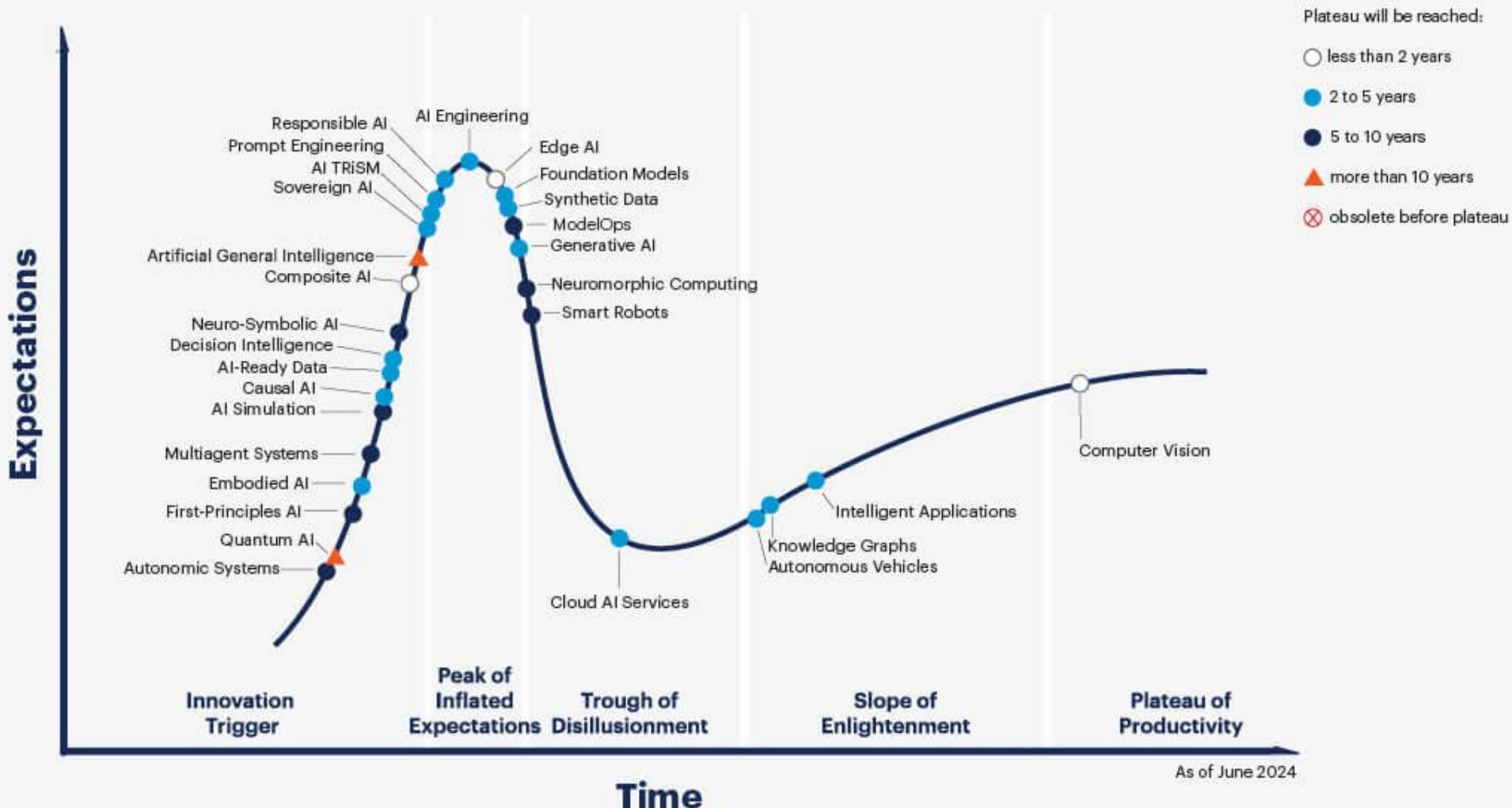
The Hydra





Fail

Hype Cycle for Artificial Intelligence, 2024



Source: Gartner

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Gartner®

Agenda

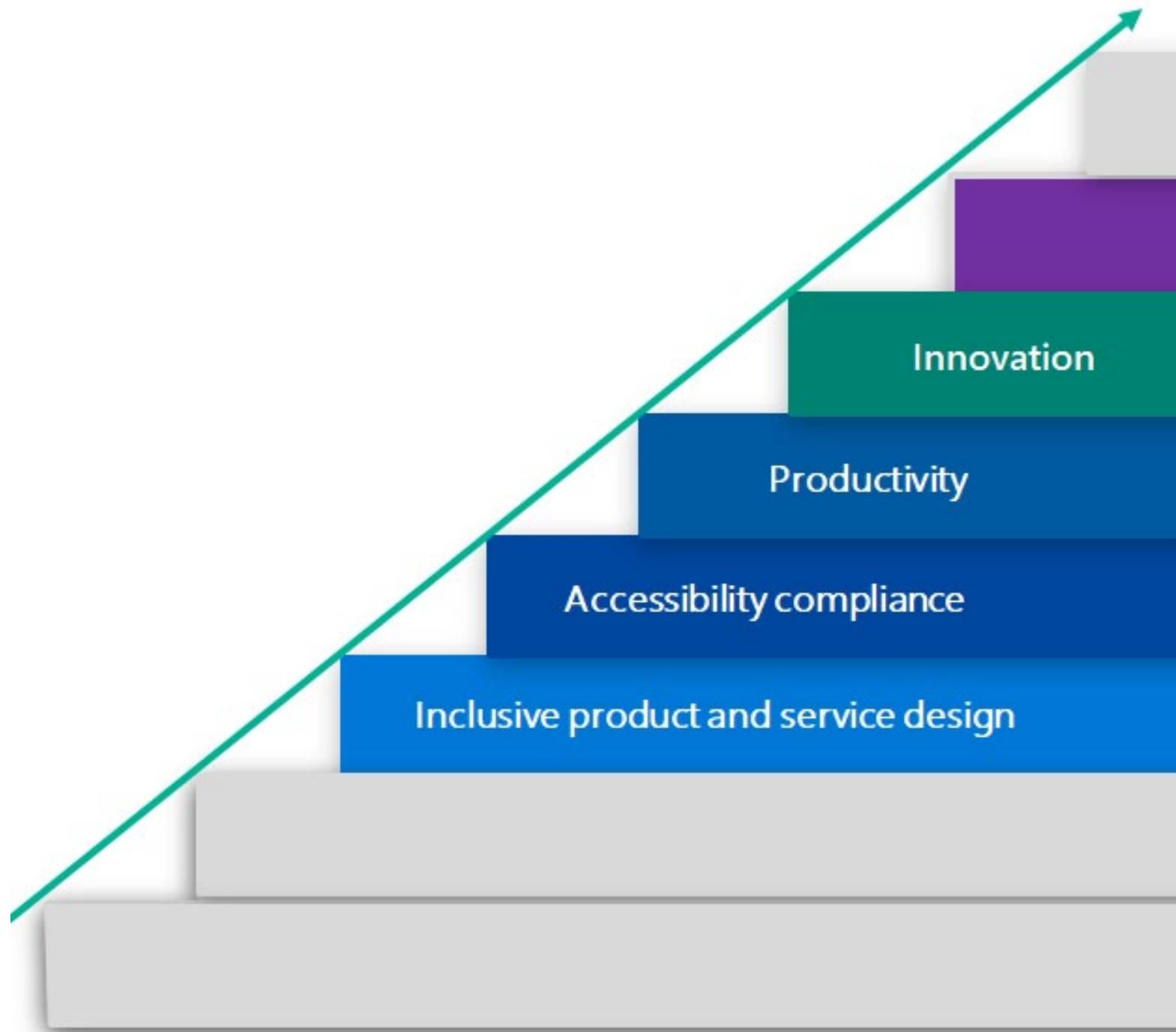
- Introduction
- Accessibility 101
- Development/Testing
- Add AI to your APP
- Demo

Accessibility 101



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



Permanent



Temporary



Situational



Disabilities are diverse



Visual



Hearing



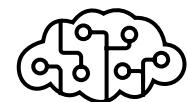
Cognitive



Speech



Mobility



Neural

Accessibility Testing

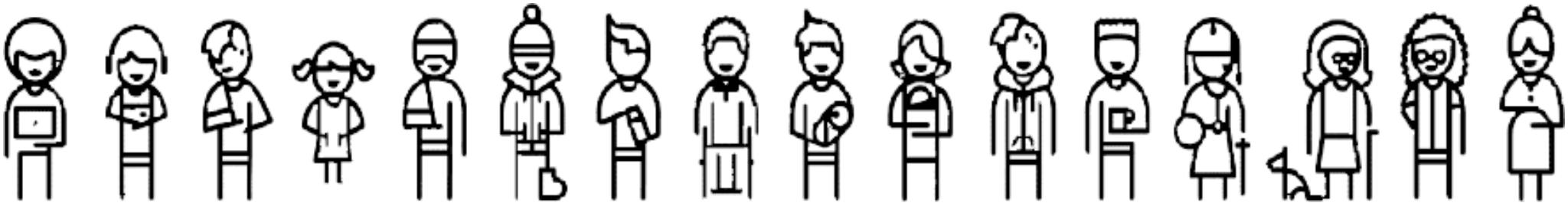


It starts with inclusive design

Recognize exclusion

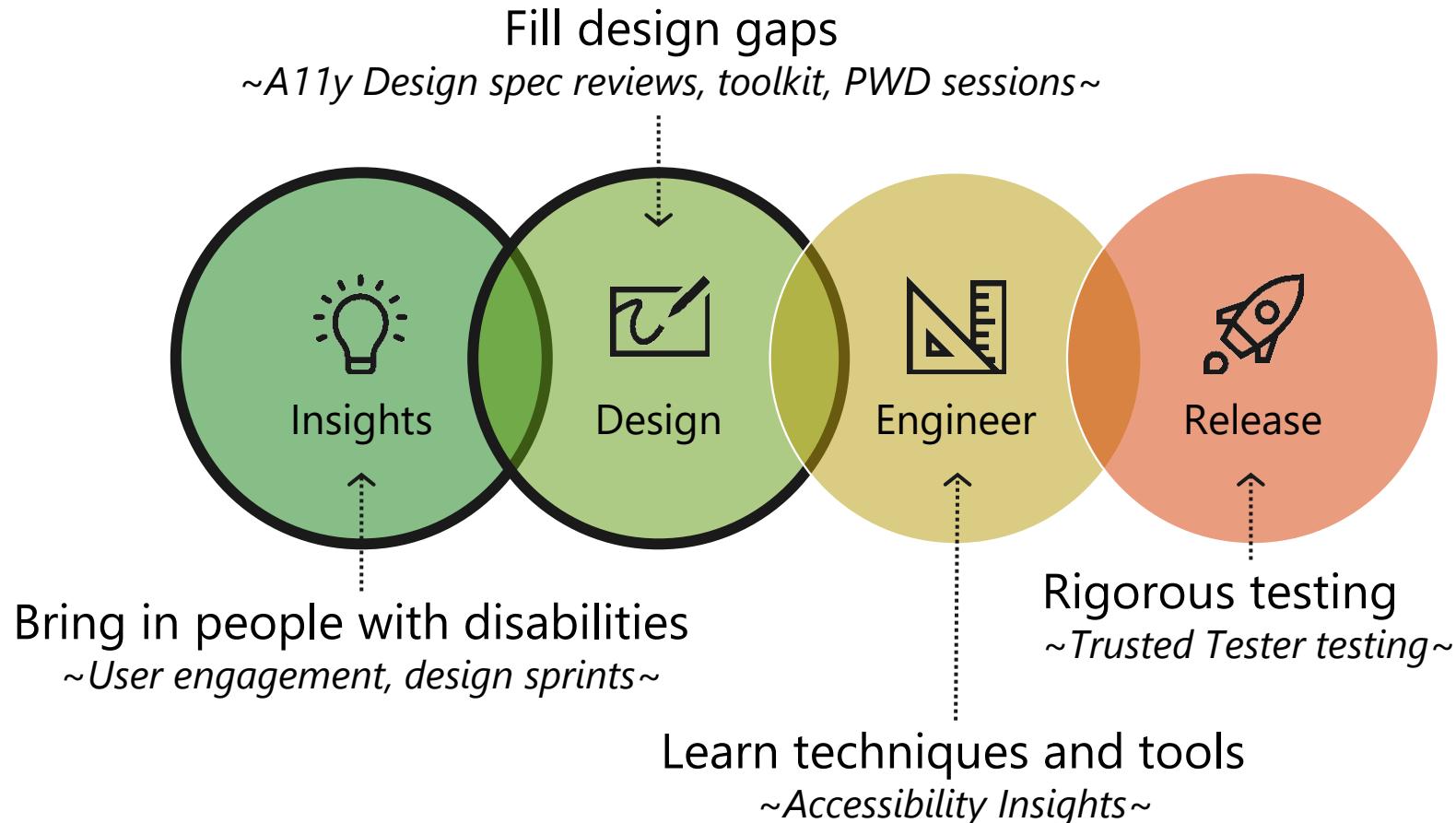
Solve for one, extend to many

Learn from diversity



We integrate feedback and offer support

"Shift Left": Design & build accessibility from the start





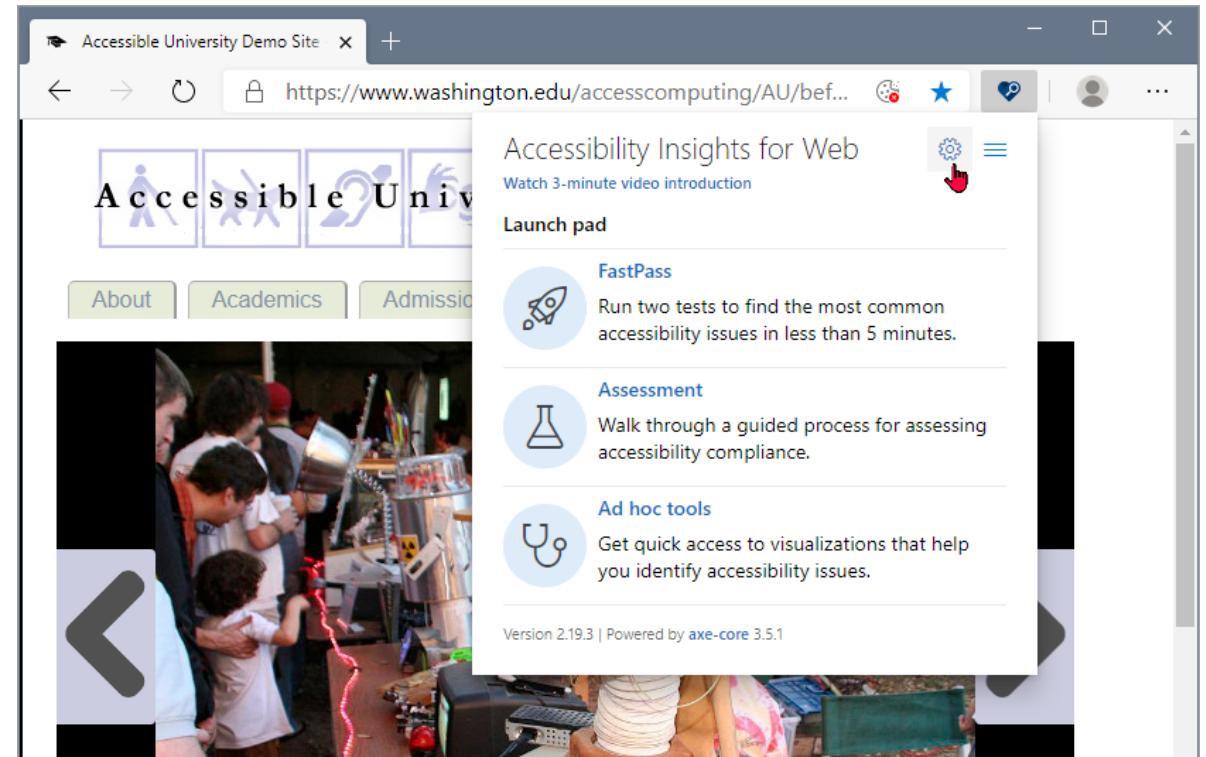
Accessibility Insights for Web

Accessibility Insights

Accessibility Insights for Web

Accessibility Insights for Web is an extension that helps developers find and fix accessibility issues in web apps and sites.

- **FastPass** (fast accessibility checker)
- **Assessments** (compliance with WCAG)



TS Home.tsx

```
const path: string

src > compo
1   import corgi
2   impo
3   Axe Linter (image-alt): Ensures img elements have alternate text or a role of none or
4   cons presentation (dequeueuniversity/image-alt)
5   <d View Problem (F8) No quick fixes available
6   | <img src={corgi} className='center' />
7   |</div>
8 }
9
10 export default Image
11
```

TERMINAL

PROBLEMS 1

OUTPUT

DEBUG CONSOLE

Filter (e.g. text, **/*.ts, !**/node_modules/**)

TS Image.tsx src/components 1

☒ Axe Linter (image-alt): Ensures img elements have alternate text or a role of none or presentation ([dequeueuniversity/image-alt](#)) [6, 5]

<https://github.com/microsoft/accessibility-insights-action>

or jump to... Pull requests Issues Codespaces Marketplace Explore

Unwatch 1 Fork 0 Star 0

os / action-test Private

Issues Pull requests 2 Actions Projects Security Insights Settings

bad-file.md #7

dequelabs wants to merge 1 commit into main from bad-file

tion 0 Commits 1 Checks 1 Files changed 1 +7 -0

All commits File filter Conversations Jump to 0 / 1 files viewed preview changes

bad-file.md Viewed ...

8 → 1.7 KB

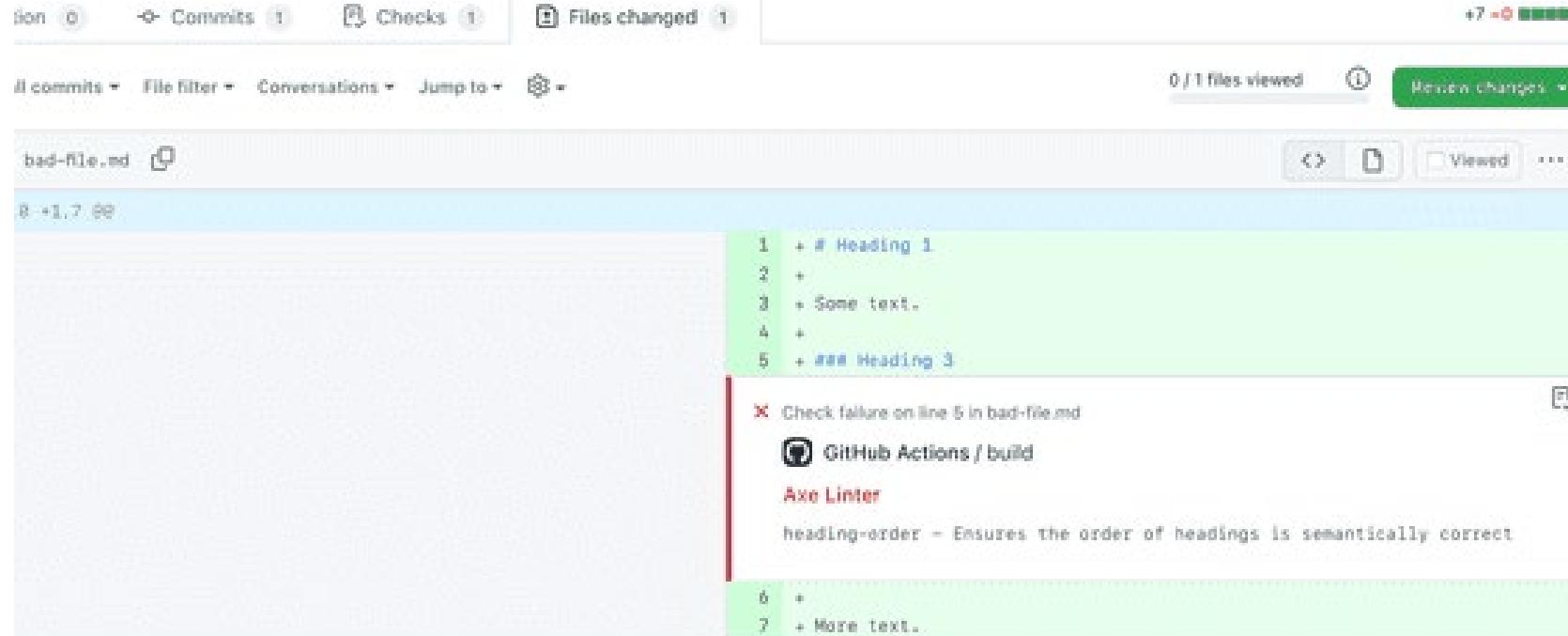
```
1 + # Heading 1
2 +
3 + Some text.
4 +
5 + ## Heading 3
6 +
7 + More text.
```

✗ Check failure on line 5 in bad-file.md

GitHub Actions / build

Axe Linter

heading-order = Ensures the order of headings is semantically correct



<https://github.com/dequelabs/axe-linter-action>



dequelabs/axe-core-maven-html

Tools for using axe for web accessibility testing with JUnit, Selenium, and Playwright

At 29

Contributors

Used by 9

Forks

Stars 81

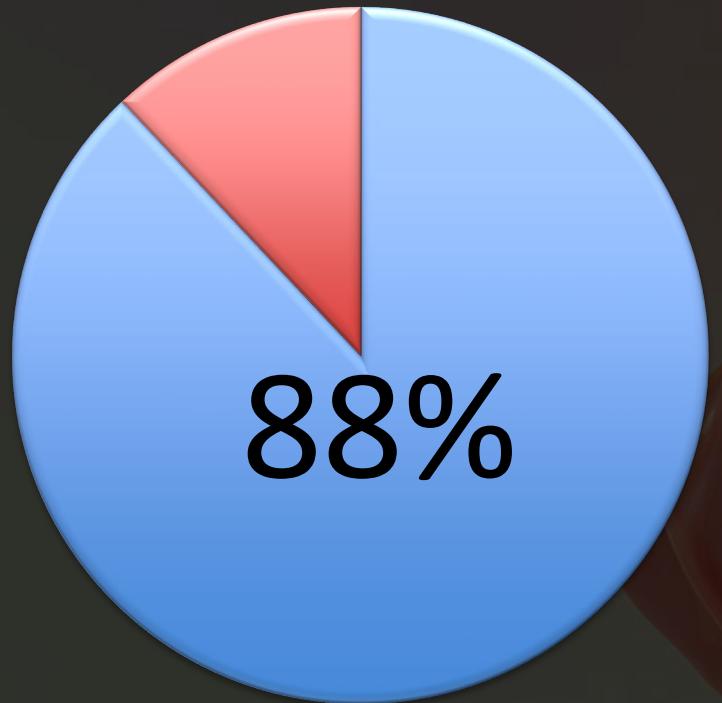
Y 102



Develop with
AI



GitHub Survey



- Focus
- Inspiration
- Enjoyment

<https://aka.ms/flow-state>



JS test.js 1 ●

JS test.js > ⚭ calculateDaysBetweenDates

```
1  function calculateDaysBetweenDates(begin, end) {  
    var beginDate = new Date(begin);  
    var endDate = new Date(end);  
    var days = Math.round((endDate - beginDate) / (1000 * 60 * 60 * 24));  
    return days;  
}
```

2



Workspace

> Used 6 references

To add a new page to your Express application, you need to follow these steps:

1. Create a new controller method in the `IndexController` class in `src/controllers/index.ts`. This method will handle requests to your new page. For example, if you want to add an "About" page, you could add a method like this:

```
class IndexController {  
    // ...  
  
    getAbout(req: Request, res: Response) {  
        res.render('about');  
    }  
}
```

2. Add a new route in `src/routes/index.ts` that uses the new controller method. For the "About" page, it would look like this:

```
export function setRoutes(app: express.Application): void {  
    const indexController = new IndexController();  
  
    // ...
```

How can I pass data to the new page I added in my Express application?

Ask Copilot or type / for commands



Show All Commands `Ctrl + Shift + P`

Go to File `Ctrl + P`

Find in Files `Ctrl + Shift + F`

Toggle Full Screen `F11`

Show Settings `Ctrl + ,`

```
src > TS app.ts > ...
  9  var livereload = require("livereload");
10  var connectLiveReload = require("connect-livereload");
11  */


```

The first line of the code creates a live reload server instance by calling `livereload.createServer()`.

This server will listen for changes in the files and trigger a reload when necessary.

Next, the code sets up an event listener for the `connection` event on the live reload server's underlying HTTP server. The `connection` event is emitted when a new client (typically a web browser) connects to the live reload server.

Inside the event listener, a `setTimeout` function is used to delay the execution of the

Ask Copilot

U Q GPT 4o ▶

Close

View in Chat



```
12 const liveReloadServer = livereload.createServer();
13 liveReloadServer.server.once("connection", () => {
14   setTimeout(() => {
15     liveReloadServer.refresh("/");
16   }, 100);
17 });


```

```
18
19 // Set the view engine to EJS
20 app.set('view engine', 'ejs');
21 app.set('views', path.join(__dirname, 'views'));
22


```



CHAT

+ ⏪ ...



Hi @burkeholland, how can I help you?

1

...

...

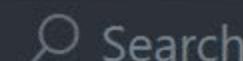
...

CL

✨ /help What can you do?

Ask Copilot or type / for commands

0 ➤ ▾



PROBLEMS

TERMINAL

...



bash - burkeholland.github.io



⑥ vscode → /workspaces/burkeholland.github.io (gh-pages) \$ jekyll serve
/usr/local/rvm/gems/default/gems/bundler-2.5.7/lib/bundler/runtime.rb:304:in `check_for_activated_spec!': You have already activated jekyll-sass-converter 3.0.0, but your Gemfile requires jekyll-sass-converter 1.5.2. Prepending `bundle exec` to your command may solve this. (Gem::LoadError)

from /usr/local/rvm/gems/default/gems/bundler-2.5.7/lib/bundler/runtime.rb:25:in `block in setup'

cal/rvm/gems/default/gems/bundler-2.5.7/lib/bundler/spec_set.rb:191:in `each'

cal/rvm/gems/default/gems/bundler-2.5.7/lib/bundler/spec_set.rb:191:in `each'

cal/rvm/gems/default/gems/bundler-2.5.7/lib/bundler/runtime.rb:24:in `map'

from /usr/local/rvm/gems/default/gems/bundler-2.5.7/lib/bundler/runtime.rb:24:in `setup'

cal/rvm/gems/default/gems/bundler-2.5.7/lib/bundler.rb:162:in `setup'

Ctrl + Shift + i

Cmd + Shift + i



Dev Container: Jekyll

gh-pages



0 ! 0

A 1





CHAT

+ ⏪ ...



Hi @burkeholland, how can I help you?



...



✨ /help What can you do?



Ask Copilot or type / for commands

🎙 ➤ ▾



Ask Copilot



Ask Copilot

Hi there! Copilot is powered by AI, so mistakes are possible.
Review output carefully before use. [Learn more.](#)



Ask Copilot...





roryp

@azure Breakdown the cost of my rg-ozrpza resource group for November?



Azure (Preview)

The breakdown of the cost for the resource group rg-ozrpza for November is as follows:

- **November 2024:** \$227.02

Please note that the charges mentioned above do not include any credits or taxes.

I want to change my selected subscriptions

Give me a cost breakdown for subscription with ID e7bf8026-5546-4843-9edc-3137d8b3e801.

How much did my resources in subscription with ID e7bf8026-5546-4843-9edc-3137d8b3e801 cost me last month?

How can I view the cost breakdown for a specific resource group in the Azure portal?

Can I export the cost breakdown for my resource group?

@azure Breakdown the cost of my rg-ozrpza resource group for November?

@ ⌂ ⌂

The screenshot shows the Visual Studio Code (VS Code) interface with the "Ask Copilot" feature integrated. The top bar includes standard icons for file operations and a search bar labeled "scenarios". The left sidebar has sections for "EXPLORER", "OPEN EDITORS", and "SCENARIOS", with "housing.csv" and "jamesbond.csv" listed under "SCENARIOS". The main workspace is dark-themed and features a large "Ask Copilot" icon with a question mark and the text "Ask Copilot". Below it, a message states: "Copilot is powered by AI, so mistakes are possible. Review output carefully before use." Another message notes: "As an internal user, additional telemetry is collected. If you work on a project that contains customer content, you must [disable telemetry](#)." A command palette at the bottom left lists keyboard shortcuts for "Show All Commands", "Go to File", "Find in Files", "Toggle Full Screen", and "Show Settings". A floating chat window in the bottom right corner shows a message from the AI: "/help What can you do? @data I can help you with data analytics". The status bar at the bottom displays icons for file status (1), outline (1), and terminal.

scenarios

EXPLORER

OPEN EDITORS

SCENARIOS

housing.csv

jamesbond.csv

Ask Copilot

Copilot is powered by AI, so mistakes are possible.
Review output carefully before use.

As an internal user, additional telemetry is collected. If you work on a project that contains customer content, you must [disable telemetry](#).

>Show All Commands ⌘P

Go to File ⌘P

Find in Files ⌘F

Toggle Full Screen ⌘F

Show Settings ⌘,

/help What can you do?

@data I can help you with data analytics

@ ⓘ ⓘ ⏪ ⏴

OUTLINE

1

1

0 0 0 0

This screenshot illustrates a developer's workflow across three windows:

- VSCode Explorer View:** Shows a Vue project structure. The `index.js` file is currently selected.
- Copilot Edits Overlay:** A modal window titled "Edit with Copilot". It includes a "PREVIEW" button, a large "Edit with Copilot" icon, and instructions: "Start your editing session by defining a set of files that you want to work with. Then ask Copilot for the changes you want to make." It also notes: "Copilot is powered by AI, so mistakes are possible. Review output carefully before use." A text input field says "or type # to attach context".
- Browser Preview:** A Vite application running at `127.0.0.1:5173`. The page displays the Vite logo and the message "You did it!". Below it, a success message states: "You've successfully created a project with Vite + Vue 3." It includes links for "Home" and "About".

The bottom status bar shows the environment as "WSL: Ubuntu" and various system indicators.

Create a new API route for sharing a story



GitHub Copilot

▼ Used 5 references

⚙️ [github.copilot.chat.codeGeneration.instruction...](#)

⬇️ [copilot-instructions.md](#) .github

⚛️ [page.tsx: 39-50 app](#)

MDB [schema.sql scripts](#)

⬇️ [spec.md](#)

```
$ ghcs "How do I find all the files bigger than 128k?"
```

Suggested command

```
find . -size +128k
```

? Select an option

> Explain command

Explanation

find is used to list files.

. specifies that we search in the current directory.

-size +128k specifies that we only want files larger than 128k

? Select an option [Use arrows to move, type to filter]

> Copy command to clipboard

Explain command

Execute command

Revise command

Fine-tuned models



Shoelace-AI model has been deployed to Shoelace-AI

Congratulations! Your first custom model has been successfully trained and deployed. Your team can now start using it in your IDE.

Created 2 seconds ago by

 monalisa

Status

 Deployed

Repositories

4,000

Telemetry collection

On

Training history



Shoelace-AI model

monalisa created 2 days ago



Shoelace-AI model Deployed

monalisa created 20 days ago

Copilot  reviewed just now

common/models/application.js

```
24 + }
```

```
25 +
```

```
26 +     useEffect(() => {
```

```
27 +       const response = await fetch(basePageDataUrl)
```

 Copilot 

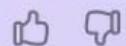
...

The fetch call is not awaited. This can lead to unexpected behavior.
Use `await fetch(basePageDataUrl)` instead.

Suggested change

```
27 -       const response = fetch
```

```
27 +       const response = await
```



Request up to 100 reviewers 

Type or choose a user

 Copilot

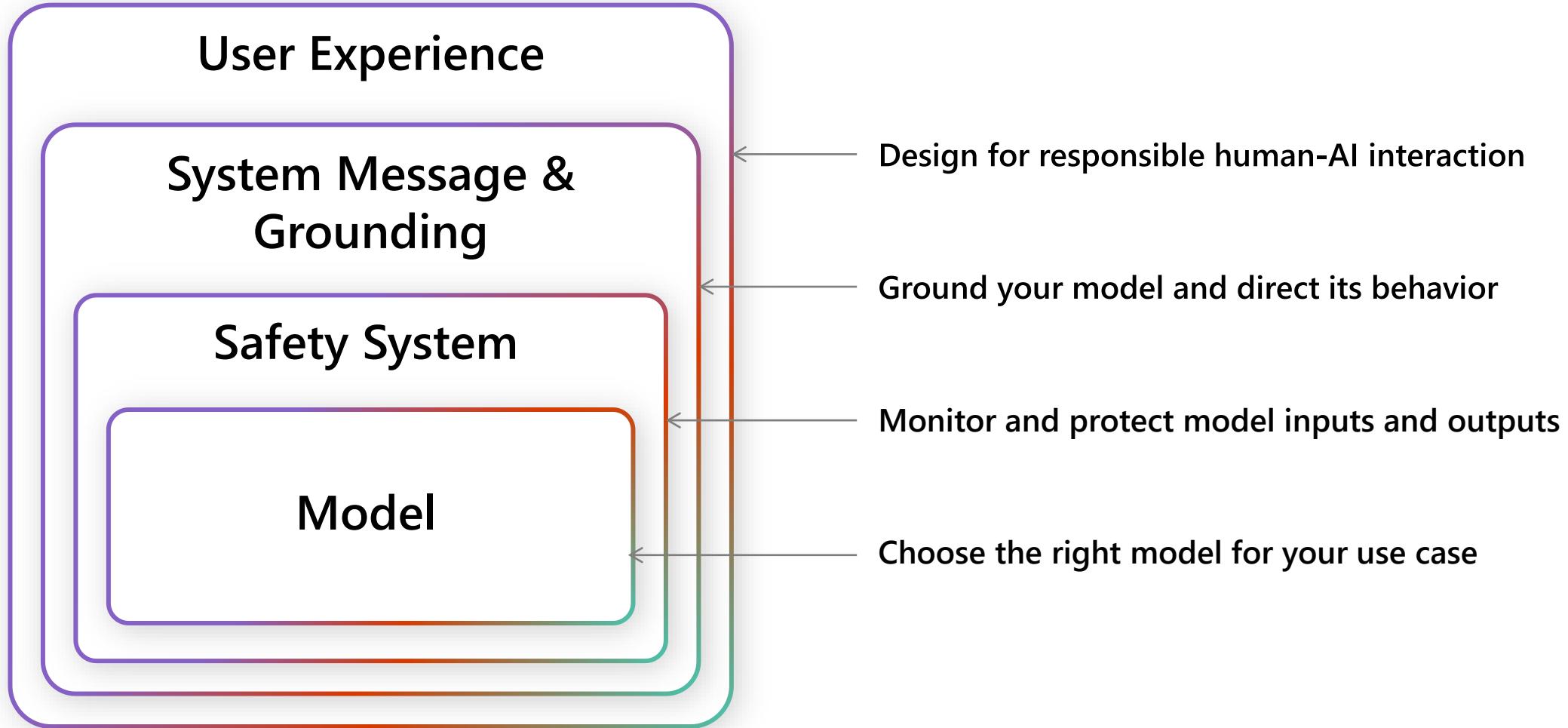
 fernflare Fernanda Sarmento

 rodbotas6 Rodrigo Botas

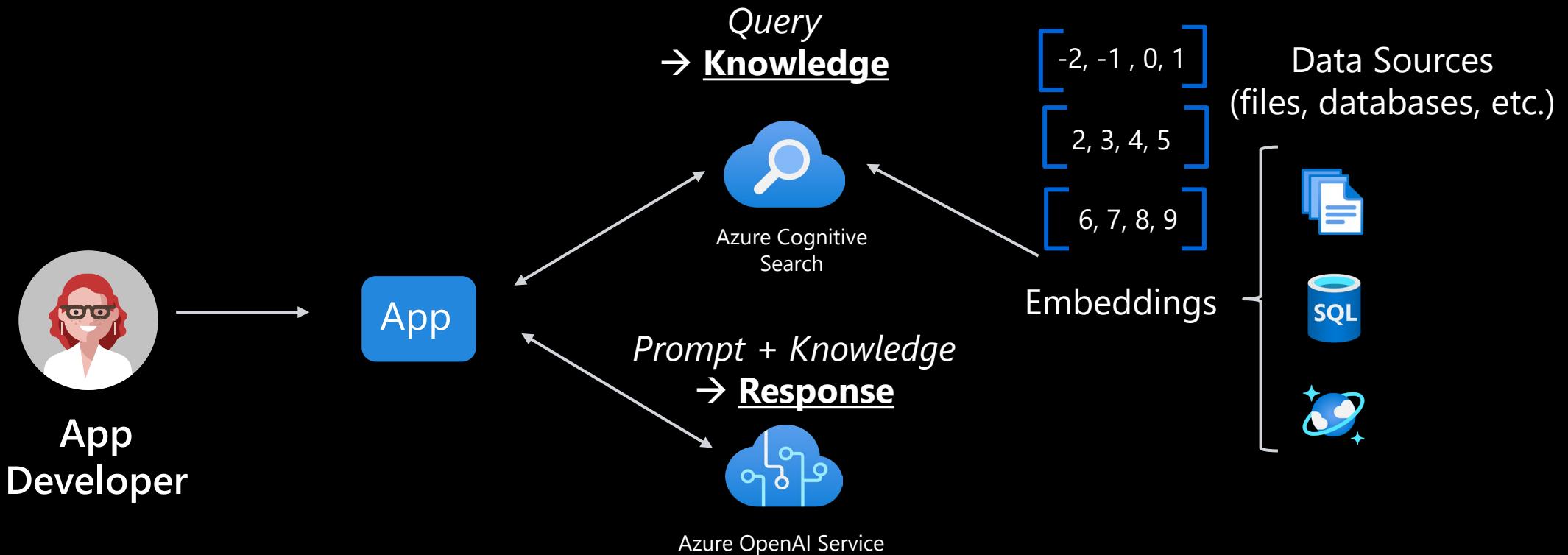
Add AI to
your App



LLM Layers



Retrieval Augmented Generation (“RAG”)



Template Library

A community-contributed template gallery built to work with the Azure Developer CLI.



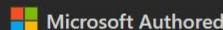
openai



Not familiar with the Azure Developer CLI (azd)? [Learn more](#)

Viewing 2 templates for '**openai**'

Sort by: [Alphabetical \(A - Z\) ▾](#)



Java - ChatGPT + Enterprise data with Azure OpenAI and Cognitive Search

by Davide Antelmo

This repo is the java conversion of the well known chatGPT + Enterprise data code sample originally developed in python

Artificial Intelligence

Azure App Service

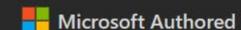
Bicep

Azure Cognitive Search

Java

Azure OpenAI Service

React.js



Spring ChatGPT Application using Azure OpenAI on Azure Spring Apps

by Yi Liu

A sample that uses Java Spring framework to build ChatGPT-style application running in Azure Spring Apps.

Artificial Intelligence

Azure Spring Apps

Bicep

<https://aka.ms/awesome-azd>



Users

1. Ask a question or chat with data

Intelligent App with Custom Copilot



Chat Web App

React single page application hosted on NGINX. It also serves as reverse proxy for backend api

2. Chat API



API App

Java spring boot app implementing RAG patterns and AI orchestration

3. Extract search keywords from chat

4. Embed keywords for vector search

6. Generate answer based on retrieved info

5. Search relevant info

7. Get original file for citations



Azure Open AI

GPT and embeddings models



Azure AI Search

Text, Vector or Hybrid Search



Storage Account

Store raw documents



Admins

1. Upload local documents

Document Ingestion

ACA Environments



Indexer App

Java spring boot app implementing documents ingestion, chunking, embedding and storing results

8. Store text chunks embeddings

7. Create embeddings for text chunk



Azure Open AI

Embeddings models

6. Extract text



Azure AI Search

Vector and Text Index



Azure Document Intelligence

Extract text from pdf including images and tables

Indexer CLI

Java PICO cli

1. Upload local documents
2. Upload documents in the cloud storage



Storage Account

Store raw documents

3. Subscribe



Event Grid

5. Consume Document Ingestion messages



Service Bus

Document ingestion request Messages with BlobID
4. Push Blob Uploads Events



Search explorer

...



gptkb-uvjzc4xuevj7q

View ▾



2023-07-01-Preview ▾

Search

Query string ⓘ

search=corruption

▼ Query options (Preview)

Request URL

<https://gptkb-uvjzc4xuevj7q.search.windows.net/indexes/gptkbindex/docs?api-version=2023-07-01-Preview&search=corruption>

Results

o	value . L
9	{
10	"@search.score": 0.27893725,
11	"id": "data_Anti-Corruption_Module_4_Public_Sector_Corruption_pdf-11407",
12	"content": " corruption that primarily abuses government resources, and private
13	"category": null,
14	"sourcepage": "Anti-Corruption_Module_4_Public_Sector_Corruption-6.pdf",
15	"sourcefile": "data/Anti-Corruption_Module_4_Public_Sector_Corruption.pdf"
16	},
17	{

Home

Voice Chat

Documents

Chat



Chat with your data

What is corruption?

What is corruption in
the public sector?

What is corruption in
the private sector?

Prompt

Enter OpenAI + Azure Search prompt

Use Shift + Enter for new lines.

0 / 1000



▶ CHAT

**UNODC**

United Nations Office on Drugs and Crime

Global Resource for Anti-Corruption
Education and Youth Empowerment



Demo

<https://github.com/roryp/html-wcag-issues>



Questions?



[https://aka.ms/
accessibility-fundamentals](https://aka.ms/accessibility-fundamentals)

@rorypreddy

