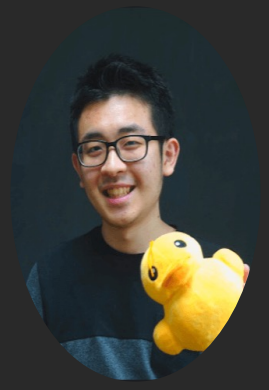
CodeA11y: Making AI Coding Assistants Useful for Accessible Web Development

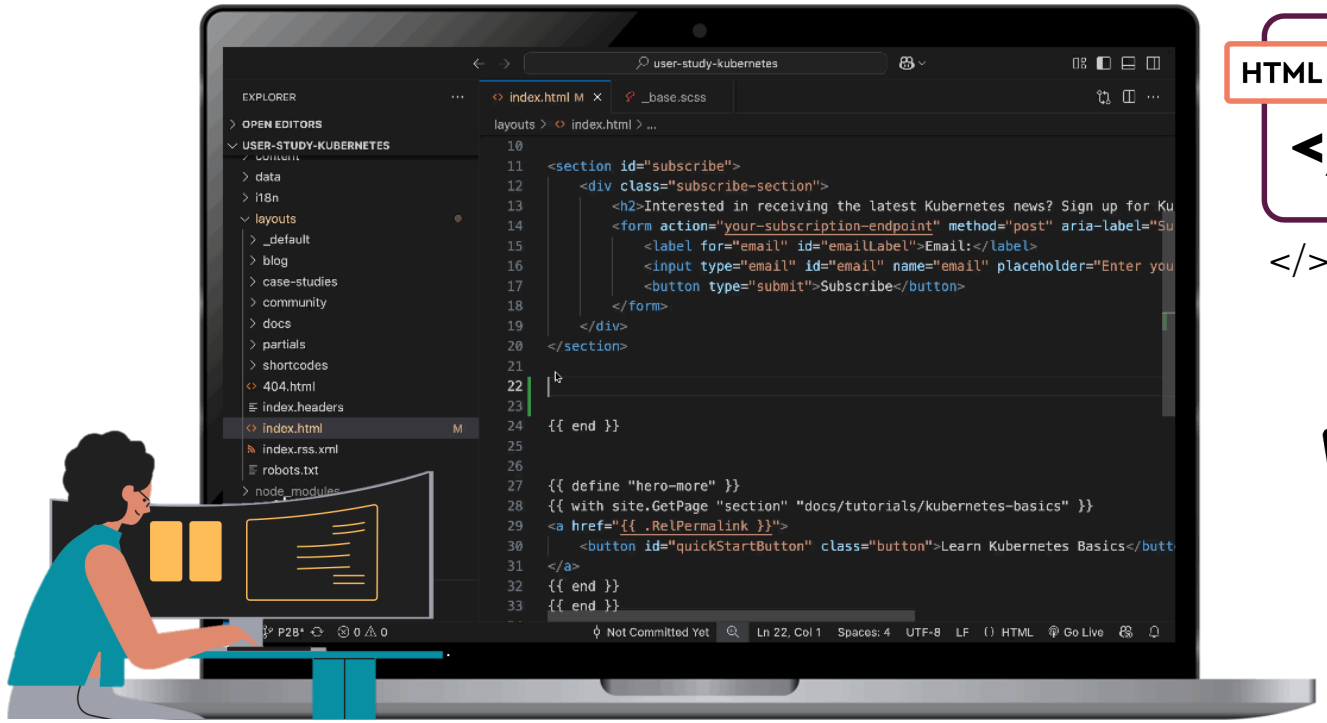
Peya Mowar, Yi-Hao Peng, Jason Wu, Aaron Steinfeld, Jeffrey Bigham


Carnegie Mellon University

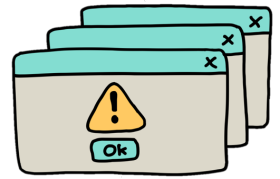
CHI2025

Getting developers to write accessible UI code is a challenge.



Developer coding the web UI

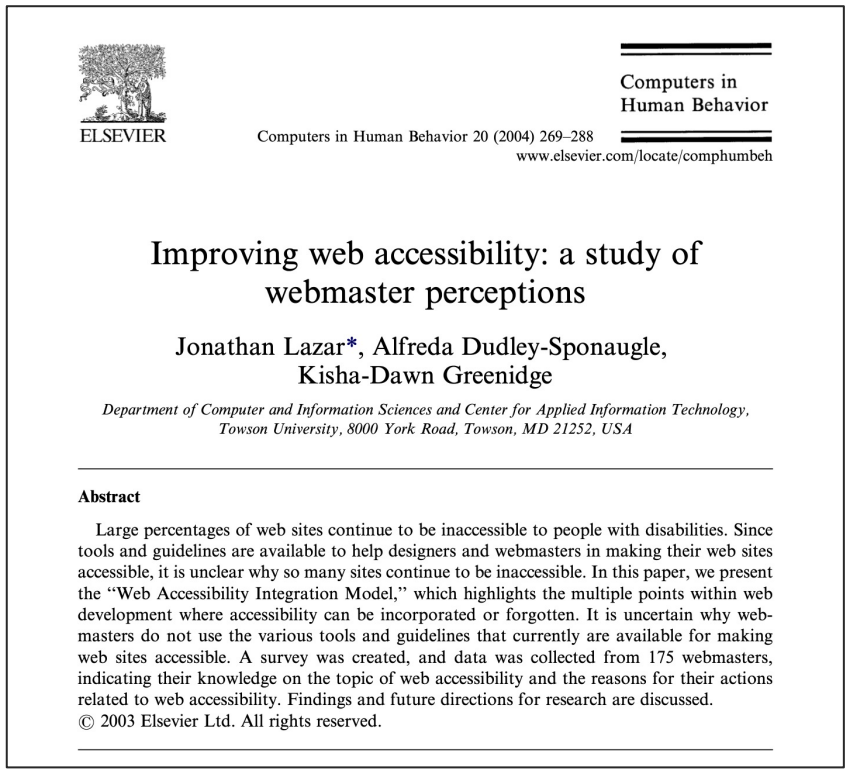
</> UI code



Accessibility Errors

Rendered UI accessed by end-user

Getting developers to write accessible UI code is a long-standing challenge.



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Computers in Human Behavior

Computers in Human Behavior 20 (2004) 269–288
www.elsevier.com/locate/comphumbeh

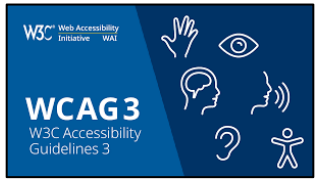
Improving web accessibility: a study of webmaster perceptions

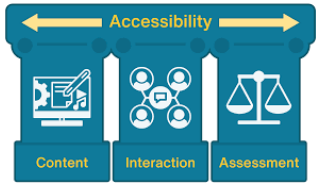
Jonathan Lazar*, Alfreda Dudley-Sponaugle, Kisha-Dawn Greenidge

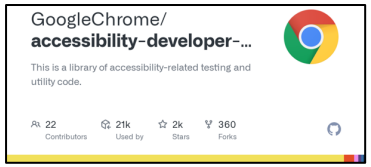
Department of Computer and Information Sciences and Center for Applied Information Technology, Towson University, 8000 York Road, Towson, MD 21252, USA

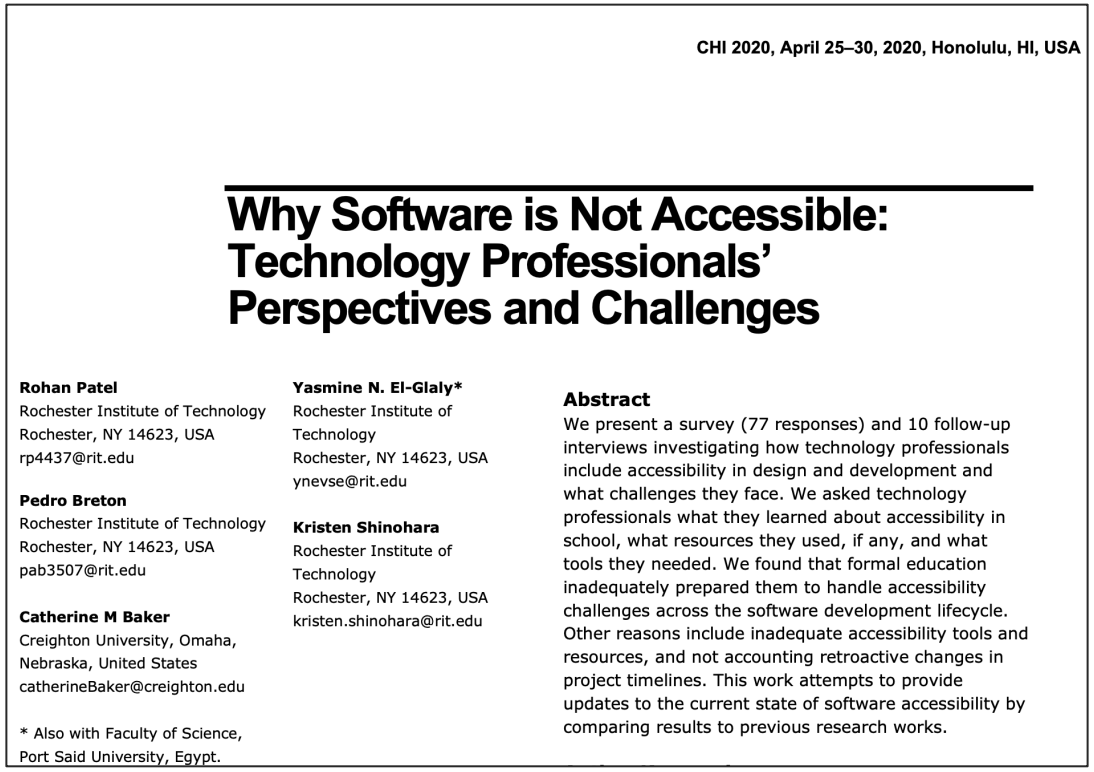
Abstract

Large percentages of web sites continue to be inaccessible to people with disabilities. Since tools and guidelines are available to help designers and webmasters in making their web sites accessible, it is unclear why so many sites continue to be inaccessible. In this paper, we present the "Web Accessibility Integration Model," which highlights the multiple points within web development where accessibility can be incorporated or forgotten. It is uncertain why webmasters do not use the various tools and guidelines that currently are available for making web sites accessible. A survey was created, and data was collected from 175 webmasters, indicating their knowledge on the topic of web accessibility and the reasons for their actions related to web accessibility. Findings and future directions for research are discussed.









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Why Software is Not Accessible: Technology Professionals' Perspectives and Challenges

Rohan Patel
Rochester Institute of Technology
Rochester, NY 14623, USA
rp4437@rit.edu

Pedro Breton
Rochester Institute of Technology
Rochester, NY 14623, USA
pab3507@rit.edu

Catherine M Baker
Creighton University, Omaha, Nebraska, United States
catherineBaker@creighton.edu

* Also with Faculty of Science, Port Said University, Egypt.

Yasmine N. El-Glaly*
Rochester Institute of Technology
Rochester, NY 14623, USA
ynevse@rit.edu

Kristen Shinohara
Rochester Institute of Technology
Rochester, NY 14623, USA
kristen.shinohara@rit.edu

Abstract

We present a survey (77 responses) and 10 follow-up interviews investigating how technology professionals include accessibility in design and development and what challenges they face. We asked technology professionals what they learned about accessibility in school, what resources they used, if any, and what tools they needed. We found that formal education inadequately prepared them to handle accessibility challenges across the software development lifecycle. Other reasons include inadequate accessibility tools and resources, and not accounting retroactive changes in project timelines. This work attempts to provide updates to the current state of software accessibility by comparing results to previous research works.

Lazar *et al.*, 2004

Patel *et al.*, 2020

Tools, training, guidelines

Getting developers to write accessible UI code is a long-standing challenge.

"Most webmasters supported web accessibility, but cited roadblocks such as lack of time, training, managerial and client support, inadequate software tools, and confusing accessibility guidelines."

Lazar *et al.*, 2004

"Developers received inadequate formal education about accessibility and software development cycles did not accommodate accessibility implementation."

Patel *et al.*, 2020

AI Coding Assistants offer a new opportunity to automatically make UI code more accessible.

Our Contributions:

1. Formative User Study with 16 Developers
   - ➢ Revealing benefits and limitations of AI assistants for authoring accessible UI code
2. **CodeA11y**: a GitHub Copilot Extension for improving UI code accessibility
3. Evaluation User Study with 20 Developers
   - ➢ Demonstrating CodeA11y's effectiveness in authoring accessible UI code
   - ➢ Raising broader questions on the adoption and awareness of accessibility tooling

Formative Need-finding Study

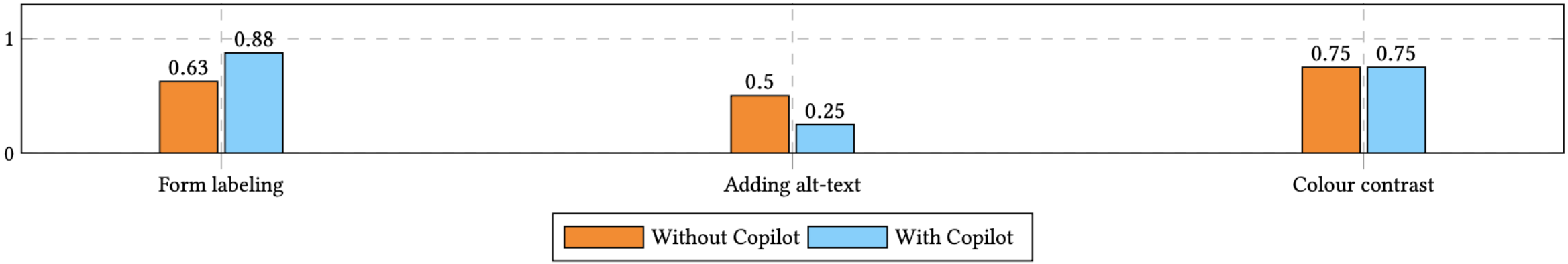
Developers (N=16) prompt the AI assistant.

For Web Component Modification Tasks (with Implicit Accessibility Considerations)

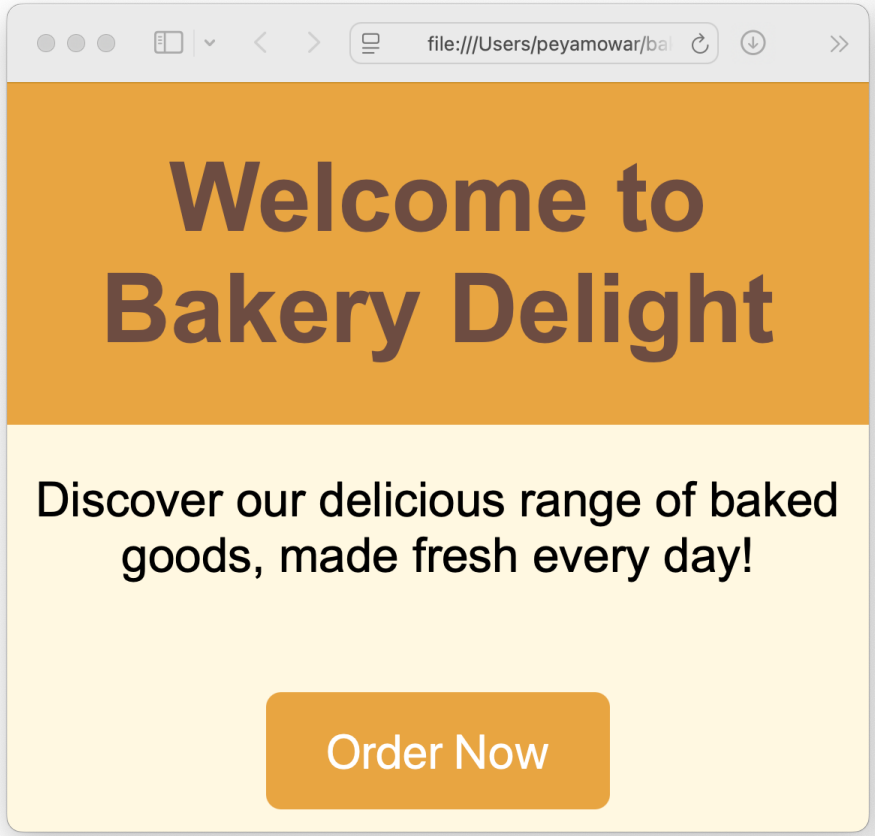
The AI assistant (GitHub Copilot) generates a text explanation and associated UI code

The developer failed to explicitly prompt for accessibility considerations.	The AI assistant produced incomplete code with placeholder attributes.	The button originally had poor colour contrast in the default state.
↓	↓	↓
The AI assistant did not consider accessibility requirements in UI code.	The developer uncritically accepted incomplete code suggestions.	The AI assistant perpetuated existing errors in newly added effects.

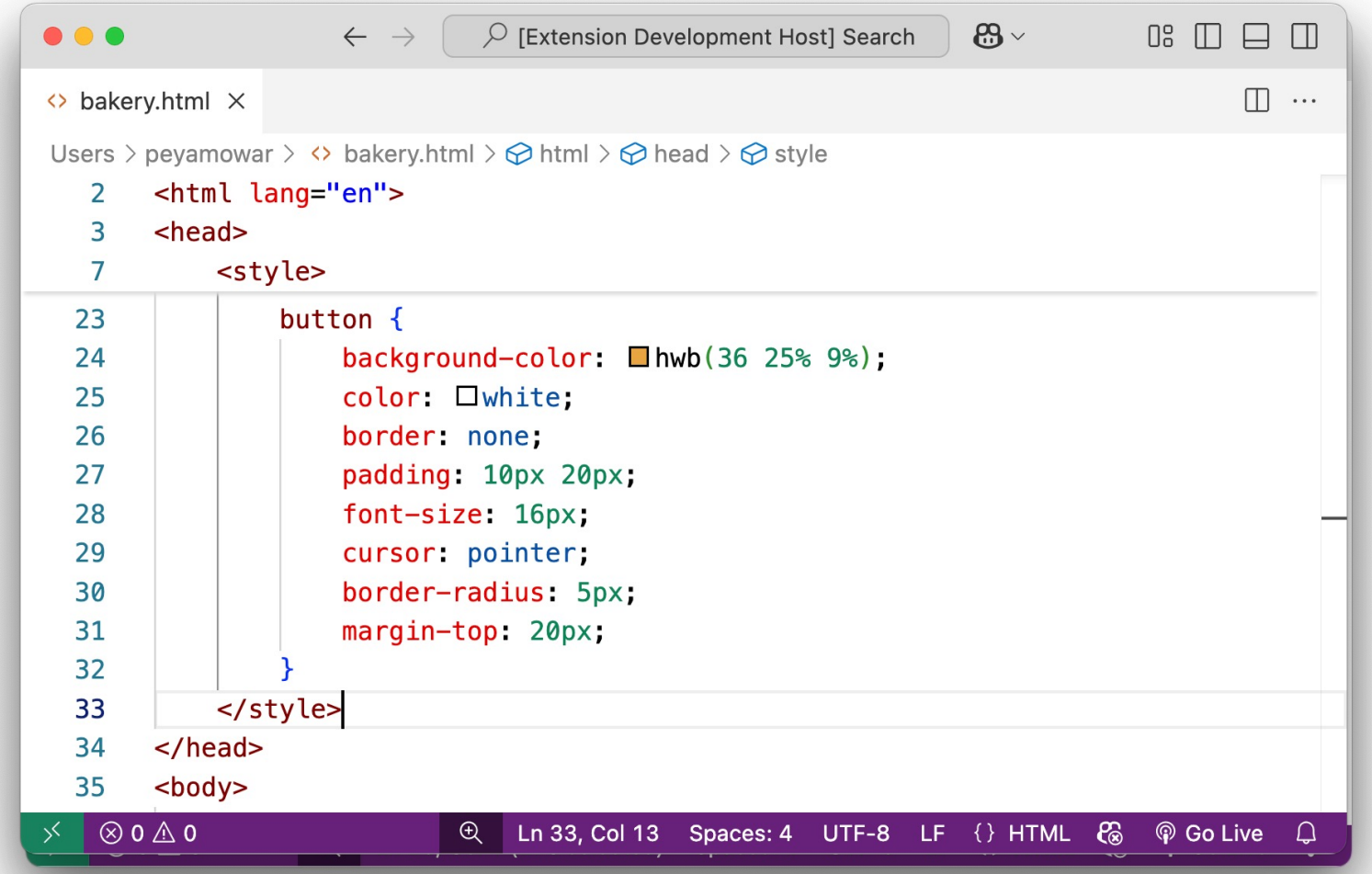
Manual Accessibility Evaluation Scores by Tasks and Copilot Usage: 0 is Unacceptable, 1 is Needs Improvement and 2 is Good.



CodeA11y: A GitHub Copilot Extension for Accessible Web Development



Rendered UI



Developer using CodeA11y

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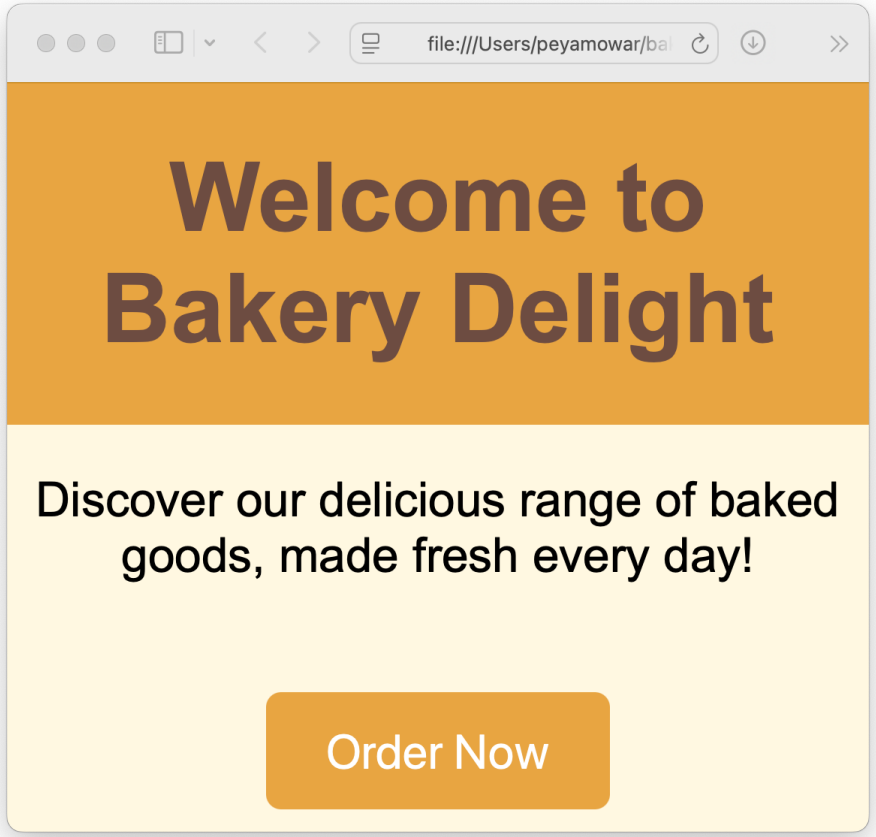

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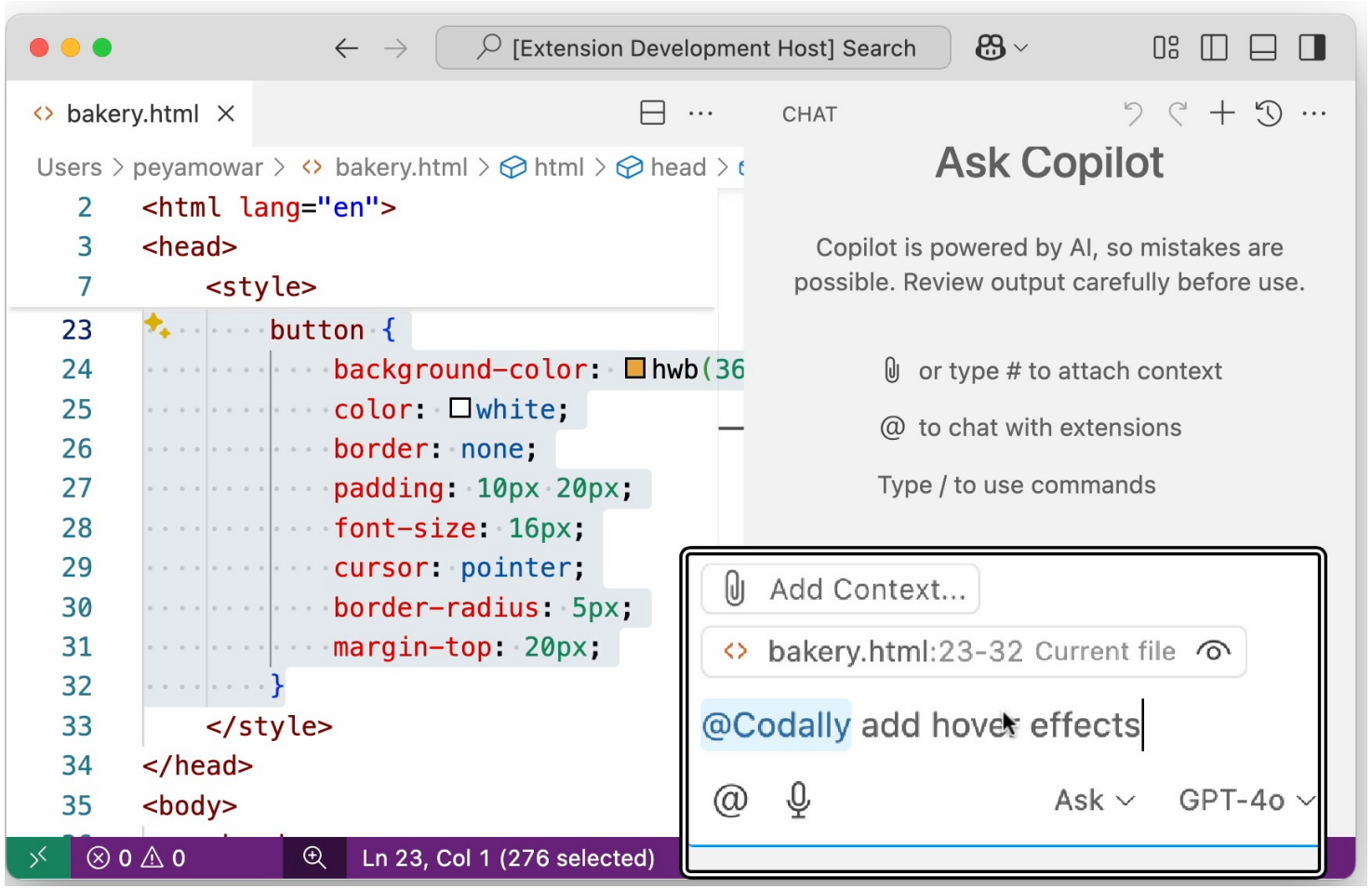

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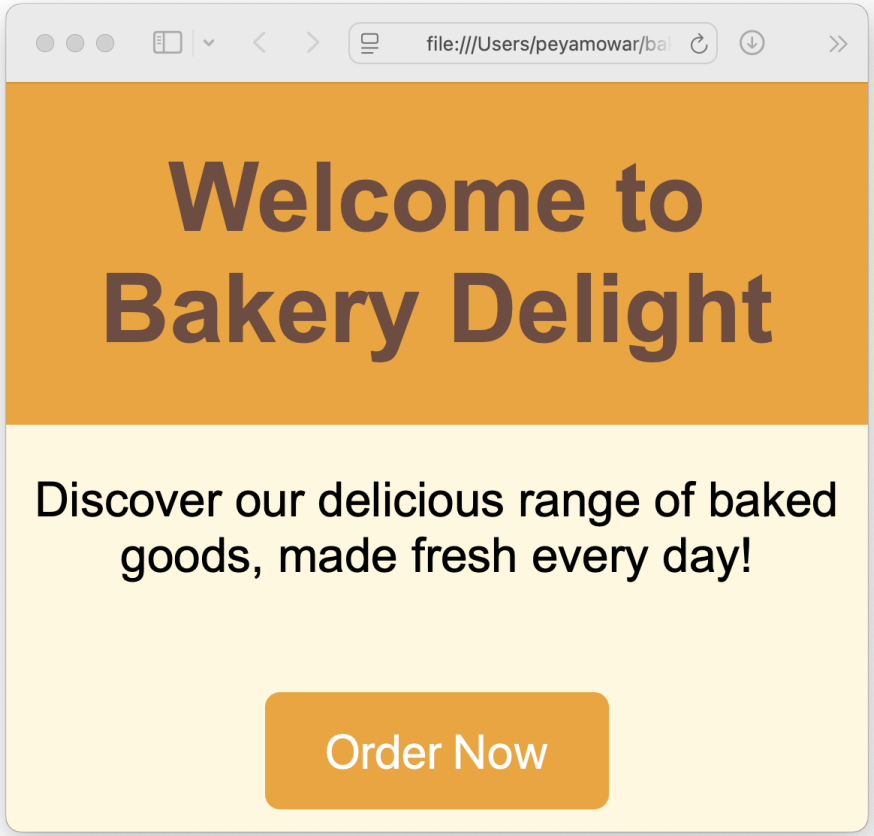

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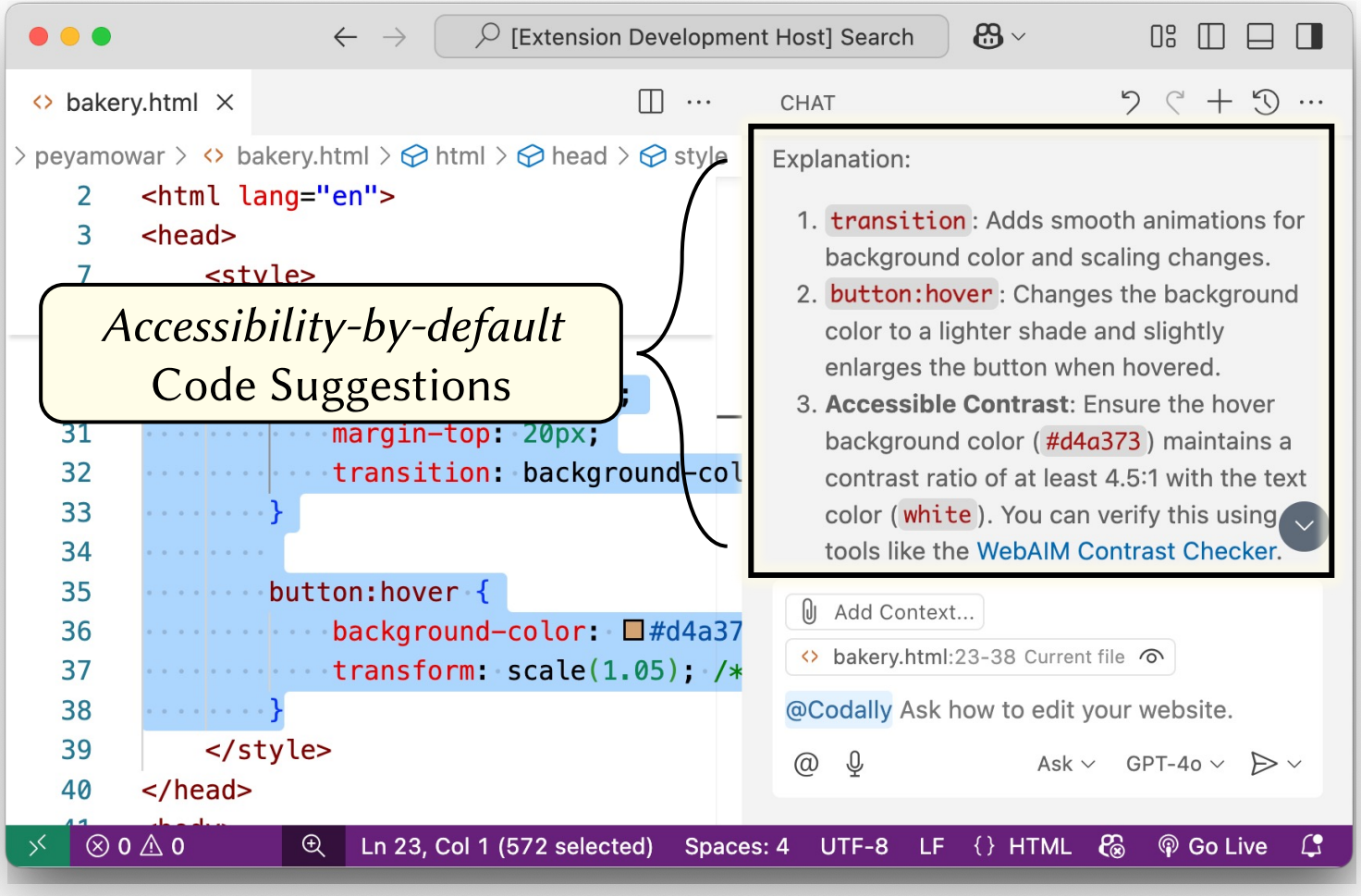

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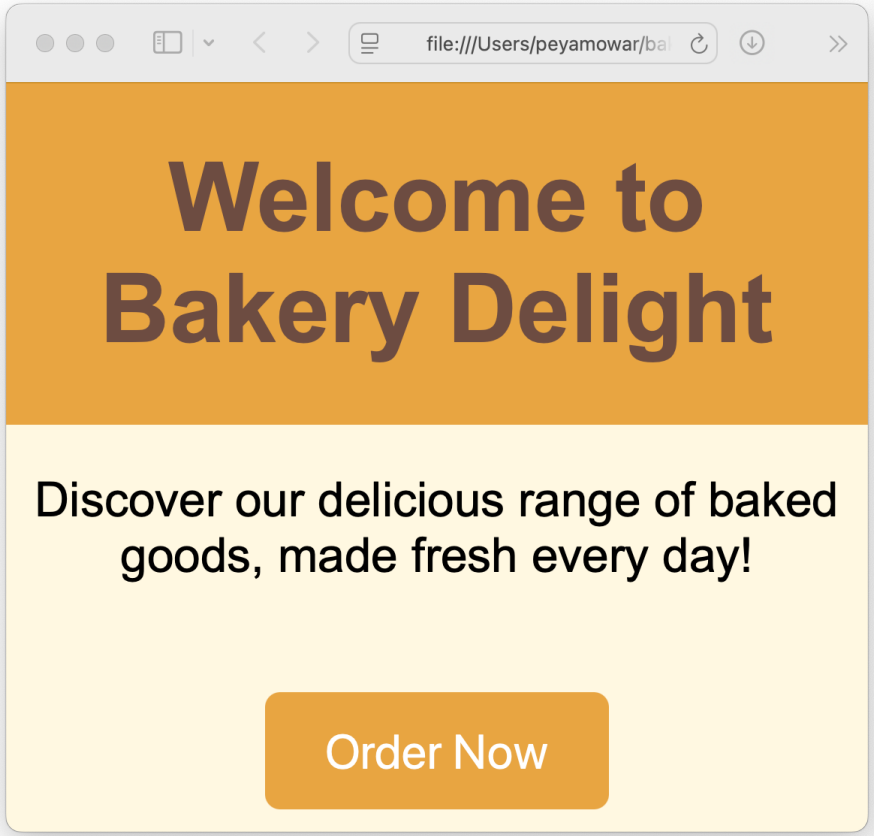

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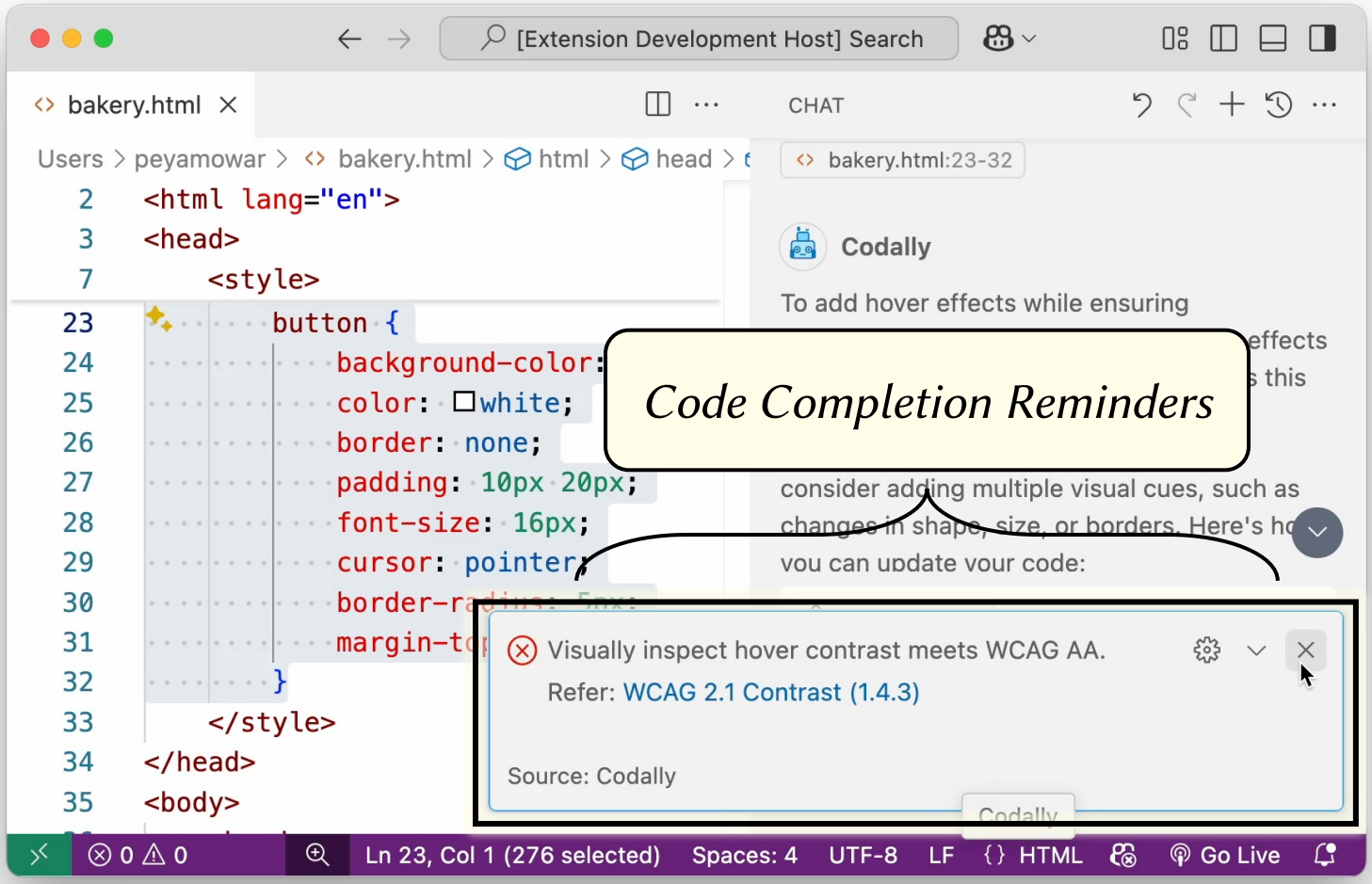

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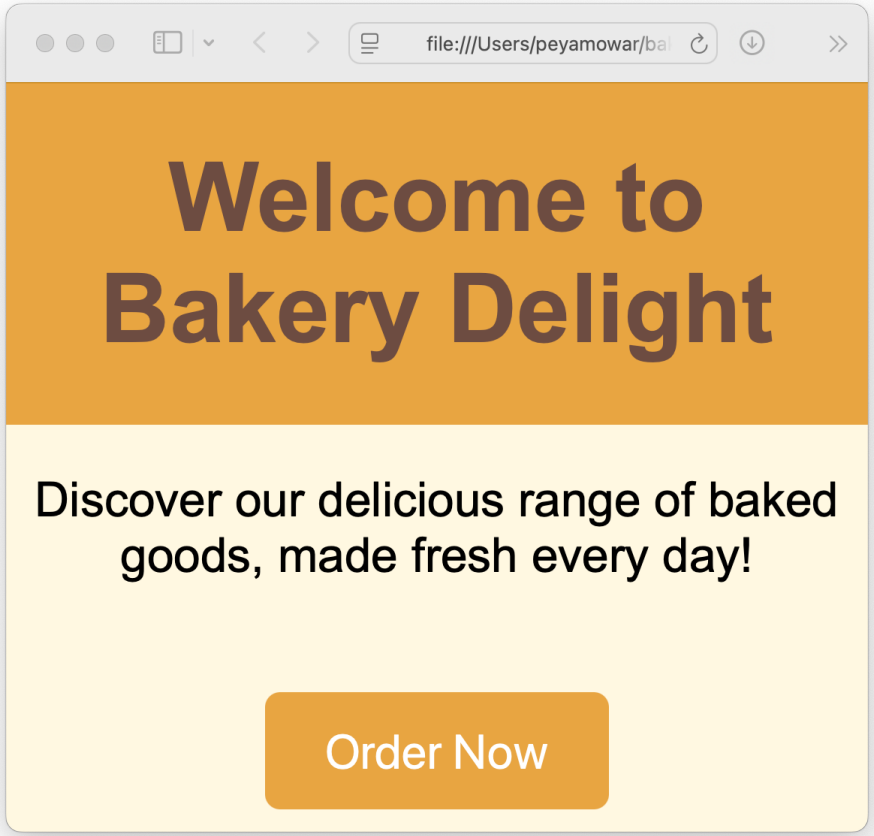

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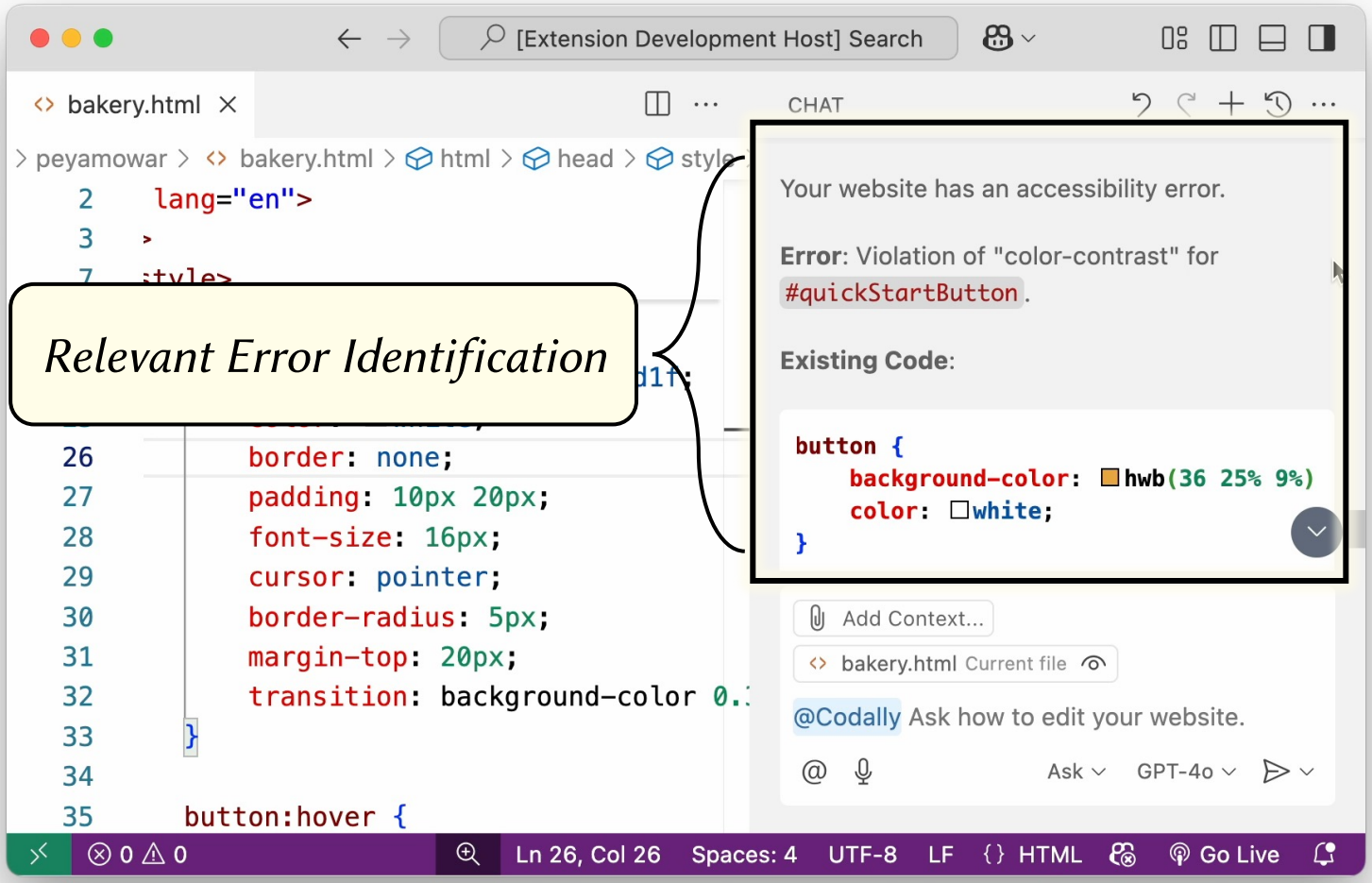

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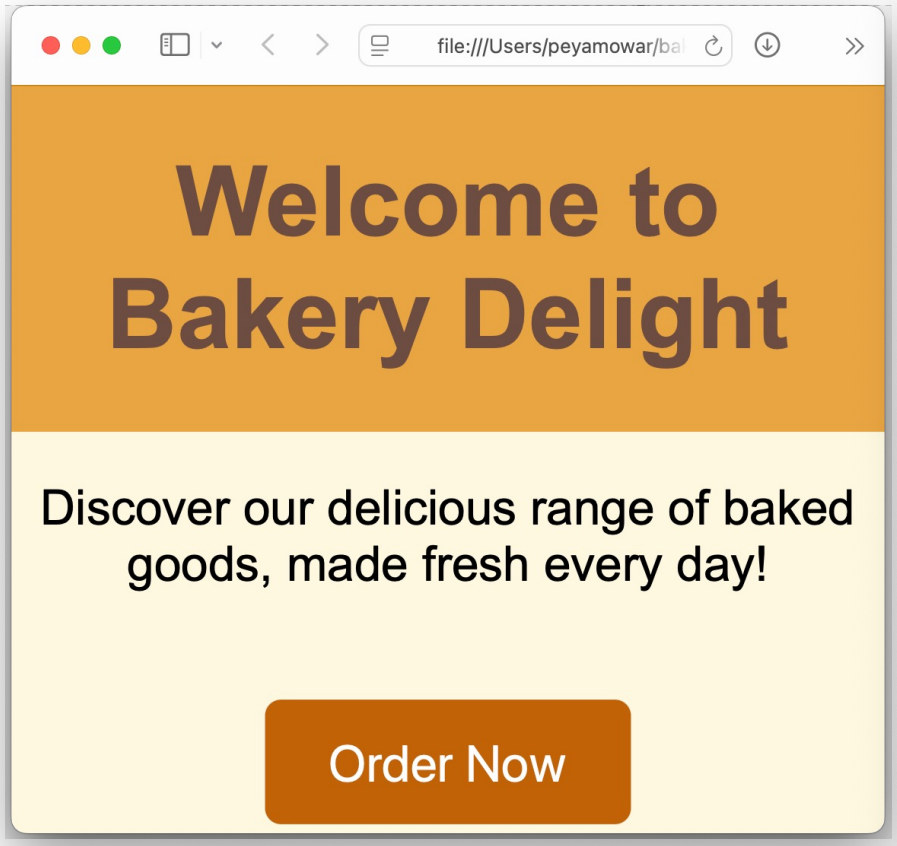

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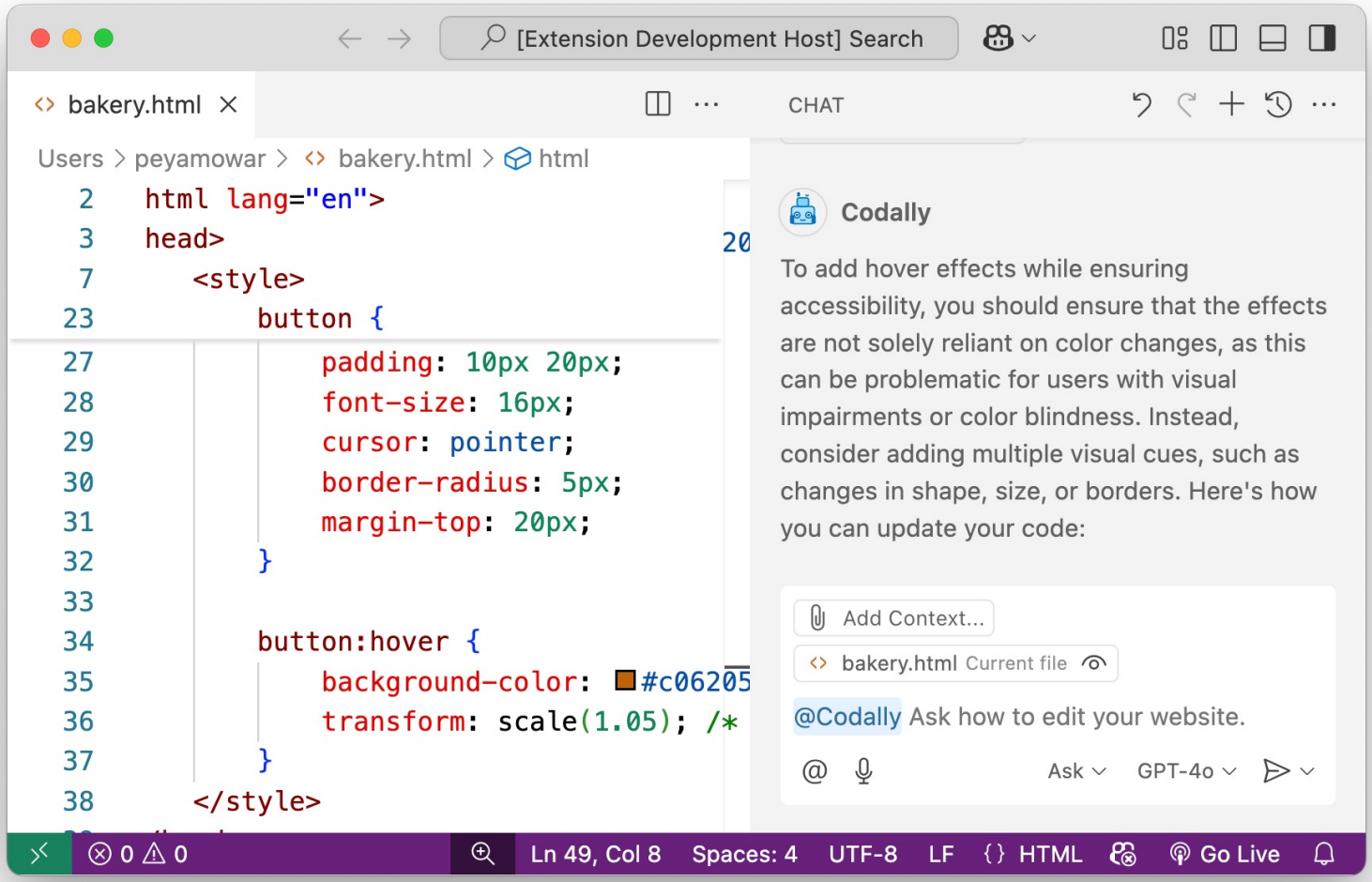
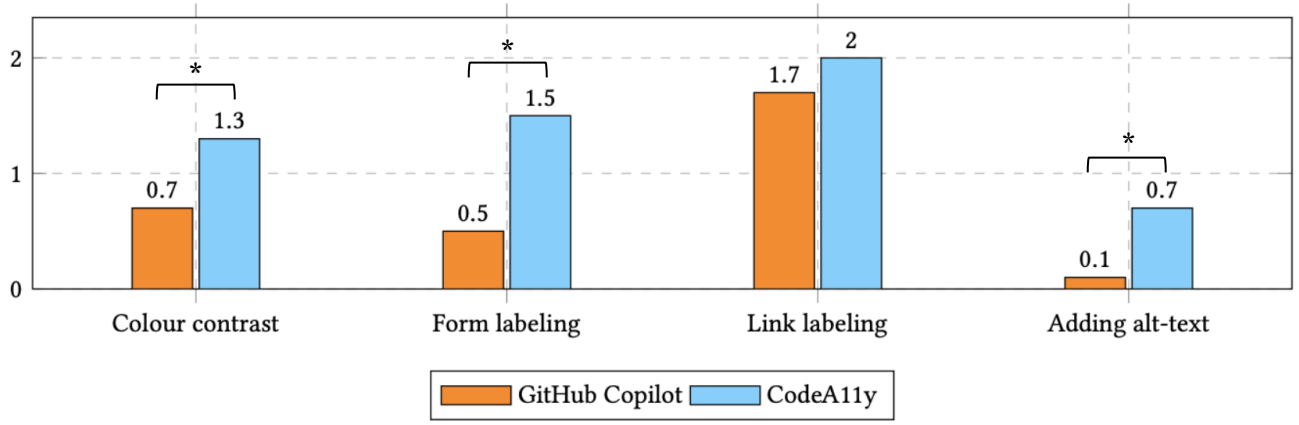


Developer using CodeA11y

CodeA11y Evaluation Study

Manual Accessibility Evaluation (N = 20)



CodeA11y statistically significantly improved the accessibility of UI code over GitHub Copilot

Developer Perspectives

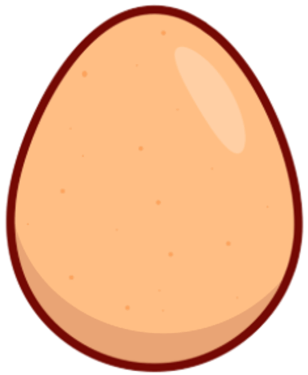
Statement	Distribution
"I am satisfied with the code suggestions provided by":	
GitHub Copilot	20% 75%
CodeA11y	15% 75%
"I found it easy to complete the coding tasks with":	
GitHub Copilot	15% 80%
CodeA11y	10% 90%

Strongly Disagree | Disagree | Slightly Disagree | Neutral | Slightly Agree | Agree | Strongly Agree

...while retaining (marginally improving) developers' perceived satisfaction and ease of use.

Which comes first?

Adoption or Awareness



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Contact: Peya Mowar
cs.cmu.edu/~peyajm29
peyajm29@cmu.edu

Read our paper to know more about how we built CodeA11y!
(among other interesting findings and discussions)

Carnegie Mellon University

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