CodeA11y: Making AI Coding Assistants Useful for Accessible Web Development

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





Carnegie Mellon University

Getting developers to write accessible UI code is a challenge.



Developer coding the web UI

Rendered UI accessed by end-user

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



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

Computers in

Improving web accessibility: a study of webmaster perceptions

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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. © 2003 Elsevier Ltd. All rights reserved.









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

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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.

CHI 2020, April 25-30, 2020, Honolulu, HI, USA

Lazar *et al.*, 2004



Tools, training, guidelines

Patel et al., 2020

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

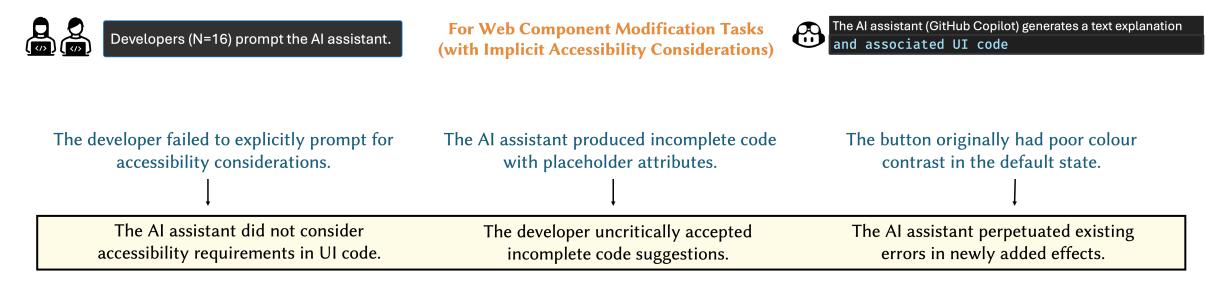


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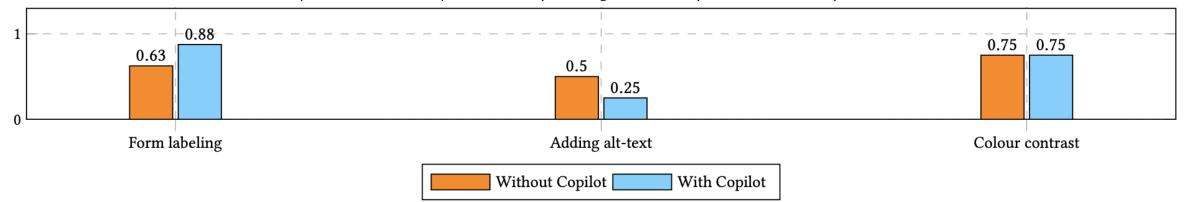
Our Contributions:

- 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



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



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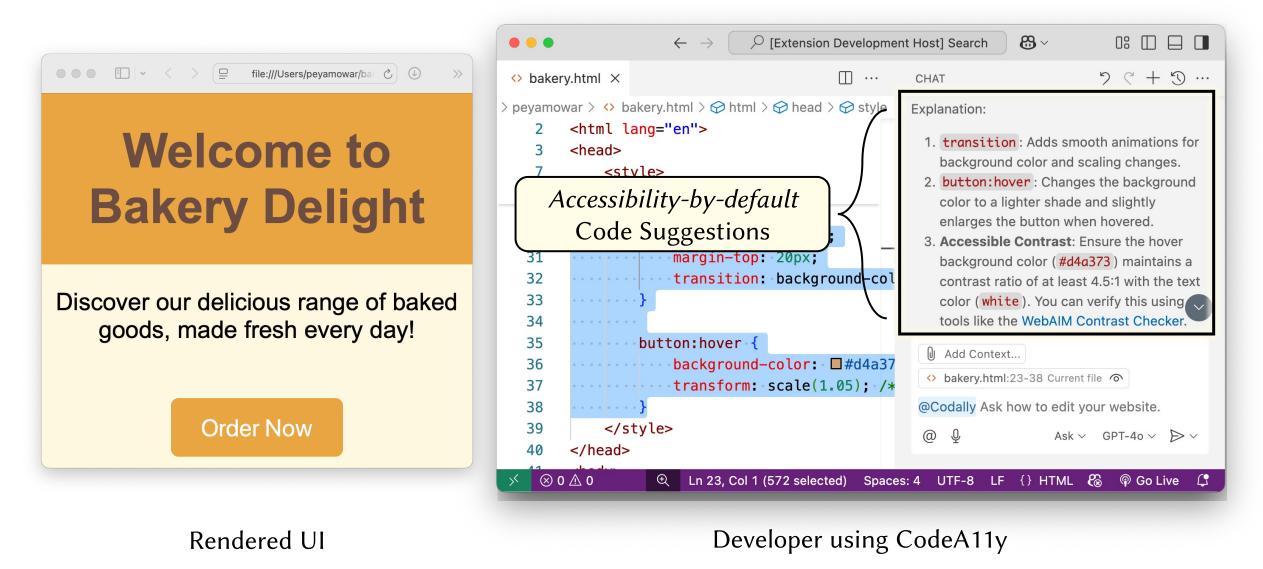
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Developer using CodeA11y



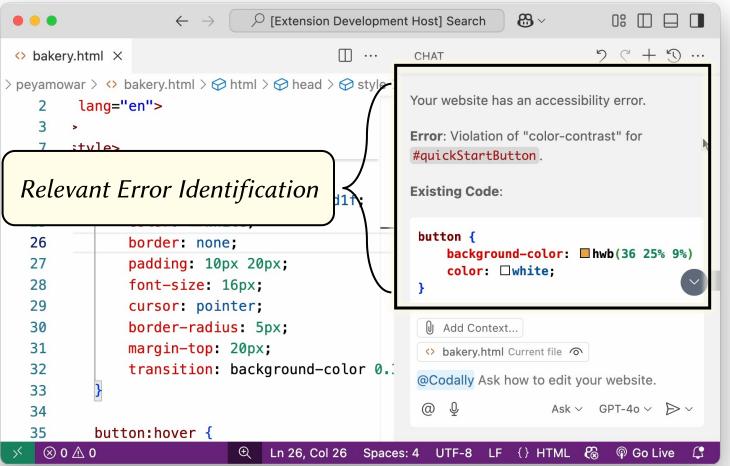
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Developer using CodeA11y

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Developer using CodeA11y

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Bakery Delight

Discover our delicious range of baked goods, made fresh every day!

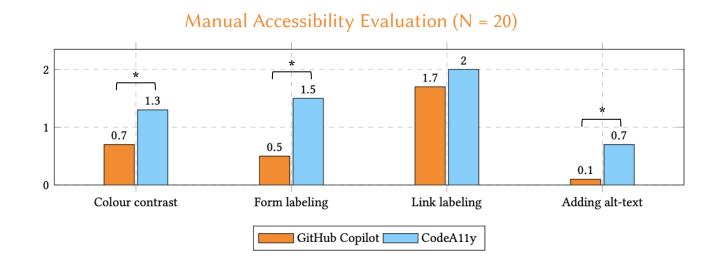
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Developer using CodeA11y

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CodeA11y Evaluation Study



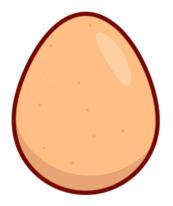
CodeA11y statistically significantly improved the accessibility of UI code over GitHub Copilot

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



CodeA11y: Making AI Coding Assistants Useful for Accessible Web Development



Contact: Peya Mowar [®] <u>cs.cmu.edu/~peyajm29</u> ⊠ peyajm29@cmu.edu

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





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