

An Investigation of Online Developer Discussions About Generative AI Programming Assistants

Cordelia Ludden, Cordell J. Burton, and Daniel Votipka
Tufts University

{cordelia.ludden,cordell.burton,daniel.votipka}@tufts.edu

1 Introduction

Large Language Models (LLMs) have rapidly emerged as powerful tools in the field of AI, revolutionizing various industries, including software development. LLMs, such as OpenAI’s ChatGPT [3] and GitHub’s Copilot [3], can generate human-like text and code snippets, offering developers assistance in tasks ranging from code generation to debugging and documentation. According to a 2023 Stack Overflow Developer Survey, approximately 70% of professional developers are using or planning to use AI tools in their development processes, highlighting these technologies’ widespread adoption [6].

However, amid the potential productivity gains, concerns have been raised about the security implications of using AI-generated code. Recent studies revealed AI assistants often suggest insecure code, with one experiment finding Copilot produces vulnerable code in 40% of security-critical programming tasks [4]. Another study showed that using AI assistants led participants to produce significantly less secure code [5]. This highlights the risks of blindly trusting AI-generated code without adequate scrutiny and validation. However, it remains unclear how programmers utilize AI and address security concerns when employing AI programming assistants. This leads us to our two research questions: 1) How are people using generative AI programming assistants and 2) What are their perceptions or concerns regarding generative AI usage?

To address this, we systematically reviewed discourse on Reddit regarding AI-assisted development. Our goal was to gain insights into a community’s perspectives and experiences regarding AI assistant usage for software development and its potential security impacts. We reviewed posts from relevant subreddits up to 9/2023 and identified 68 posts and

122 comments discussing AI assistants supporting software development.

We chose to look at discourse solely on Reddit because platforms dedicated to helping with coding (i.e. StackOverflow, Github, etc.) mainly contained debugging advice, but not how the original code was produced (with help from AI or not).

Redditors most often discussed using AI to generate code, but also used it for other tasks, such as debugging and code optimization. Interestingly, we did not observe any discussion of security of AI-suggested code. However, posts about using AI assistants to produce code were most often met with comments cautioning that these assistants often produce bad code and should not be implicitly trusted.

Our findings provide a snapshot of one community’s practices surrounding AI usage in coding. As this field is new and rapidly evolving this insight can help guide future research surrounding AI usage in coding, making developers more aware of AI-generated security risks and how to mitigate them.

2 Methods

Initially, we started to perform a grey literature review to broadly capture public sentiment. During the initial search we performed four google searches (see Table 1).

For each term, we reviewed the top 10 results. We then read each page and examined user perceptions towards AI usage in coding, and identified common terms related to using generative AI for software development. However, the majority of literature we found were blog posts that did not discuss specific individuals using AI to aid with coding. We believed surveying a forum based site could yield responses from more individuals with specific examples of AI use in coding that reflects the wider community. Using the above four searches on Reddit, we found more interpersonal and topic specific discussion occurred there compared to google. Therefore, we continued a more in-depth search focused on Reddit.

Preliminary Round
ai chatbot writing code
developers opinions on ai chatbot writing code
what are the uses of ai chatbots in writing code
how do developers use ai chatbots in their work
Reddit Round 1
ai chatbot writing code
developers opinions on ai chatbot writing code
how do developers use ai chatbots in their work
what are the uses of ai chatbots in writing code
company policy on ai chatbots
best practices for using ai assistants in coding
ai chatbot debugging
best ai assistants to use
ai uses for reviewing code
ai uses for explaining code
ai chatbot insecure code
risks of ai generated code
vulnerabilities of ai generated code
Reddit Round 2
ai write code
ai debugging code
ai explaining code
ai documenting code
developers using ai assistant

Table 1: Search queries used in the preliminary gray literature search and Reddit reviews.

We searched the most popular computer science subreddits: r/compsci, r/programming, r/learnprogramming, and r/Technology (all with at least one million members) and r/ChatGPT to ensure we received relevant results related to AI usage in coding. We chose these subreddits for their large following and active discussion on new computer science developments like generative AI.

For each subreddit, we repeated our google searches (Table 1). Two researchers independently reviewed each thread to determine its relevance to our questions. After, we calculated the most common terms used in both relevant and non-relevant responses. Terms common in only relevant responses were then used to create our second round of queries. In total, our searches yielded 398 posts and 366 comments. Of these, 68 posts and 122 comments were relevant.

After identifying the full set of relevant posts and comments, two researchers completed an iterative open coding of the data [1]. We allowed themes to arise from the data. Two researchers independently coded in rounds of 50 until a sufficient agreement was reached (Krippendorff’s $\alpha = 0.91$) [2]. A single researcher coded the remaining posts and comments.

This study was approved by the Tufts University Institutional Review Board. We only collect data posted in public forums and do not report individual’s account names.

3 Results

We identified two themes in the results: Redditors’ use of AI assistants to code and Redditors’ opinions about using AI assistants to code. Table 2 shows the codes and their corresponding number of posts and comments. The most discussed topic was using AI assistants to generate code for Redditors’ projects (P=28, C=18). Some Redditors described using AI assistants for improving code’s efficiency (P=3, C=7), debugging (P=5, C=0), or producing explanations (P=6, C=4).

Code	#Posts	#Comments
<i>How AI is used</i>		
Write new code.	28	18
Improve code efficiency.	3	7
Explain or document code.	6	4
Debug code.	5	0
Translate programming languages.	1	0
<i>Perceptions of AI</i>		
Concerns about job loss due to AI.	9	33
AI generates poor code.	3	19
AI will make programming easier.	8	6
AI companies hide data.	2	3
Overconfidence in AI code security.	2	1
Legal concerns with AI code.	0	1

Table 2: Uses of AI and redditior perceptions about its use. Sorted by total number of posts and comments.

Only two posts and one comment discussed AI-generated code security. However, Reddit commenters often mentioned that AI generates bad code (P=3, C=19). On average, posts about code generation received 0.6 comments saying AI-generated code should be thoroughly scrutinized. For example, one redditior said, “they[AI’s] are great at writing incorrect code that looks right and is a pain to debug” suggesting AI-generated code requires oversight.

4 Discussion

These results suggest that AI is being adopted widely by developers, however primarily as assistants requiring oversight. In addition, the volume of comments that are skeptical of AI generated code’s quality indicates developers scrutinize the results given to them. Given many developers copy code from sources, such as stack overflow, this skepticism related to AI generated code may suggest a more secure final product.

This study has several limitations that future work can improve upon. The data collection was performed during the early adoption of AI assistance in programming. This type of review should be replicated in the future to see changes as AI is widely adopted and developers become more accustomed to using it. Further, we did not assess actual development practice. Future work should investigate how developers interact with AI-generated code at multiple stages of a project.

References

- [1] Juliet Corbin and Anselm Strauss. *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage Publications, 2014.
- [2] Andrew F Hayes and Klaus Krippendorff. Answering the call for a standard reliability measure for coding data. *Communication methods and measures*, 1(1):77–89, 2007.
- [3] OpenAI. Introducing chatgpt, 11 2022. Accessed: 2024-03-01.
- [4] Hammond Pearce, Baleegh Ahmad, Benjamin Tan, Brendan Dolan-Gavitt, and Ramesh Karri. Asleep at the keyboard? assessing the security of github copilot’s code contributions, 2022.
- [5] Neil Perry, Megha Srivastava, Deepak Kumar, and Dan Boneh. Do users write more insecure code with ai assistants?, 2023.
- [6] Stack Overflow. Stack Overflow Developer Survey 2023, 2023. Accessed: 2024-03-01.