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CS 477 - 1001
Due: 2/26/24

GitHub Repo for Tasks 2.1 - 2.3 ○ GitHub Repo for Task 2.4

Reflection Report

I. Introduction

This report covers my experience using ChatGPT to assist in my programming. In this lab, we were tasked to use ChatGPT to help refactor code, provide appropriate documentation, analyze and assist complex code, and assist in workflow automation. The code in this report is all within the GitHub repositories linked above but will still include hyperlinks to the specific commits to show the difference ChatGPT has made.

II. Task Experiences

Task 1: Familiarizing with ChatGPT

When reading examples of how ChatGPT was being implemented in a professional field, I was honestly surprised. With how many instructors and professors had strongly disliked any usage of it, I had deterred from using it. It was not until my senior years where I had been told by my counselor and some of my professors that ChatGPT was a powerful tool that I could use to help myself understand concepts or review any papers I have written.

At first I was skeptical of why people were talking so much about ChatGPT but also a little excited at our step towards generative AI and have thus been using it for my senior year. I had mainly used it as a consultant to understand why sometimes my code would generate errors or help delve further into a topic if I struggled to understand it in classes as I could specifically ask it the question without getting stuck behind sites that may be irrelevant to my issue.

Task 2.1: Code Refactoring

For the first task, I had gotten my previous bubble sort program from my old computer science class and had ChatGPT figure out ways to optimize it and refactor it. Compared to my code, ChatGPT had advised me to make multiple files, a header for the function prototypes, a source file for function definitions, and the source file for main.

It had also removed my swap function by adding the utility library into my program and even advised me to avoid ‘using namespace std;’ as it is a bad practice for programmers in the industry. It even told me to keep my variables consistent and to provide a better description of the variable, in which I was pleased when it explained in further detail why it had made those changes.

Commits + Chatlog: Provided Code | ChatGPT Implementations | ChatGPT Chatlog

Task 2.2: Documentation Assistance

In this task, I had reused the bubble sort algorithm program and tasked ChatGPT to provide documentation for the code. To my surprise it generated a helpful format that I've seen provided by instructors before and even explained some questions I had concerning the way it added comments. It elaborated on the structure further when requested to and explained to me why some aspects of the comments were repetitive.
Commits + Chatlog: ChatGPT Implementations | ChatGPT Chatlog

Task 2.3: Understanding Complex Code

For this task, I had created a matrix multiplication program that I found to be reasonably complex that didn't have a simple solution. Initially, I had planned for the program to sum the squared values of the elements of an array but the "complexity" or refinement of the code was too obvious so I opted for a more difficult program. For the matrix multiplication, ChatGPT has explained improvements that can be done to improve my program.

My 2D arrays were changed to using the library array, removed 'using namespace std;', used const for function parameters and constexpr for variables in main, and explained the importance of these changes. One of the reasons explained was that using the library array rather than the 2D array can help avoid issues like buffer overloads.
Commits + Chatlog: Provided Code | ChatGPT Implementations | ChatGPT Chatlog

Task 2.4: Workflow Automation with GitHub Actions

In this task, we were instructed to return to our previous lab which was working on continuous integration and the workflow file we created during the lab. Based on ChatGPT's suggestions, it advised me to use the PostgreSQL database to run my tests, cache my dependencies which can reduce the workflow execution time, and create a coverage report. When asking questions on the implementations, ChatGPT replied in a detailed manner and explained further how these changes contribute to enhancing and optimizing the workflow.
CI Workflow + Chatlog: CI Workflow Commit | ChatGPT Chatlog

III. Impact

ChatGPT can definitely improve aspects of my coding and maybe even further my skill as long as I use it responsibly. During this process of my tasks, ChatGPT has given me useful insights and understandings of topics I might've looked over when developing programs. However, it does have its shortcomings and shouldn't be heavily relied upon as OpenAI themselves have stated that important information should be

cross-checked and that the chatbot can make mistakes. In which I experienced some myself in these tasks as well as prior experiences of using it.

IV. Lessons Learned

I've learned that ChatGPT can be considered a double-edged blade. In one way, you can improve your knowledge on a topic you may be struggling with. But in another way, this technology can be abused and cause students to be over reliant on this technology, impeding the growth and retention students may have gotten without ChatGPT. It's important to maintain discipline when using this as it is quite powerful and generates code better than I would have expected, but it is also important to understand the code it generates as I had caught and changed some aspects of the code that could be deemed irrelevant.

I believe I will still continue to use it as a pseudo-tutor to help me learn more about subjects and topics I may be struggling to comprehend, but be wary of the information provided as it is prone to misinformation by cross-referencing it. I feel conflicted using it as I feel like employers may raise the bar higher with the implementation of ChatGPT and I don't feel like I could meet that standard, but that makes it all the more important to utilize this chatbot efficiently so I at least have a chance in the industry.

V. Future Applications

ChatGPT definitely has made its place in the software development field, it is quite the useful tool to help get employees on track if they are struggling to understand a concept or a group gets stuck on an issue that they can't seem to figure out. ChatGPT definitely has its own issues but having a chatbot to help elaborate and work out ideas or get feedback on errors that may be occurring is a useful tool to have for developers. This is ideally the way we want to work with ChatGPT as it saves developers time from scrounging the internet to find a specific solution to their problem or interrupting other developers' work which could lead to further expected development of projects.

VI. Conclusion

ChatGPT has been useful to me as a way to elaborate on aspects of code that I may be confused upon, finding and fixing minor issues I might have missed, and can save me time and resources compared to searching through books or stack overflow. However, I am afraid of over relying on it and using it as a clutch for my shortcomings. I understand that with careful usage, this can greatly make up for my shortcomings as a programmer and help me learn from my mistakes. Yet, it's a fine line between what most professors wish for students to avoid which is simply copy and pasting code without learning or taking away from it.