Bilkent University

Department of Computer Engineering

CS 453

Application Lifecycle Management

Report of Assignment #2

Experimenting with Gemini API

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Section 1

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This report is submitted to the Department of Computer Engineering of Bilkent University in partial fulfillment of the requirements of the Application Lifecycle Management course, CS 453.

Discussing the Favorability of Gemini-Generated Pull Request Titles

Throughout this assignment, implemented a bot to autonomously generate titles for GitHub pull requests. The overarching aim of this initiative is to aid and bolster developers by alleviating the burdensome nature of title creation, which often presents a formidable challenge. This report aims to discuss and analyze the favorability of the titles auto-generated by the bot [1].

For testing and analyzing purposes, chosen the repository “ghidra” on GitHub, which is a software reverse engineering (SRE) framework [2] and, programmed the bot to generate new titles for the last five merges of the repository (Refer to the Appendix for the list of the original titles and the titles generated).

Comparing the titles assigned by the developers with the ones contrived by the bot, can say that the ones automated are sufficiently elucidatory and concise. However, it is important to note that these freshly-proposed titles often require further explanations; for instance, the very first title suggested “Relocate shift constant and variable” does not say much about the changes performed, and it might be indispensable to further explain it. On the other hand, the third title suggestion “Fix: Update MachoProgramBuilder to handle zero file offset segments” is adequately satisfactory and does not seem to need any additional clarification.

Moreover, it would not be an unfair assessment to comment that it is better for language model AIs, like Gemini in that case, to be vague and general rather than specific aiming maximum user satisfaction. Furthermore, such AIs are not exclusively designed for this particular task of the assignment, i.e. title generation for pull requests.

To infer and conclude, the bot is deemed dependable and advantageous; nevertheless, it is recommended that one should consider and deliberate suggested titles rather than directly ratify them without any deliberation. It is important to note that the bot is not aware of everything going on momentarily about the repository; and, therefore, it cannot be expected to run with an absolute accuracy and high satisfactoriness all the time.

Appendix

PR #	Original titles	Titles generated by the bot
5756	Tricore, fix DEXTR, `Extract from Double Register` instruction	Relocate shift constant and variable
6266	Fix FDIVP freg,ST0 in x86	Fix: Swap dividend and divisor for FDIVP and FDIVRP instructions
6302	Fix Mach-O import when no segment contains the header	Fix: Update MachoProgramBuilder to handle zero file offset segments
1449	Tricore improvements	Update TriCore patterns and relocation handling
6270	SPARC: Update missing relocation enum types and order by value	Add ARM and MIPS support to relocation types

Titles suggested for the last five PRs of ghidra [2]

References

[1] OpenAI, “ChatGPT: Conversational AI Language Model” [Online], OpenAI, https://chat.openai.com (accessed Mar. 24, 2024).

[2] NationalSecurityAgency, “NationalSecurityAgency/Ghidra,” GitHub, https://github.com/NationalSecurityAgency/ghidra (accessed Mar. 24, 2024).