Some Experiments in Chatbot-Assisted Program Development

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Abstract

Chatbots are computer programs designed to simulate conversation with human users. They can be used for various purposes, including customer support, information retrieval, entertainment, and more. Recently, they were also used to support the development of programs. Given natural language specifications, a chatbot may generate a program in the programming language of choice. Some chatbots also support program documentation, program analysis, refactoring, generation of test cases, further program verification, and many further supportive functionality for program development. Chatbots may also suggest to run certain testing and/or development tools, but in general, not all chatbots are capable of running tools.

In this talk, we report from our experiments with ChatGPT (version 3.5) to generate programs from given natural languages specifications. We investigate to which extent it is able - to generate simple programs - to point out common deficiencies in programs - to generate test cases for programs, - to generate temporal logic formulae (LTL) for given programs - and to deal with automata specifications. Our experiments suggest, as expected, that the more specific the underlying formalism the lesser the quality of the solution provided by ChatGPT.

Moreover, we show how use prompt engineering to build a simple chatbot that both relies on the capabilities of ChatGPT for general support but also allows to run dedicated analysis tools like a model checker locally, eventually resulting in a full-scale Chatbot-Assisted Program Development.

Keywords

AI, Programming, Chatbot