AutoCodeRover: Autonomous Program Improvement

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Motivation

- Large Language Models can assist human in solving problems especially in automated program repair and coding.
- AutoCodeRover is an open-source project.
- Clear setup instructions

Agenda

I. Tool Information

II. Evaluation

III. Demo

I. Tool Information

- AutoCodeRover: a novel LLM-driven multi-agent framework combining with code search capabilities for automating bug detection, structuring bug reporting, and program repair for Python Projects (SWE-bench).

- In February, 2025, It is acquired by Sonar

I. Tool Information

Table 1: List of Context Retrieval APIs.

API name	Description	Output
search_class (cls)	Search for class `cls` in the codebase.	Signature of the searched class.
search_class_in_file (cls, f)	Search for class `cls` in file `f`.	Signature of the searched class.
search_method (m)	Search for method `m` in the codebase.	Implementation of the searched method.
search_method_in_class (m, cls)	Search for method `m` in class `cls`.	Implementation of the searched method.
search_method_in_file (m, f)	Search for method `m` in file `f`.	Implementation of the searched method.
search_code (c)	Search for code snippet `c` in the codebase.	+/- 3 lines of the searched snippet `c`.
search_code_in_file (c, f)	Search for code snippet `c` in file `f`.	+/- 3 lines of the searched snippet `c`.

I. Tool Information

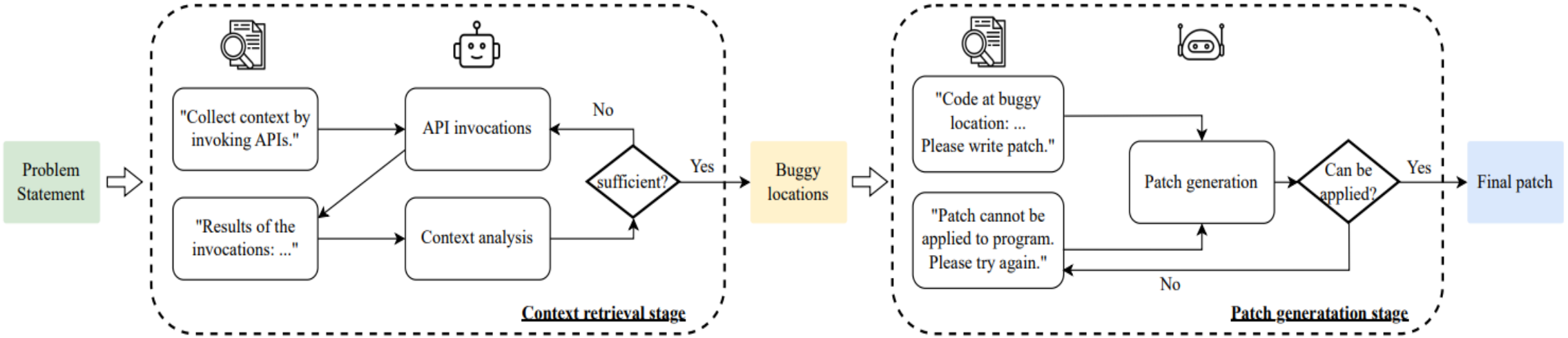

Figure 2: Overall workflow of AutoCodeRover.

II. Evaluation

AutoCodeRover achieves lower cost (on average $0.43 USD), compared to SWE-Agent

AutoCodeRover can resolve more tasks with less cost (31) compared to SWE-Agent (23)

Limitation:

1. Rely on LLM to decide bug and generate code
2. Overfittting patch

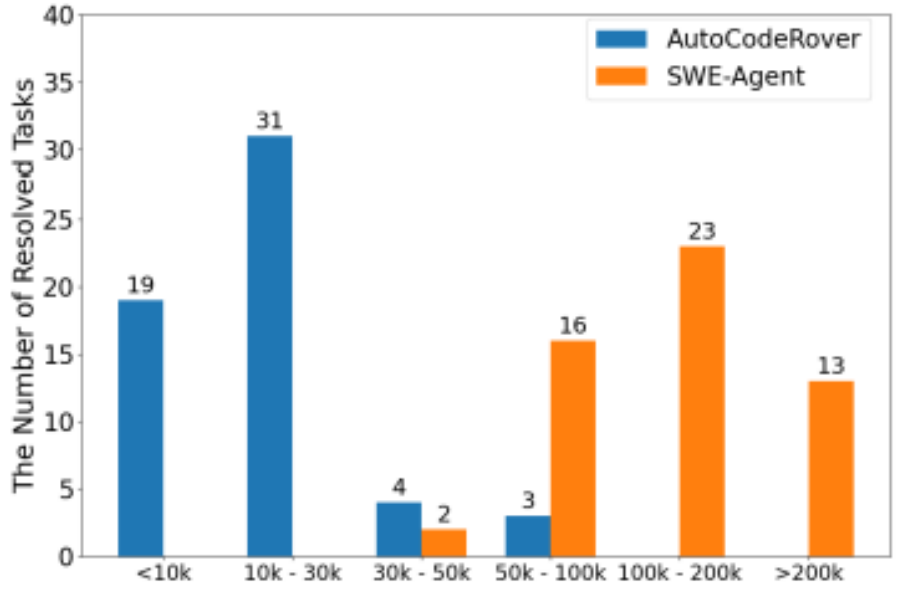

Figure 8: The number of resolved tasks and token cost distributions of AutoCodeRover and SWE-agent.

III. Demo

- **Environment setup**
  - Docker
  - OPENAI_API_KEY, ANTHROPIC_API_KEY. GROQ_API_KEY
  - Link setting up AutoCodeRover: https://youtu.be/ZwRGiMduXh4
  - Link setting up SWE-bench: https://youtu.be/BVswfxKhkO8

- **Demo for one task**
  - https://youtu.be/Co_TxGwZNrk

- **Demo for multiple tasks and SWE-bench-Lite (300 tasks)**
  - https://youtu.be/9MoMlz_Vcp0

Thank you!

Questions?

References

- AutoCodeRover: https://arxiv.org/abs/2404.05427
- AutoCodeRover's Github: https://github.com/AutoCodeRoverSG/auto-code-rover
- SWE-bench: https://www.swebench.com/