Project 6
Replication study on
AGORA: Automated Generation of Test Oracles for REST APIs

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Research questions we will test :

1. How effective is AGORA in generating test oracles?
2. What is the impact of the size of the input data set on the precision of AGORA?
3. How effective are the generated test oracles in detecting failures?

Design and Evaluation :

In our experiment design, we aim to comprehensively understand and replicate the intricate flow of AGORA, particularly focusing on the implementation details such as the extension of Daikon and the functionality of Beet. By dissecting and replicating AGORA's flow, we seek to gain insights into its underlying mechanisms and contribute to a deeper understanding of its capabilities in automated test oracle generation for REST APIs.

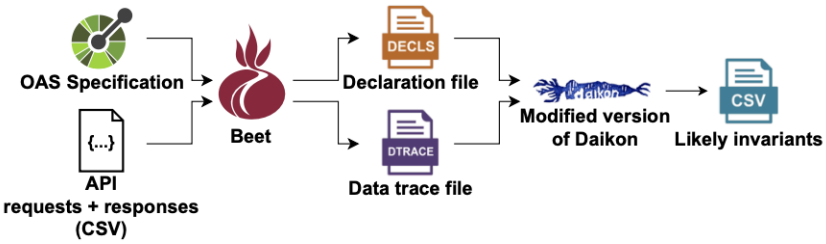

Figure 1: Workflow of AGORA.

OAS : OpenAPI Specification, is a widely used standard for describing RESTful APIs. It provides a clear, language-agnostic way to describe both the structure and behavior of these APIs.

BEET : In the context of AGORA, Beet plays a crucial role in detecting likely invariants – conditions or patterns that are expected to always hold true in the API

responses. By processing the OpenAPI specifications and the accompanying API data, Beet facilitates the identification of these invariants.

When Beet processes an API response, especially those containing complex data structures like arrays of objects, it generates trace files for each item in these structures. These trace files are used by Daikon to dynamically detect invariants in the API outputs.

Daikon : By using Daikon's dynamic invariant detection, AGORA can create more accurate and reliable test oracles, as they are based on actual observed behavior of the API rather than static assumptions or manually defined conditions.

Tests :

1. Verifying results
    i. Making sure if the results from the paper match when the same or similar dataset is used.
2. Testing under different conditions
    i. Testing AGORA on different datasets. The goal is to verify if the desired output is similar to the yielded result.

Report the findings in the study

Plan of Action:

1. Methodology and Data Preparation - week 1 - Abhishek
    a. Literature Review & Project Familiarization
    b. Review the original methodology used in the AGORA study and identify any potential adjustments for replication.
    c. Select and prepare the datasets needed for testing, ensuring they are comparable to those used in the original study or suitably diverse for extended analysis.

2. Testing and Analysis - week 2-4 - Anushka
    a. Set up the testing environment, ensuring it matches the conditions of the original study as closely as possible.
    b. Run the tests using AGORA on the selected datasets.
    c. Analyze the results, comparing them to the findings of the original study and noting any deviations or new insights.

3. Documentation and Review - week 5 - Rishitha
    a. Document each step of the replication process, including methodology adjustments, testing setups, and analysis findings.
    b. Prepare the final report and presentation, ensuring they are comprehensive and clear.
    c. Review the entire replication study, checking for consistency and completeness.