

AGORA: Automated Generation of Test Oracles for REST APIs



Enhancing API Testing Through Invariant Detection

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Let's unravel the essence of AGORA

- AGORA isn't just another acronym, it represents a paradigm shift in how we approach API testing.
- At its core, AGORA is designed to automate the generation of test oracles for REST APIs. But what sets AGORA apart is its method
 - it achieves this through the detection of invariants.

What are invariants?

Think of them as the fundamental truths that should always hold in the output of an API, regardless of its complexity.

- OAS - OpenAPI Specification
- Beet
- Daikon

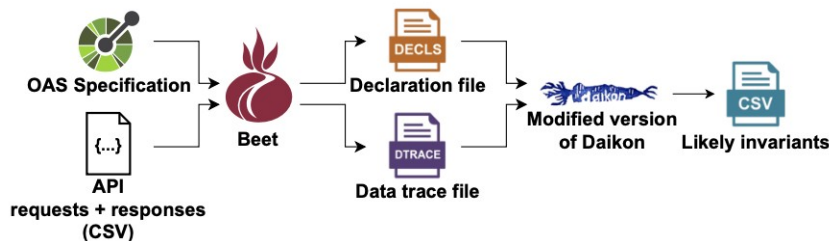


Figure 1: Workflow of AGORA.

What does this mean for API testing?

- Supporting the detection of up to 105 different types of invariants in REST APIs.
- Enhanced Accuracy and Efficiency
- Scalability in Testing
- Dynamic Invariant Detection

Objective

- Verifying results

Making sure if the results from the paper match when the same or similar dataset is used.

- Testing under different conditions

Testing AGORA on different datasets. The goal is to verify if the desired output is similar to the yielded result.

We aim to answer the following research questions:

1. How effective is AGORA in generating test oracles?

We aim to measure the precision of AGORA in generating invariants that result in valid test oracles (i.e., they properly model the expected API behavior) using the default configuration of Daikon as a baseline.

2. What is the impact of the size of the input data set on the precision of

^ The precision of the detected invariants usually depends on the quality and diversity the input datasets (i.e., API requests and responses). Hence, we aim to study the impact of data set size on the effectiveness of AGORA.

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3. How effective are the generated test oracles in detecting failures?

The final goal is generating test oracles that can be used during testing to identify erroneous responses caused by faults. Thus, we aim to investigate the effectiveness of the generated oracles for detecting non-trivial failures in REST APIs.

How we will accomplish our goal

- Learning Expected Behavior.
- Extension of Daikon.
- Instrumentation with Beet.
- Diverse Invariant Detection- For other dataset.

PLAN OF ACTION

● **Methodology and Data Preparation - week 1 - Abhishek**

Role: Establishing and refining the methodology to be used in the replication study.

Tasks:

- Literature Review & Project Familiarization
- Review the original methodology used in the AGORA study and identify any potential adjustments for replication.
- 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.

PLAN OF ACTION

● **Testing and Analysis - week 2-4 - Anushka**

Role: Conducting tests and analyzing the results.

Tasks:

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

PLAN OF ACTION

● **Documentation and Review - week 5 - Rishitha**

Role: Documenting the study process and outcomes, and conducting a thorough review.

Tasks:

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

THANK YOU