A Survey on the Usefulness of Automatic Identification of Violation Symptoms in Code Reviews

[**Problem Statement**] During software evolution, the implemented architecture tends to exhibit increasing and accumulating violations of the intended architecture. This phenomenon is defined as **architecture erosion**, and can manifest in a variety of **symptoms**. One such category of symptoms, are **architectural violations**, such as violations of design principles (e.g., the Single Responsibility Principle), architecture patterns (e.g., layering pattern), design decisions, requirements, dependencies, and modularity. Although the percentage of violation symptoms at the architecture-level is far lower compared to code-level violations (e.g., duplicated code), the accumulation of such symptoms can be detrimental to the overall system quality.

[**Our Approach**] We advocate that automatically identifying violation symptoms from textual artifacts (e.g., code reviews) can help developers to prevent an architecture from rapidly eroding. To this end, we trained several machine learning and deep learning classifiers which automatically identify violation symptoms from code review comments.

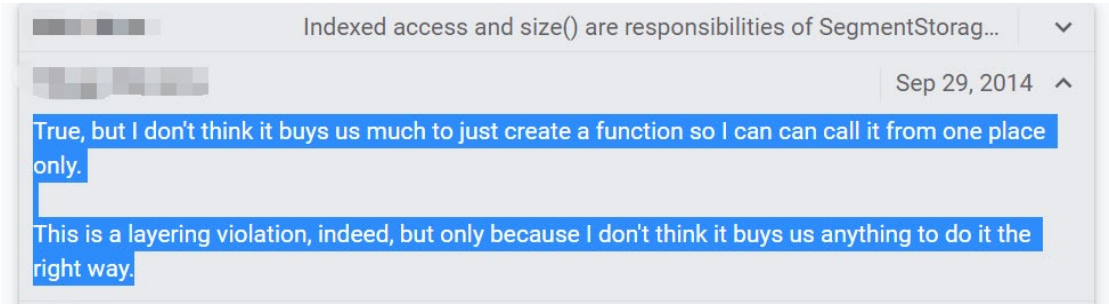
As an example, the following figures show how our classifiers detect code review comments related to violation symptoms (see text **highlighted in blue**).

[**Survey Goal**] Through this **anonymous** survey, we want to investigate the **usefulness** of our approach in practice from the developers' perspective.

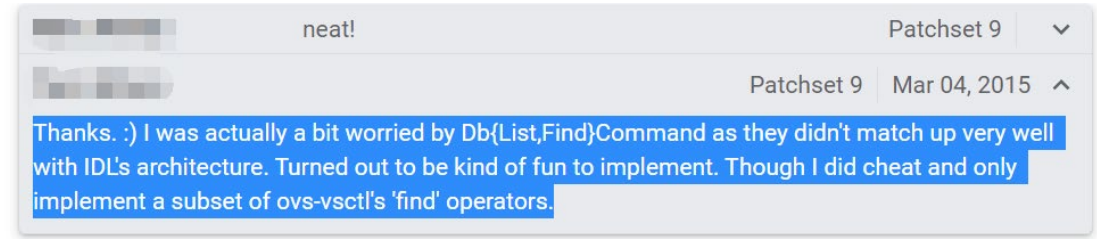
Thank you. If you have any questions, please contact us.

Ruiyin Li (r.li@rug.nl), Wuhan University & University of Groningen
Peng Liang, Wuhan University, China
Paris Avgeriou, University of Groningen, The Netherlands

Example 1



Example 2



General Questions (GQ)

GQ1: Which country are you working in?

GQ2: How many years have you been involved in software development?

- ○ 0 - 2 years
- ○ 3 - 5 years
- ○ 6 - 10 years
- ○ More than 10 years

GQ3: What is your main role in software development?

- ○ Developer
- ○ Architect
- ○ Tester
- ○ Project Manager
- ○ Business Analyst
- ○ Requirements Engineer
- ○ Software Engineer
- ○ DevOps Engineer
- ○ Operations Engineer
- ○ Other: _____

GQ4: If you are working for a company, what is the size of this company (number of employees)?

- ○ Less than 20
- ○ 21 - 100
- ○ 101 - 500
- ○ 501 - 1000
- ○ More than 1000
- ○ I do not work for a company

GQ5: If you are working for a company, what is the application domain of that company?

Statements

Statements on the usefulness of automatic identification of architectural violation symptoms: **How strongly do you agree or disagree with the following statements**?

S1: **Violation symptoms in code review comments** identified by the approach represent potential architectural violations.

- ○ Strongly Agree
- ○ Agree
- ○ Neutral
- ○ Disagree
- ○ Strongly Disagree
- ○ I don't know

S2: **Violation symptoms in code review comments** identified by the approach can be used to improve the code quality.

- ○ Strongly Agree
- ○ Agree
- ○ Neutral
- ○ Disagree
- ○ Strongly Disagree
- ○ I don't know

S3: I (as a practitioner) can find potentially constructive and useful architectural information from **violation symptoms in code review comments** identified by the approach.

- ○ Strongly Agree

- ○ Agree
- ○ Neutral
- ○ Disagree
- ○ Strongly Disagree
- ○ I don't know

S4: **Violation symptoms in code review comments** identified by the approach can help us identify violation-related issues faster than if we do this manually.

- ○ Strongly Agree
- ○ Agree
- ○ Neutral
- ○ Disagree
- ○ Strongly Disagree
- ○ I don't know

S5: **Violation symptoms in code review comments** identified by the approach might help us locate, identify, and prioritize potential architectural violations in our systems.

- ○ Strongly Agree
- ○ Agree
- ○ Neutral
- ○ Disagree
- ○ Strongly Disagree
- ○ I don't know

S6: **Violation symptoms in code review comments** identified by the approach can provide us with input to find other violations of similar nature or otherwise.

- ○ Strongly Agree
- ○ Agree
- ○ Neutral
- ○ Disagree
- ○ Strongly Disagree
- ○ I don't know

[**Optional Question**] Please kindly let us know if there is anything else you would like to share with us. For example, suggestions to help improve the automatic identification of architectural violation symptoms.