API Evolution and Co-Evolution – A Systematic Mapping Study

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***Abstract*—Context:**
Objective:
Methods:
Results:
Conclusions:
***Index Terms*—**

I. Introduction

Research Objectives

Context

Review Questions

RQ1 What types of studies are conducted and what are the knowledge artifacts produced regarding api-evolution?

RQ2 What api languages and api types have been investigated in the study of api evolution?

Organization

The remainder of this paper is organized as follows. Sec. II details the methods utilized in this systematic mapping study. Sec. III details the inclusion and exclusion criteria used by this study. Sec. IV describes the results of this study. Sec. V presents a in-depth analysis of the results and the interpretation of these findings. Finally, Sec. VI summarizes the key findings and concludes this paper.

II. Review Methods

A. Data Sources and Search Strategy

Data Sources:

- ACM Digital Library
- IEEEXplore
- SpringerLink
- ScienceDirect
- Web of Science

Search Strategy:

- Search String: (api AND evolution)

Search Restrictions:

- ACM Digital Library: None
- IEEEXplore: Restricted to Articles, Journals and Magazines only.
- SpringerLink: Restricted to:
  - Discipline: Computer Science
  - Subdiscipline: Software Engineering
  - Content Types: Article, Conference Paper
- ScienceDirect: Restricted to the following Journals:
  - Information and Software Technology
  - Information Systems
  - Journal of Systems Architecture
  - Journal of Systems and Software
  - Science of Computer Programming
- Web of Science: Retricted to:
  - Document type: Articles
  - Databases Used: SCI-EXPANDED, CPCI-S, ESCI
  - Research Area: Computer Science

Additionally, we utilized both backward and forward snowballing procedures, as suggested by Wohlin [1], to find studies missed based on the above criteria.

B. Study Selection

C. Study Quality Assessment

In this study we are more concerned with understanding the research area rather than the exploring the quality of studies in the research area. Thus, we did not apply quality criteria to the research.

D. Data Extraction Procedures

We followed the methods of Petersen et al. [2] to develop the categorization criteria to map the selected studies. Upon the completion of our search process, we then extracted keywords from each paper using the title, author's keywords, and abstracts as our data sources. In the case that these sources were too limited, we expanded to the introduction and conclusion sections of the paper as well. Using these keywords we then developed a classification scheme(s) to classify each paper. During the classification of the papers, we also identified the study type and knowledge artifact type of each paper.

E. Data Synthesis Procedures

III. Included and Excluded Studies

Inclusion Criteria:

- Included studies whose title, keywords, and abstract contained relevant keywords related to API evolution and API co-evolution.
- Included studies whose publication date was within the year range 2009 – 2019

Exclusion Criteria:

- Excluded studies whose title, keywords, and abstract did not contain relevant keywords related to API evolution or API co-evolution.
- Excluded studies written in languages other than English.
- Excluded studies written earlier than 2009.

IV. Results

Findings

Sensitivity Analysis

V. Discussion

Principle Findings

Strengths and Weaknesses

Meaning of Findings

VI. Conclusions

Recommendations

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Conflicts of Interest

References

[1] C. Wohlin, "Guidelines for snowballing in systematic literature studies and a replication in software engineering," in *Proceedings of the 18th International Conference on Evaluation and Assessment in Software Engineering - EASE '14*. London, England, United Kingdom: ACM Press, 2014, pp. 1–10. [Online]. Available: http://dl.acm.org/citation.cfm?doid=2601248.2601268

[2] K. Petersen, S. Vakkalanka, and L. Kuzniarz, "Guidelines for conducting systematic mapping studies in software engineering: An update," *Information and Software Technology*, vol. 64, pp. 1–18, Aug. 2015. [Online]. Available: https://linkinghub.elsevier.com/retrieve/pii/S0950584915000646

Appendix