



University of L'Aquila

**DEPARTMENT OF ENGINEERING COMPUTER
SCIENCE AND MATHEMATICS**

Master degree in Software Engineering for Adaptive Systems

**AUTOMATED APPROACHES TO ASSESS THE SIMILARITY OF
OPEN SOURCE PROJECTS**

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Introduction

Scenario



Introduction

Challenges

- Searching for candidate components.
- Evaluating a set of retrieved candidate components to find the most suitable one.
- Adapting the selected components to fit the specific requirements.

Introduction

Similarity Overview

- **Low-level Software Similarity:** Using source code (variable/function names, API references, etc.)
- **High-level Software Similarity:** Using metadata such as readme files, description, GitHub star events

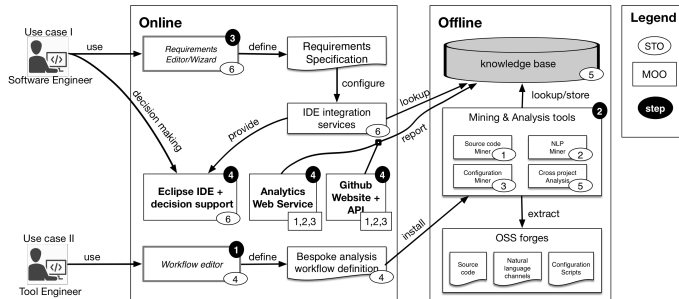
CROSSMINER

Description

- CROSSMINER aims at addressing such challenges by providing advanced techniques and tools supporting the identification and adoption of existing high-quality open source software components instead of implementing in-house proprietary solutions with similar functionalities.

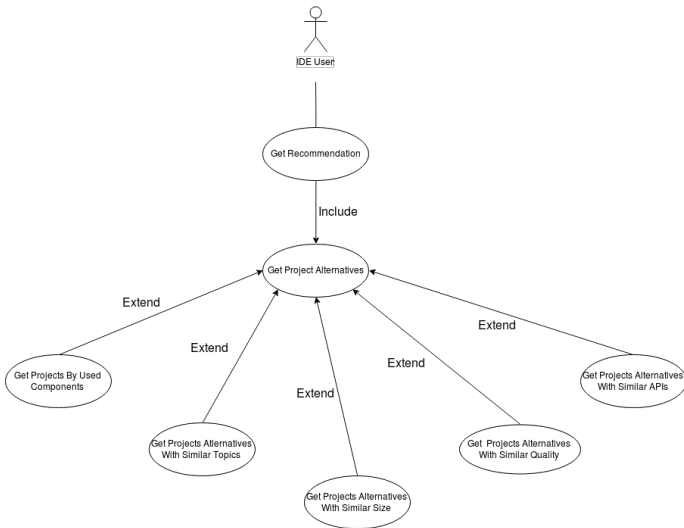
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System Architecture



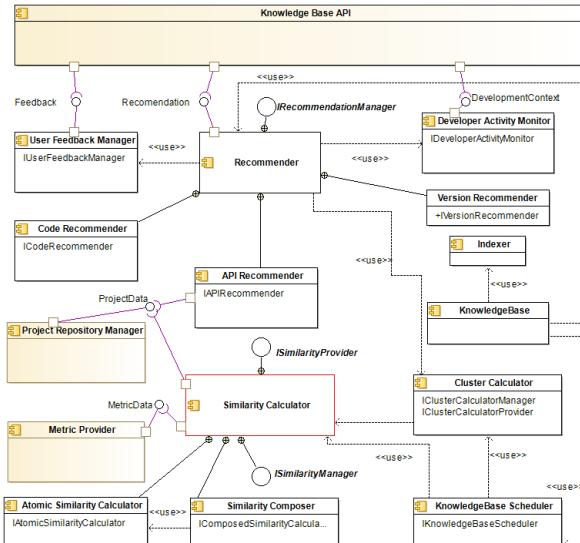
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System Architecture



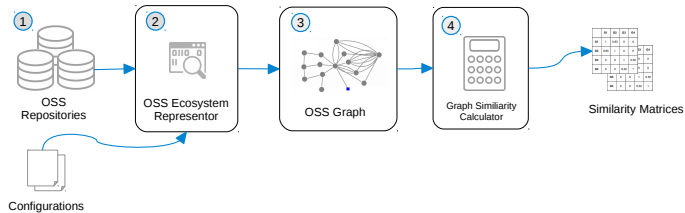
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System Architecture



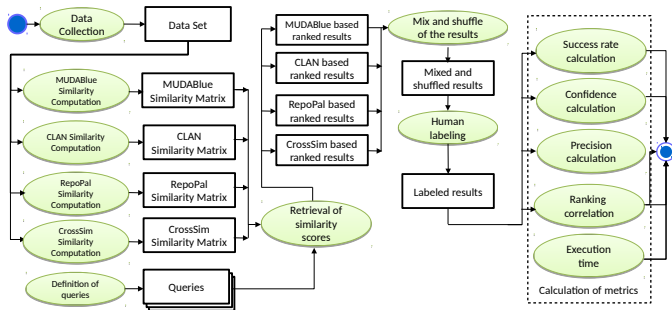
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CROSSSIM



Contribution

Evaluation Process



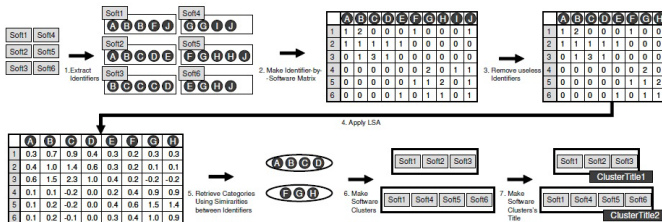
Contribution

Procedure

- Studying the originals papers
- Implementation
- Testing

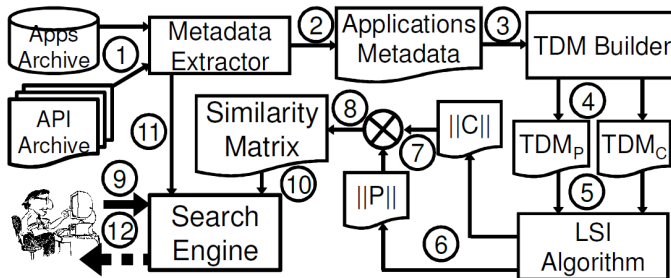
Contribution

MudaBlue



Contribution

CLAN



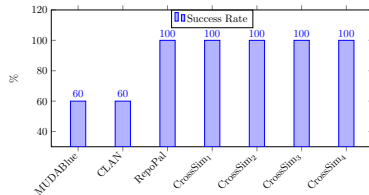
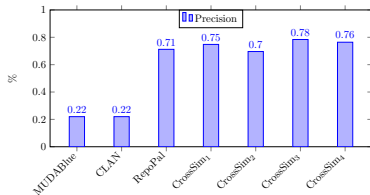
Evaluation

User Study

- User study: Human evaluators label the similarity between query and retrieved projects
- User study: 10 people involved with experience plus a double check
- Similarity scales: *Dissimilar*, *Neutral*, *Similar*, and *Highly Similar*
- Evaluation metrics: Success Rate, Confidence, Precision

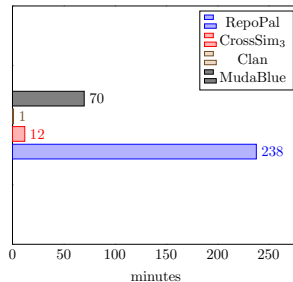
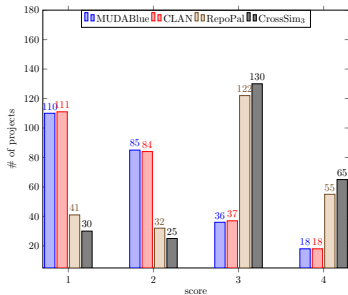
Evaluation

Results



Evaluation

Results



Conclusion

What Has Been Done

- Implementation of two approaches
- Evaluating the results
- Confirmation of the goodness of CrossSim

Conclusion

What Else to be Done

- Eclipse Integration
- Provide API recommendation
- Provide snippets of code