OpenTrace: a Workbench for Automatic Software Traceability Link Generation and Evaluation

- Semantic Software Engineering
- Traceability

The OpenTrace workbench provides for automatic traceability link recovery between various types of textual artifacts of a software project. It includes a collection of customizable GATE pipelines and configurable components that allow to generate, evaluate and visualize traceability information. OpenTrace facilitates reproducibility, as it provides out-of-the-box traceability; as well as support for all-in-one packaging of tools, datasets, and configurations ready for remote distribution, download, and installation [1].
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1. Overview

Software traceability involves finding relationships between pairs of artifacts, such as requirements, source code, test cases, among others. While the artifacts contribute to the planning, creation, and documentation of a project, traceability links between them support activities like reverse engineering, impact analysis, and compliance testing.

The *OpenTrace* workbench allows for experimenting with traceability strategies to automatically discover the relationship between artifacts. This workbench additionally supports evaluation of generated links against a gold standard as well as visualization of trace experiments for optimal trace calibration. OpenTrace also provides a process for packaging a complete trace experiment with the tool, configuration and analysed data for easy remote download and installation, facilitating the reproduction of traceability results.

2. Design

OpenTrace consists of a collection of sophisticated GATE pipelines. These pipelines are customizable and extendible because they are component based. They include standard off-the-shelf components as well as custom-build traceability ones that can be sequentially assembled and configured.

Resetter	Document Reset PR
Tokeniser	ANNIE English Tokeniser
Splitter	ANNIE Sentence Splitter
Linguistic	ANNIE POS Tagger
Stopword	ANNIE Gazetteer
Morpher	GATE Morphological analyser
Recogniser	Artifact Recogniser
Purifier	Artifact Purifier
Linker	Artifact Linker
Evaluator	Trace Evaluator
Reporter	Trace Visualizer

Trace generator Pipeline

Benchmark evaluation Pipeline