Dataset of developer–labeled commit messages for task classification validation

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Summary

Current research on change classification centers around automated and semi–automated approaches which are based on evaluation by either the researchers themselves or external experts. In most cases, the persons evaluating the effectiveness of the classification schemes are not the authors of the original changes and therefore can only make assumptions about the intent of the changes. To support validation of existing labeling mechanisms and to provide a training set for future approaches, we present a survey of source code changes that were labeled by their original authors. Seven developers from six different project applied three existing classification schemes from current literature to enrich their own changes with meta–information, so the intent of the changes becomes more evident. The final data set consists of 967 classified changes and is available as an SQLite database as part of the MSR data set.

Step 1: Selection of Developers and Projects

Step 2: Assembly of commit data and creation of survey forms

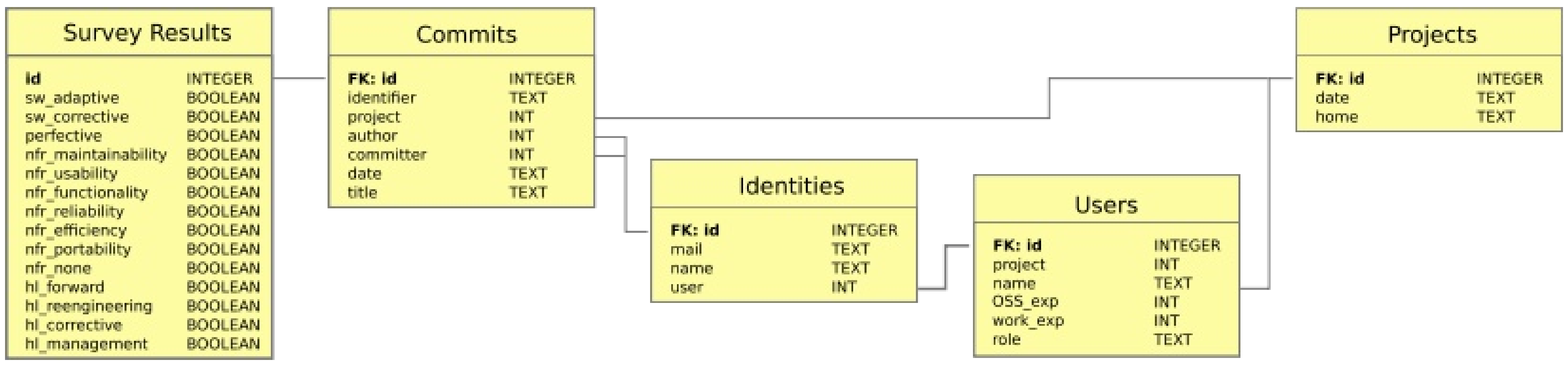
Step 3: Providing instructions and guidance

Step 4: Aggregation of the data into a single data source

Projects	Description	LOCs	Developers	Role	Classified Commits
Vala	A source to source compiler used by GNOME. » http://www.vala-project.org	236.071	Luca Bruno Evan Nemerson	**Maintainer** **Maintainer**	116 194
Valadoc	The documentation generator for Vala. » http://www.valadoc.org	50.709	Florian Brosch	**Maintainer**	200
Drupal Search API	A framework for creating searches on any entity known to Drupal, using any kind of search engine. » https://www.drupal.org/project/search_api	21.696	Thomas Seidl	**Maintainer**	118
TapiJI	A set of smart tools that integrate into the Eclipse IDE for Java developers with the goal to reduce effort of Internationalization. » http://code.google.com/a/eclipselabs.org/p/tapiji/	19.611	Martin Reiterer	**Architect**	123
MyLyn	Task and application lifecycle management framework for Eclipse. » http://eclipse.org/mylyn/	76.464	Kilian Matt	**Developer**	81
DeltaSpike	A number of portable CDI extensions that provide useful features for Java application developers. » http://deltaspike.apache.org/	35.202	Mark Struberg	**Architect**	135
					Total: 967

Data Assembly

SubCat, a tool for automated repository analysis, was used to extract and transform the raw data from the various open source projects into an SQLite database. The survey forms for the participants of the study were exported from this database which has been stripped of all entities and attributes not relevant for the survey. The returned survey forms could be easily reimported into the database into a seperate table that now contains the survey results.



Survey Results	
id	INTEGER
sw_adaptive	BOOLEAN
sw_corrective	BOOLEAN
perfective	BOOLEAN
nfr_maintainability	BOOLEAN
nfr_usability	BOOLEAN
nfr_functionality	BOOLEAN
nfr_reliability	BOOLEAN
nfr_efficiency	BOOLEAN
nfr_portability	BOOLEAN
nfr_none	BOOLEAN
hl_forward	BOOLEAN
hl_reengineering	BOOLEAN
hl_corrective	BOOLEAN
hl_management	BOOLEAN

Commits	
FK: id	INTEGER
identifier	TEXT
project	INT
author	INT
committer	INT
date	TEXT
title	TEXT

Identities	
FK: id	INTEGER
mail	TEXT
name	TEXT
user	INT

Users	
FK: id	INTEGER
project	INT
name	TEXT
OSS_exp	INT
work_exp	INT
role	TEXT

Projects	
FK: id	INTEGER
date	TEXT
home	TEXT

Classification Schemes

Swanson's Maintenance Tasks

A customized classification scheme based on Swanson's maintenance tasks that fits the open source development life cycle.

- Corrective Tasks
- Adaptive Tasks
- Perfective Tasks

NFR Labeling

A classification schema based on non-functional requirements (NFR) a commit addresses. It is based on the ISO9126 quality model and was proposed by Hindle et al.

- Functionality
- Reliability
- Usability
- Efficiency
- Maintainability
- Portability

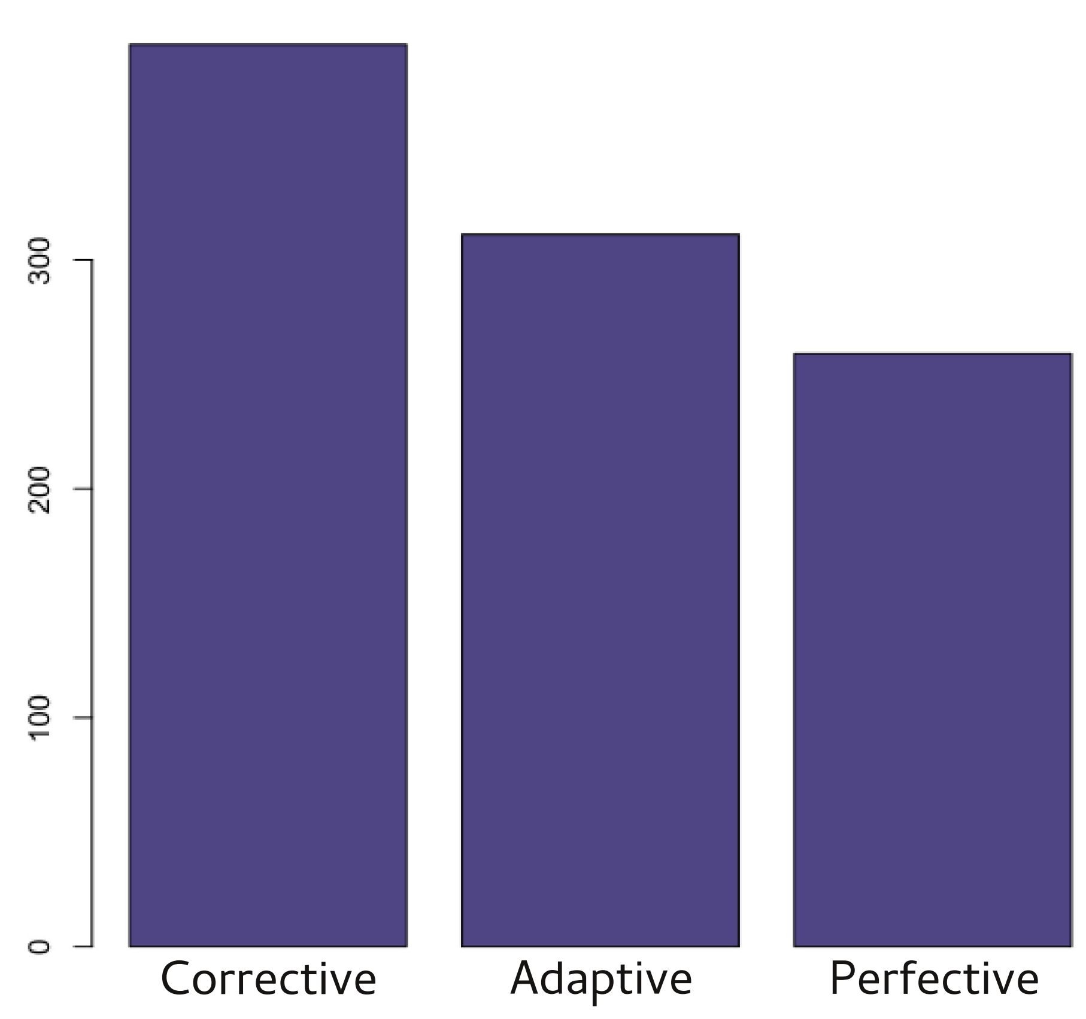
Software Evolution Tasks

A classification schema based on activities during software evolution in open source projects, as defined by Hattori and Lanza.

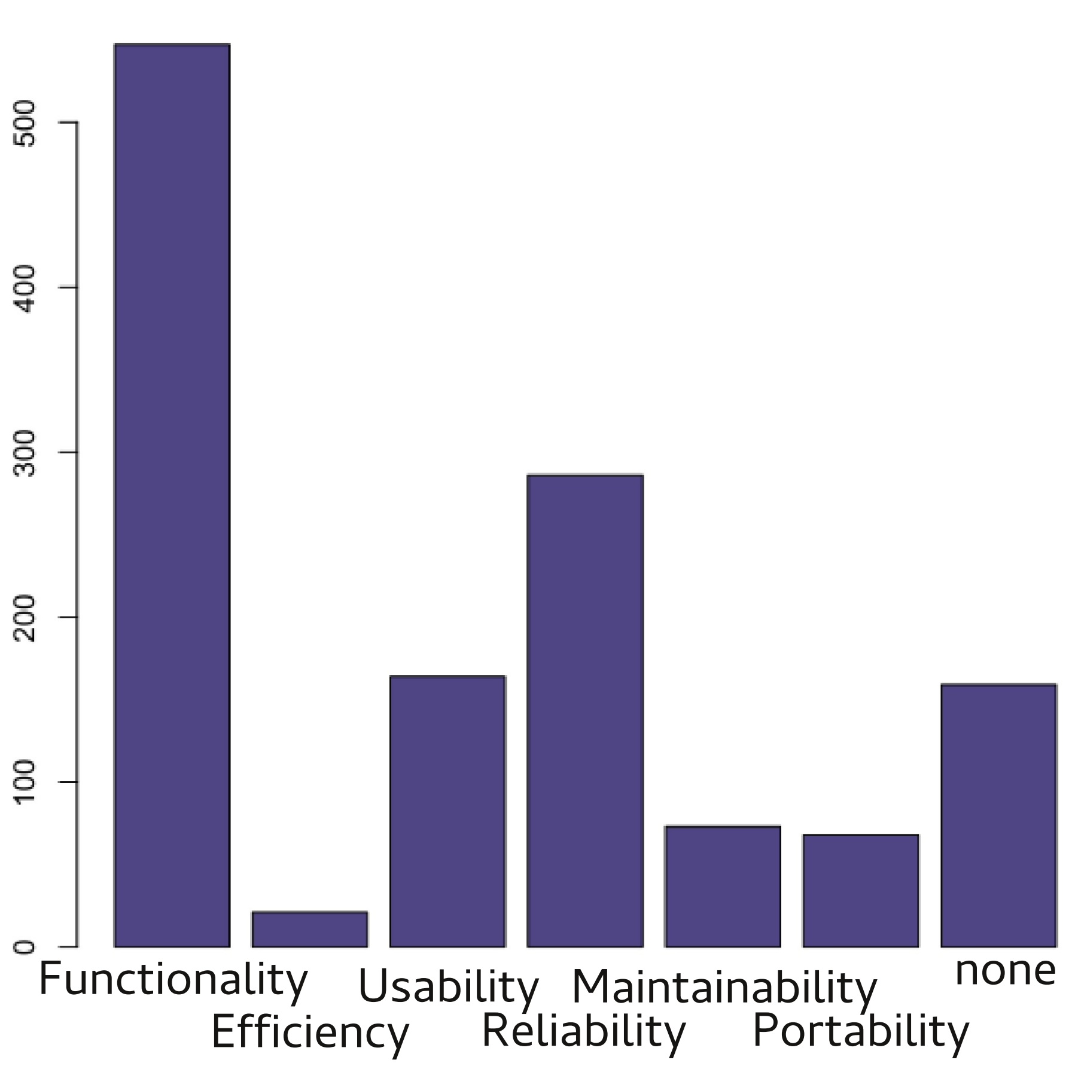
- Forward Engineering
- Re-Engineering
- Corrective Engineering
- Management

Classification Overview

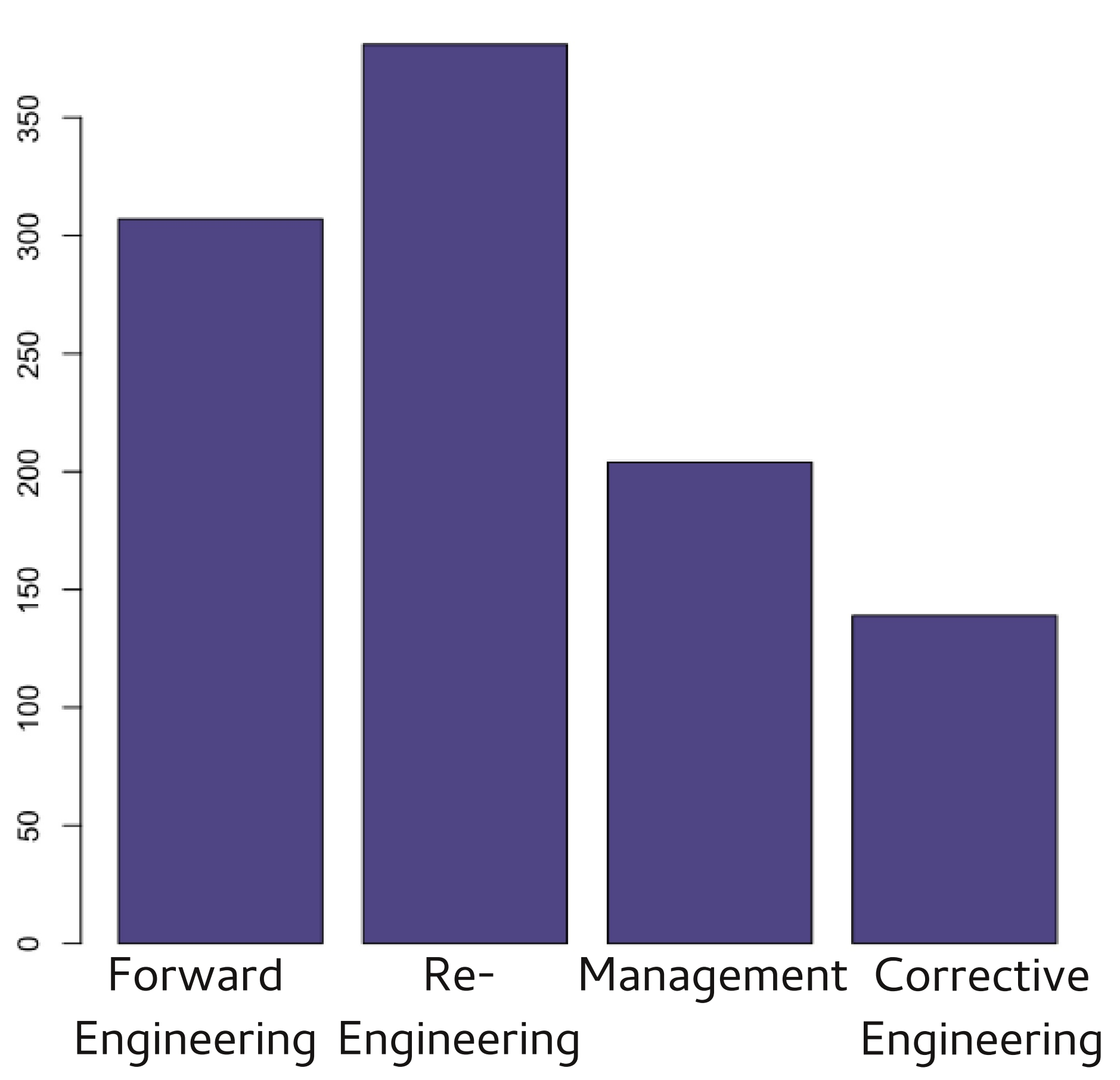
Swanson's Maintenance Tasks



NFR Labeling



Software Evolution Tasks


Forward Engineering
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