Real-time management of code clones in an IDE environment

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Contents

1 Introduction

Refactoring is the process of restructuring code in order to improve the internal behavior of the code, without changing the external behavior.[1]

Code clones are a problem ...

Many tools exist which ...

2 Background

2.1 Software quality

2.1.1 Bad smells

2.1.2 Software quality metrics

2.1.3 How refactoring affects software quality

2.1.4 Duplicated code

Write about what duplicated code is, how it affects software and some statistics on duplicated code (need reference)

2.2 Code clones

2.2.1 Code clone types

Code clones are generally classified into four types.[2] These types classify code snippets as code clones with an increasing amount of leniency. Therefore Type-1 code clones are very similar, while Type-4 clones are not necessarily similar at all. However, all code clones do still have the same functionality, it is the syntactic and structual differences which distinguish the types. The set of code clones classified by a code clone type is also a subset of the next type, meaning all type-1 clones

are also type-2 clones, but not vice versa.

The code clone types are defined as follows:

Type-1 clones are syntactically identical. The only differences allowed are elements without meaning, like comments and white-space.

Type-2 clones are structurally identical. Possible differences include identifiers, literals and types.

Type-3 clones are structurally similar, but not equal. Differences include statements which are added, removed or modified. For this clone type one needs to determine a threshold θ which determines how structurally different snippets can be to be considered Type-3[2].

2.3 Code clone detection

2.4 Code clone management

3 The way forward

References

[1] Martin Fowler. *Refactoring - Improving the Design of Existing Code.* Addison Wesley object technology series. Addison-Wesley, 1999.

[2] Katsuro Inoue. *Introduction to Code Clone Analysis*, pages 3–27. Springer Singapore, Singapore, 2021.