**SQUAD: Software Quality Understanding through the Analysis of Design**

**Foutse Khomh and Yann-Gaël Guéhéneuc**

**Motivation**
Understanding the impact of the design on the quality of systems

**Problem**
Building quality models that take into account explicitly the design of systems

**Solution**
Study the relations between design patterns, design defects, code smells and changes, issues and Bugs

Data extraction with the framework IBDOOS
- Extracting change data of systems from CVS and SVN.
- Extracting issues and bugs data of systems from Bugzilla and others

Building models for the prediction of quality, change, issues, and bug proneness
- Building models to predict design defects on the basis of metrics
- Building models to predict changes, issues and bug-proneness using Information on metrics, design patterns, design defects and code smells

**OCEAN: Software Change and Evolution ANalysis**

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**Motivation**
Software repositories such as versioning systems are used to help manage the progress of software projects. Analyzing these repositories can help to support predictions about software development, and to plan various evolutionary aspects of software projects.

**Problem**
The complexity and the amount of data requires the use of efficient techniques for version comparisons.

**Solution**
We propose a metaphor of homology to study the evolution of a program.

Software Evolution Analysis
- Version 1: PADL Parser and CLAN
- Version 2: Simplex and Chinese Postman
- Version 1: String Builder
- Version 2: String Builder
- Step 1: PADL Parser and CLAN
- Step 2: Simplex and Chinese Postman
- Step 3: String Builder
- Step 4: Versions Alignment

Homologous DNA Analysis
- Step 1: Blood Extraction
- Step 2: Genomic DNA isolation from blood
- Step 3: DNA Sequences Encoding
- Step 4: DNA Alignment

DNA1: ACTGCATGCAGCTGCTACCTTCAATGAT
DNA2: ACT CAGTCTAGCTCTCAT

A in B in D dm B in E co B in C dm F ag A
A in B in D dm B in E co B in C dm G cr C dm G cr D dm G cr E dm G as F ag A
A in B in D dm B in E co B in C dm G cr C dm G cr D dm G cr E dm G as F ag A
A in B in D dm B in E co B in C dm G cr C dm G cr D dm G cr E dm G as F ag A