Supporting Feature-Level Software Maintenance

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Feature Location

Impact Analysis

Feature Location Techniques



Research Goals

- Feature Location
 - What sources of information should be used to most effectively perform feature location?
 - What is the best way to combine those sources of information?
- Feature-Level Impact Analysis
 - Develop and evaluate feature coupling metrics

Coupling Metrics

Coupling Dimension	Structural	Dynamic	Textual	Hybrid	Historical
Class					
Feature	NEWF		NEWF	NEW	

Metrics

- Structural Feature Coupling (SFC)
 - Measure of code shared by two features
 - Variant that considers 1st order dependencies
- Textual Feature Coupling (TFC)
 - Average similarity of the text of two features source code using LSI
 - Variant that considers max similarity
- Hybrid Feature Coupling (*HFC*)
 - Combines *SFC* and *TFC* using affine transformation

Evaluation



Using coupling for impact analysis



F1 is coupled to F2 and F4. Coupling Threshold 0.5

	Bug A	Bug B	Bug C	Bug D
F1	Х	Х		
F2		Х		
F3			Х	Х
F 4			Х	

F1 and F2 have Bug B in common.

Evaluation - Impact Analysis



Contributions

- Aide programmers doing feature-level software maintenance
 - Identify the most efficient approach for locating a feature's relevant code
 - Determine other coupled features
 - Reduce time and effort spent on maintenance
 - Facilitate development of higher quality software