An Evaluation of the MOOD Set of Object-Oriented Software Metrics

Harrison, Counsell and Nithi
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Coupling Factor

\[ CF = \frac{\sum_{i=1}^{TC} \sum_{j=1}^{TC} is\_client(c_i, c_j)}{TC^2 - TC} \]

Model for CF?

- What would be a good abstraction?
- Is there a well-understood Empirical Relationship?
- Scale Type?

Polymorphism Factor

Let \( M_o(C_i) \) be the number of overriding methods in class \( i \).
Let \( M_n(C_i) \) be the number of new methods in class \( i \).

Let \( DC(C_i) \) be the number of descendants of class \( i \).

\[ PF = \frac{\sum_{i=1}^{TC} M_o(C_i)}{\sum_{i=1}^{TC} [M_n(C_i) \times DC(C_i) \times DC(C_i)]} \]

Model for PF?

- What would be a good abstraction?
- Is there a well-understood Empirical Relationship?
- Scale Type?

Criteria for Valid Metrics

- 1. Must allow different entities to be distinguished
- 2. Must obey representation condition
- 3. Each unit of attribute contributing to a valid metric is equivalent
- 4. Different entities can have the same attribute value
**types of measurement**
- direct
  - does not depend on other measures
- indirect
  - involves one or more other measures
  - e.g. density

**Criteria for Indirect Metrics**
- 1. Explicitly defined model
- 2. Model must be dimensionally consistent
- 3. No unexpected discontinuities
- 4. Units and scale types must be correct

**Encapsulation**
- MHF - Method Hiding Factor
- AHF - Attribute Hiding Factor
- Proposed as “measures of encapsulation”
- Earlier as measures of “the use of information hiding concept”

**Terms**
- Data encapsulation - “power of the a language to hide implementation detail …, the separation of interface from implementation, the use of opaque types”
- Information Hiding - “the visibility of methods and/or attributes to other code”

**Question**
- Why do the authors have the encapsulation vs information hiding vs visibility discussion?

**Visibility - review**
- $\text{Is\_visible}(M,C)$
  - 1 iff class C may call method M and M is in another class
  - 0 otherwise
- $V(M) = \text{sum of Is\_visible for method M over all classes divided by number of other classes}$
  - percentage of other classes that can call this method
### MHF definition

- Summation over all methods in all classes of 1 minus the V(M) divided by the total number of methods
- Our formula from the abstraction?

### Theoretical Validation

- According to the authors, is the MHF measure theoretically validated?
- Would I agree? Why or why not?

### Validation

- What about the other metrics?