SDMETRICS: THE OO DESIGN QUALITY MEASUREMENT TOOL FOR UML

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ABSTRACT

This paper gives an overview of SDMetrics, a software metric tool that accepts UML models in XMI format.

Keywords: SDMetrics, UML, XMI, Object-Oriented, Design Quality

1. INTRODUCTION

Jurgen Wust developed the SDMetrics, at the Fraunhofer Institute for Experimental Software Engineering, Kaiserslautern, Germany and was first released in December 2002 and recently its current version was released SDMetrics V2.3 on 19-Mar-2012.

It is embarked as a vision to quantitatively measure the oo design attributes such as like design size, coupling, and complexity of various UML models.

2. FEATURES OF SDMETRICS

SDMetrics analyzes the structure of UML models, stored in XMI format. UML design measurement also helps to identify opportunities for design refactoring, and supports effort estimation, project planning and monitoring. SDMetrics features a comprehensive suite of object-oriented design quality metrics covering all nine UML diagrams.
Interoperability with UML tools: Every XMI export UML modeling tools is interoperable SDMetrics.

Data export: Measurement and Statistical data are exported via SDMetrics.

Interactive GUI: The use of graphical user interface, by this tool makes its user-friendly with the measurement data.

Supported Platforms: Platforms supporting Java 6 runtime environment (Windows XP/Vista/7, UNIX and Linux), can easily run this tool.

3. RELATED WORK

Several commercial as well as open-source OO metric tools exist today. Prominent commercial ones include –

Java Metrics which is a comprehensive Java measurement tool.

PCMetric is a tool for Code-cyclomatic complexity & Halstead measures.

Various metrics on source codes in different languages can be computed by TCC.

MetricONE can calculate four categories of namely class, package, operation and usecase.

Open source tools include Jmetric and MOODKit metrics.

Unlike any of these tools, however, SDMetrics computes metrics on source code as well as XMI files based on nine UML diagrams.

4. SUPPORTED METRICS

Metrics implemented in SDMetrics include design as well as implementation level coupling, cohesion, size and complexity metrics.

The Table.1 lists some of the metrics supported by Use case, Component & Activity diagrams of UML as follows:
Table 1

<table>
<thead>
<tr>
<th>Metric</th>
<th>Diagram</th>
<th>Category</th>
<th>Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Including</td>
<td>Use case</td>
<td>Coupling</td>
<td>Number of use cases which this one includes</td>
</tr>
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<td>Use case</td>
<td>Coupling</td>
<td>Number of use cases which include this one</td>
</tr>
<tr>
<td>NumOps</td>
<td>Component</td>
<td>Size</td>
<td>Number of operations of the component</td>
</tr>
<tr>
<td>NumCls</td>
<td>Component</td>
<td>Size</td>
<td>Number of classes of the component</td>
</tr>
<tr>
<td>Actions</td>
<td>Activity</td>
<td>Size</td>
<td>Number of actions of the activity</td>
</tr>
<tr>
<td>Control Flow</td>
<td>Activity</td>
<td>Complexity</td>
<td>Number of control flows of the activity</td>
</tr>
</tbody>
</table>

5. HOW SDMETRICS WORKS

SDMetrics works on XMI file generated from a UML case tool for extracting the information related to metrics (such as attributes of a class, methods and their parameters, etc.) and are then stored in a metric repository, where in higher-level metrics such as coupling, cohesion and complexity metrics are computed.

The flow of processing that goes on inside SDMetrics is depicted in the diagram below (Fig.1)
6. Tool Availability

The tool, along with user guide and technical documentation, may be freely downloaded from its website www.Sdmetrics.com

7. Demo

The tool demonstration will introduce the features of SDMetrics, how it can be effectively used for UML design and size measurement.

The features to be demonstrated include the following:

(i) The UML models are parsed in XMI format.
(ii) The metric results can be viewed in both (tabular and Graphical) formats.
(iii) The metric results are exported in various formats.
(iv) Extending the tool with new metrics.
8. CONCLUSIONS

Since, metrics play a vital role in the field of software development, therefore measuring the software has become a crucial task. The importance and existence of various software metric tools essentially insists the correct estimation of the software in terms of its various attributes like quality, size, complexity, etc. SDMetrics tends to be a very reliable and supportive tool for the software engineers in assessing the quantitative aspects of the software designs based on UML.

9. Future Work

SDMetrics aims towards the structural properties of UML diagrams, and also aids in measuring all the design attributes of the UML diagrams. This tool seems to be a boom to the software practitioners for comparing the various attributes of the UML designs. Thus, SDMetrics the OO design and quality measurement tool for UML is future proof.

10. References

6. www.omg.org