Complexity Analysis and Visualization Tool

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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DECLARATION

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Sri Lanka Institute of Information Technology or to any other institution for assessment for any other purpose.

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ABSTRACT

Complexity Analysis and Visualization Tool

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The paper presents an original software metrics tool for measuring complexity which goes beyond the limitations of current tools and measurements. However, standard metrics such as those developed by Chidamber and Kemerer, they focus only on the technical aspects of software development ignoring cognitive perspectives of complexity. This research introduces advanced metrics like including Cyclomatic Complexity measure, Cognitive Functional Size and Improved CB that incorporate cognitive complexity into the evaluation of software quality. Moreover, the research describes a new tool incorporating traditional, object-oriented and these advanced measures to offer a thorough evaluation methodology. The tool has user friendly interfaces with visualizations and lack of standardization of current practices. In developing this tool and gathered observations from industry experts, including project managers and architects, to understand their needs and expectations when visualizing calculated metrics. This technique is geared towards improving software quality measurement through a more holistic appraisal system for its complexity to help get better decision in maintenance or creation processes. This advanced tool aims to explain the existing metrics and their limitations in relation to software complexity from the perspective of cognitive inclusion. In addition, this paper outlines the iterative strategy used in the design and construction of the tool, highlighting the use of the end user's feedback to refine the operations of software developers, project managers. This combination of inputs assists in ensuring that the tool is not just better at estimating complexity but is also better suited to address practical problems associated with the needs of the software development industry.

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