

# Evaluating the effectiveness of the code-map metaphor for code reviews

Student



Marc Etter

**Introduction:** Most developers are familiar with the concepts of code reviews and code metrics. These methods are commonly used to estimate the quality and correctness of code. While code reviews can grant deep levels of insight into the code, they typically require many hours of effort from an expert in the field. On the other hand, computing software code metrics can be done quickly using automated tools.

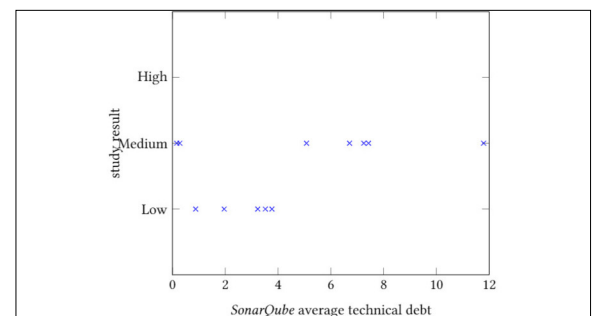
In this paper we evaluate an alternative approach to traditional code reviews and software metrics: By presenting the code in a zoomed-out manner, the focus is shifted to the silhouette of the code. Such a visualization has been named the "code-map metaphor". By using the human brain's innate image processing strengths, a reviewer can quickly find patterns and anomalies in the code. These findings can then suggest where to start with a deeper dive into the actual code, instead of doing so at random. We back our claims with a qualitative study using the tool CodePanorama.

**Result:** Based on the results of our study, the code-map metaphor is a useful tool to quickly assess various attributes of a code base: a rough sense of technical debt, (visual) patterns and anomalies, and a lower bound for complexity. Most importantly, a developer gets an intuitive feeling for the code within only a couple of seconds. Using this intuition, users can then start exploring the code, almost always finding useful information, wherever the code-map metaphor leads them.

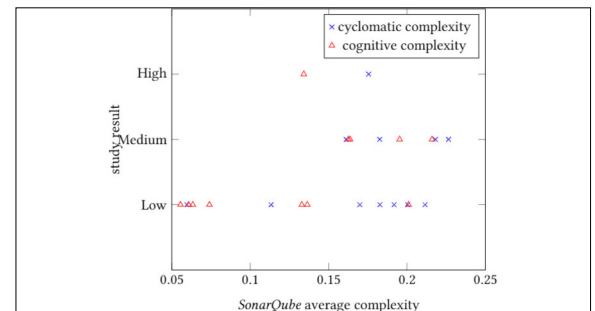
**Conclusion:** The code-map metaphor implemented in a tool like CodePanorama seems to be a promising method in a developer's toolbox. Both in terms of time required and accuracy of statements, the code-map

metaphor sits right in between software metrics and full-blown code reviews. In particular, consulting a code-map can lead to more quickly finding interesting points within the code to review.

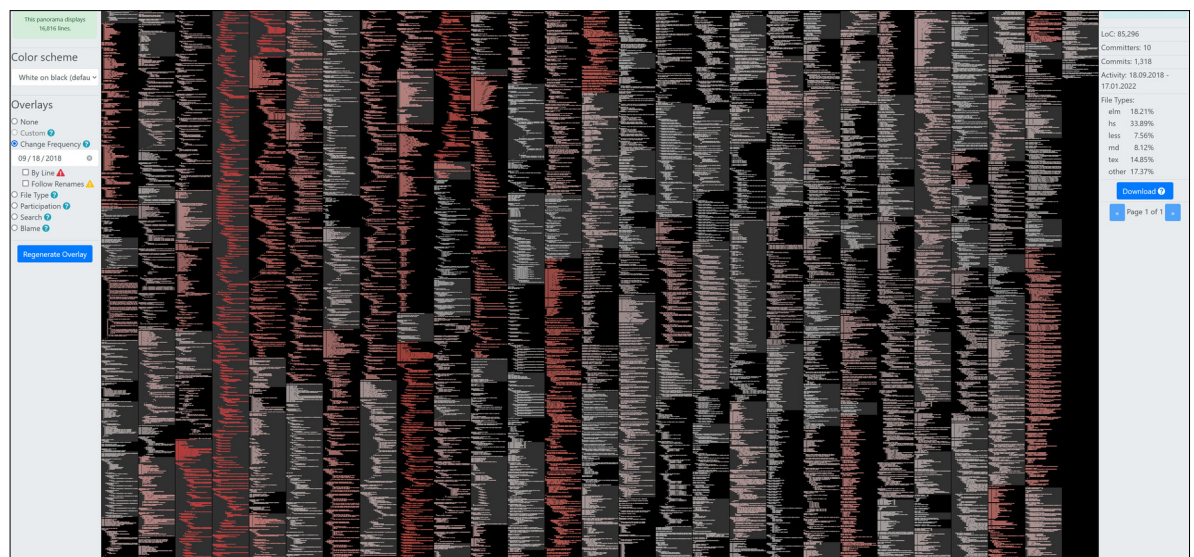
**Correlation of the study result on technical debt with that reported by SonarQube**  
Own presentation



**Correlation of the study result on complexity with that reported by SonarQube**  
Own presentation



**User interface of CodePanorama**  
Own presentation



Examiner  
Prof. Dr. Farhad D. Mehta

Subject Area  
Computer Science

