

Methodology for Assessing the State of the Practice for Domain X

Spencer Smith

McMaster University, Canada

smiths@mcmaster.ca

Jacques Carette

McMaster University, Canada

carette@mcmaster.ca

Olu Owojaiye

McMaster University, Canada

owojaiyo@mcmaster.ca

Peter Michalski

McMaster University, Canada

michap@mcmaster.ca

Ao Dong

McMaster University, Canada

donga9@mcmaster.ca

Abstract

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8.3	Verifiability/Testability [owner —OO]	5
8.4	Validatability [owner —OO]	5
8.5	Reliability [owner —OO]	5
8.6	Robustness [owner —PM]	5

8.7	Performance [owner —PM]	5
8.8	Usability [owner —JC]	5
8.9	Maintainability [owner —PM]	5
8.10	Reusability [owner —PM]	5
8.11	Portability [owner —PM]	5
8.12	Understandability [owner —JC]	5
8.13	Interoperability [owner —AD]	5
8.14	Visibility/Transparency [owner —AD]	5
8.15	Reproducibility [owner —SS]	5
8.16	Productivity [owner —AD]	5
8.17	Sustainability [owner —SS]	5
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1 Introduction

Purpose and scope of the document. [Needs to be filled in. Should reference the overall research proposal, and the “state of the practice” exercise in particular. —SS]

2 Overview of Steps in Assessing Quality of the Domain Software

1. Identify domain. (Provide criteria on a candidate domain.)
- 2.

3 Identify Candidate Software

1. Must be open source.
2. Must have GitHub repository.

4 Domain Analysis

Commonality analysis. Follow as for mesh generator (likely with less detail).

5 Empirical Measures

5.1 Raw Data

Measures that can be extracted from on-line repos.

[Still at brainstorm stage. —AD]

- number of contributors
- number of watches
- number of stars

- number of forks
- number of clones
- number of commits
- number of total/code/document files
- lines of total/logical/comment code
- lines/pages of documents (can pdf be extracted?)
- number of total/open/closed/merged pull requests
- number of total/open/closed issues
- number of total/open/closed issues with assignees

5.2 Processed Data

Metrics that can be calculated from the raw data.

[\[Still at brainstorm stage. —AD\]](#)

- percentage of total/open/closed issues with assignees - Visibility/Transparency
- lines of new code produced per person-day - Productivity
- lines/pages of new documents produced per person-day - Productivity
- number of issues closed per person-day - Productivity
- percentage of comment lines in the code - maintainability [\[Not Ao's qualities —AD\]](#)

5.3 Tool Test - HubListener

[\[This section is currently a note of unorganized contents. Most parts will be removed or relocated. —AD\]](#)

[GitHub repo](#)

The data that HubListener can extract.

Raw:

- Number of Files
- Number of Lines
- Number of Logical Lines
- Number of Comments

Cyclomatic: [Intro](#)

- Cyclomatic Complexity

Halstead: [Intro](#)

- Halstead Effort
- Halstead Bugs
- Halstead Length
- Halstead Difficulty
- Halstead Time
- Halstead Vocabulary
- Halstead Volume

Test results: HubListener works well on the repo of itself, but it did not work well on some other repos.

[\[This citation needs to be deleted later. It's here because my compiler doesn't work with 0 citations —AD\]](#) [Emms \[2019\]](#)

4 Methodology for Assessing the State of the Practice for Domain X

6 User Experiments

Describe experiments with users to assess usability, performance etc.

7 Analytic Hierarchy Process

Describe process. Domain expert review.

8 Quality Specific Measures

- 8.1 **Installability** [owner —OO]
- 8.2 **Correctness** [owner —OO]
- 8.3 **Verifiability/Testability** [owner —OO]
- 8.4 **Validatability** [owner —OO]
- 8.5 **Reliability** [owner —OO]
- 8.6 **Robustness** [owner —PM]
- 8.7 **Performance** [owner —PM]
- 8.8 **Usability** [owner —JC]
- 8.9 **Maintainability** [owner —PM]
- 8.10 **Reusability** [owner —PM]
- 8.11 **Portability** [owner —PM]
- 8.12 **Understandability** [owner —JC]
- 8.13 **Interoperability** [owner —AD]
- 8.14 **Visibility/Transparency** [owner —AD]
- 8.15 **Reproducibility** [owner —SS]
- 8.16 **Productivity** [owner —AD]
- 8.17 **Sustainability** [owner —SS]
- 8.18 **Completeness** [owner —AD]
- 8.19 **Consistency** [owner —AD]
- 8.20 **Modifiability** [owner —JC]
- 8.21 **Traceability** [owner —JC]
- 8.22 **Unambiguity** [owner —SS]
- 8.23 **Verifiability** [owner —SS]
- 8.24 **Abstract** [owner —SS]

9 Using Data to Rank Family Members

Describe AHP process (or similar).

References

Steve Emms. 16 best free linux medical imaging software. <https://www.linuxlinks.com/medicalimaging/>, 2019. [Online; accessed 02-February-2020].