

Methodology for Assessing the State of the Practice for Domain X

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Abstract

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8.2	Correctness [owner —OO]	5
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
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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

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](#)

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

Environment 1:

- Hardware: laptop
- OS: Windows 10
- Node.js version: 12
- npm version: 6
- Does it work: No
- Errors: errors during "npm install" step

Environment 2:

- Hardware: Google Cloud VM
- OS: Ubuntu 18.04

- Node.js version: 8
- npm version: 3
- Does it work: No
- Errors: errors during "npm install" step

Environment 3:

- Hardware: Google Cloud VM
- OS: Ubuntu 18.04
- Node.js version: 8
- npm version: 6
- Does it work: Yes
- Errors: see following tests

Test 1 on environment 3:

- Repo: 3D Slicer [Github repo](#)
- Command line or web app: web app
- Quick Analyze checked: Yes
- Time Consumption: 96s
- Errors/problems: data of total/open/closed issues are missing, data of Cyclomatic and Halstead metrics are missing.

Test 2 on environment 3:

- Repo: 3D Slicer [Github repo](#)
- Command line or web app: web app
- Quick Analyze checked: No
- Time Consumption: 4.3hrs
- Errors/problems: the web app lost response after the analysis

Test 3/4 on environment 3:

- Ao's repo [Github repo](#)
- Command line or web app: web app
- Quick Analyze checked: Yes/No
- Time Consumption: 121s/117s
- Errors/problems: most data are missing

Test 5/6 on environment 3:

- HubListener [Github repo](#)
- Command line or web app: web app
- Quick Analyze checked: Yes/No
- Time Consumption: 49s/131s
- Errors/problems: none

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

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]
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- 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].