SOP Discussion with Domain Expert

State of the Practice for Medical Imaging Software

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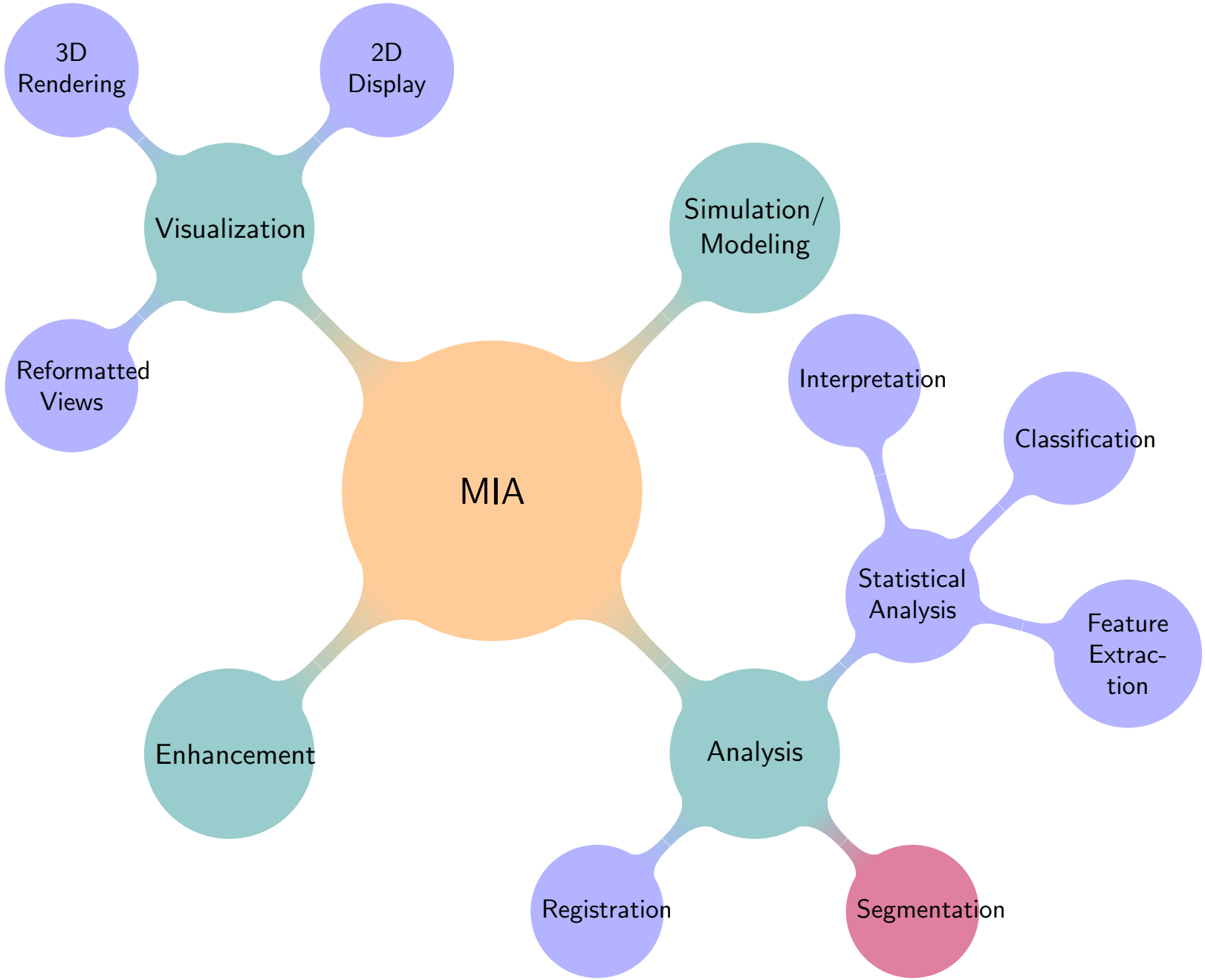
Overview

- Goals
  - Understand the state of the software development practices for medical imaging Software
  - Make recommendations for improvements
  - A publication that is useful to the community
- We have developed a standard methdology for assessing SOP for Domain X
- The methodology requires a **domain expert** to:
  - Vet the preliminary results
  - Assess the feasibility of the recommendations
  - Navigate the publication process
  - Answer **developer** interview questions on pain points
- Today's meeting
  - Informal
  - Questions do not have to be answered in real time, or by domain expert

Scope


3D Rendering
2D Display
Visualization
Reformatted Views
Simulation/ Modeling
MIA
Interpretation
Classification
Statistical Analysis
Feature Extrac- tion
Enhancement
Analysis
Registration
Segmentation

Overall Process

1. *Domain Expert*: Create a top ten list
2. Brief *Domain Expert*
3. Initial list of candidate software packages
4. *Domain Expert*: Vet domain software list
5. Domain Analysis
6. *Domain Expert*: Vet domain analysis
7. Collect empirical measures
8. Measure using measurement template
9. Interview developers
10. Use AHP process to rank the software packages
11. *Domain Expert*: Vet AHP ranking
12. *Domain Expert*: Review recommendations

Vet Software List

- How does our list compare to the domain expert's list?
- Is any software missing?
- Is there software that should be included?
- Any other questions/comments or concerns?

- 3D Slicer
- Ginkgo CADx
- XMedCon
- Weasis
- MRIcroGL
- SMILI
- ImageJ
- Fiji
- DicomBrowser
- 3DimViewer
- Horos
- OsiriX Lite
- dwv
- Drishti
- BioImage Suite Web
- OHIF Viewer
- Slice:Drop
- GATE
- ITK-SNAP
- ParaView
- MatrixUser
- DICOM Viewer
- INVESALIUS 3
- medInria
- dicompyler
- MicroView
- Papaya
- AMIDE
- Gwyddion

Common With Domain Expert List

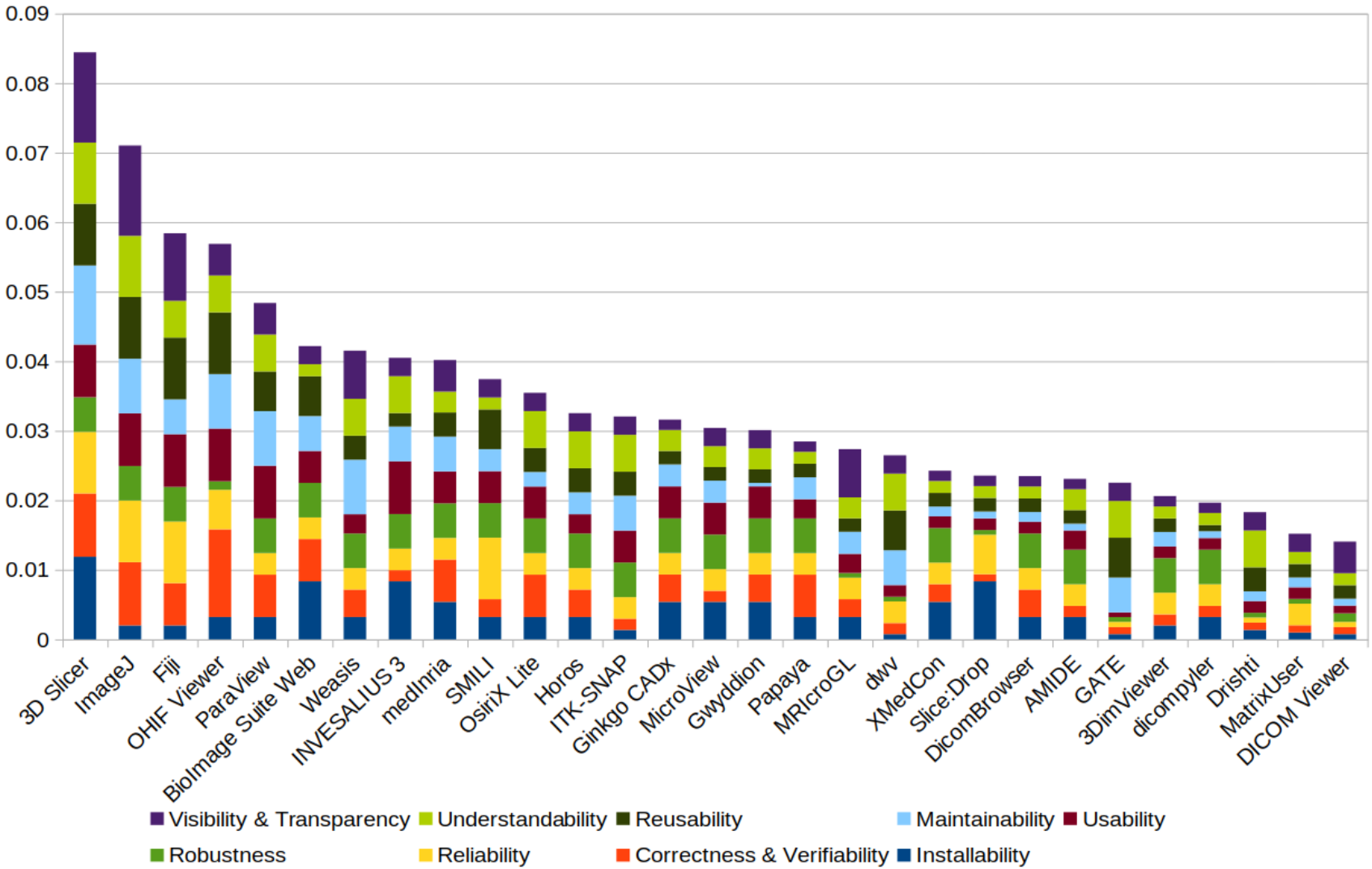
Only on Domain Expert List

Only on SOP List

Summary of Measures

- Empirical measures (number of stars, forks, pull requests, lines of code, etc)
- Measurement template
  - Installability
  - Correctness and verifiability
  - Surface reliability
  - Surface robustness
  - Surface usability
  - Maintainability
  - Surface Understandability
  - Visibility and transparency
- Developer interviews (looking for pain points)
- AHP Process with pairwise comparisons

Thoughts on Overall Ranking?



Ranking Follow-Up

- We would like feedback on the ranking for each of the qualities
- Is it feasible to review all 10 graphs, and the associated write-up?
- Maybe there is a grad student that can review the rankings?

Pain Points from Developer Interviews

Do these fit with your experience?

- Lack of time to implement new features
- Team members lack software development experience
- Lack of funding for software development
- No organizations to help with developing high quality software
- Difficulty to get test data

Recommendations

Do these seem feasible? What other ideas do we have?

- Consult with software development organization
  - Better Scientific Software (BSSw)
  - Software Sustainability Institute
  - Software Carpentry
- Citations for software (Katz project)
- Redefine productivity to include time working on tasks like testing, continuous integration and documentation

Publication

- Who do you see as the targeted readers?
- Where should we publish this paper?