[CoqTP-q*cert-Ocaml-Fortran-SIMPLE] Image Processing Software based Informatics Framework for Electron Microscopy(EM) Images – A Novel Suggestion to interface Fortran with Ocaml in the Context of cryo-EM Image Processing Tasks.

[Exploring Theorem Proving & Ocaml - Fortran Interfacing & Image Processing]

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[I] Inspiration & Introduction :

An Insight into Cryo-EM Imaging Process Architecture Using GENTLE Compiler Construction System with an Informatics Design Paradigm - [Article DOI : 10.5958/0975-8089.2016.00008.7]

Understanding JikesRVM in the Context of Cryo-EM/TEM/SEM Imaging Algorithms and Applications – A General Informatics Introduction from a Software Architecture View Point

[Article DOI: 10.5958/0975-8089.2016.00001.4]

A Technical Note on Hilbert Spaces as Mathematical Tools to Probe and Process Cryo-EM Images – An Architectural and Computational Point of View Using Higher Order Logic (HOL)/Scala/Java/JVM Software Environment

[Article DOI : 10.5958/0975-8089.2016.00016.6]

A Simple Introduction and Short Communication on Higher Order Logic (HOL)-JVM/Jikes RVM-Based Deep Learning Algorithms and Mechanisms to Probe the Frontiers of Cryo-EM Image Processing: Tasks and Big Data-Related Applications

[Article DOI : 10.5958/0975-8089.2018.00021.0]

Formalizing Image Processing in Higher Order Logic(hol) by Understanding and Using XML-Hol-Scala-JVM Software Framework Towards Processing of Cryo-Em/tem/sem Images Based on Levy Processes a Novel Suggestion - [http://vixra.org/abs/1709.0412]

[II] Informatics Framework & Implementation :
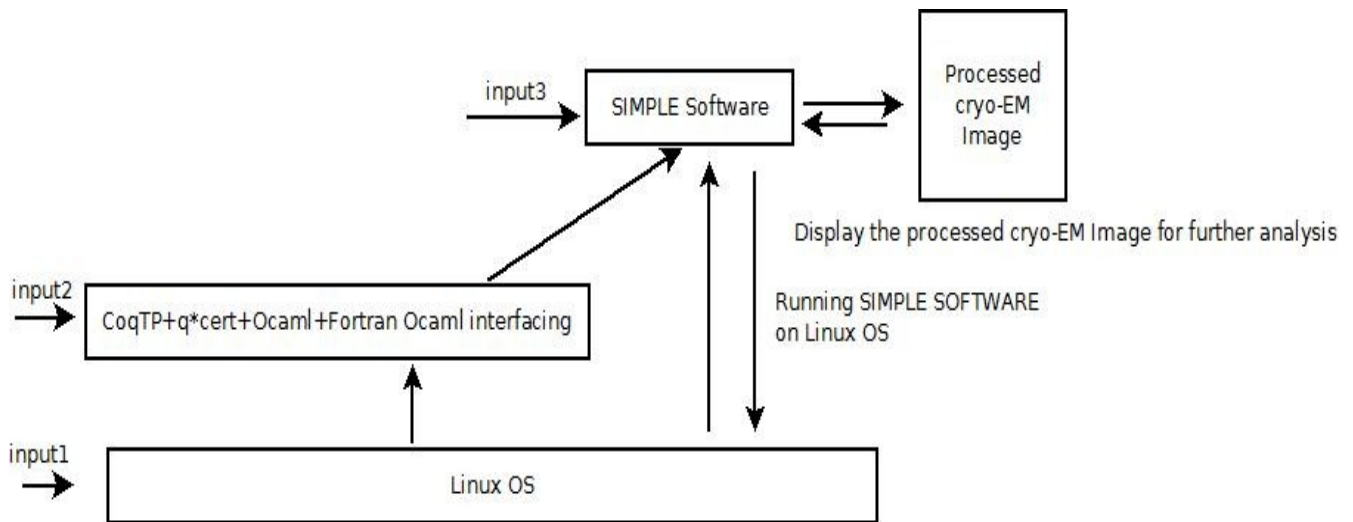
Figure I – Our Simple Idea with [SIMPLE +CTP+q*cert+Ocaml-Fortan] Interfacing Algorithms.

Why Fotran ?

"Fortran isn't a language the many people write new codes in but it still is in extensive use in the scientific communities. Many, many libraries exist for doing numerical calculation that will never be written in C or C++. It is quite possible though to call Fortran routines from OCaml as they are normally compiled into the same object format, with minimal name mangling, as C programs."

[Source : https://ocaml.org/learn/tutorials/calling_fortran_libraries.html]

[III] Information on Mathematics & Software Used/Useful :

[a] http://vixra.org/author/nirmal_tej_kumar

[b] http://vixra.org/author/nirmal

[c] http://vixra.org/author/n_t_kumar

[d] http://vixra.org/author/d_n_t_kumar

[e] *https://arxiv.org/pdf/1803.06714*

[f] *vixra.org/pdf/1709.0389v1.pdf*

[IV] Acknowledgment/s :

[V] Reference/s :

[i] Website: **http://simple.stanford.edu**

- *Current version:* 1.0.0
- *Contact:* via the simple website

  SIMPLE (Single-particle IMage Processing Linux Engine) implements an ab initio reconstruction algorithm tailored to flexible, asymmetrical single-particles. The SIMPLE front-end is developed according to the 'Unix toolkit philosophy'. The object-oriented back-end provides image clustering, ab inito 3D alignment, reconstruction, and refinement algorithms.

- *Support:* *Operating systems*: Unix (Linux, Mac OS X) *Image format support:* SPIDER
- *Cost:* Free/Open Source, GPL
- *Written In*: modern Fortran
- *Primary Publication to Cite:*
    - Elmlund D, Elmlund H (2012). "SIMPLE: software for ab initio reconstruction of flexible single-particles". *submitted*.
- *Additional References:*
    - Elmlund D, Davis R, Elmlund H (July 2010). "Ab initio structure determination from electron microscopic images of single molecules coexisting in different functional states". *Structure* **18** (7): 777–86. doi:10.1016/j.str.2010.06.001. PMID 20637414

[ii] https://physicsworld.com/a/the-rise-and-rise-of-cryogenic-electron-microscopy/

[iii] *https://arxiv.org/pdf/1602.07455*

[iv] Automated theorem proving: mapping logic into AI - ACM Digital Library
https://dl.acm.org/citation.cfm?id=12833

[v] Automated generation of geometric theorems from images of diagrams ...
https://link.springer.com/article/10.1007/s10472-014-9433-7

[vi] http://irafm.osu.cz/en/c51_0/

[vii] https://coq.inria.fr/

THE END.