Exploring IMAGEAI/Quantum Mechanics/IoT/HPC Heterogeneous Computing Environments based on LLVM based Optimized Python to Probe Novel Designs of DICOM+Medical Image Processing R&D Applications.

[LLVM based Optimized Python for Scientific Computing in the Context of Medical Image Processing]

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Abstract :

An Interesting Suggestion involved in Probing & Construction of an LLVM based Specializer in the Context of Medical Image Processing R&D Using [LLVM Compiler Tool Kit + (Python-LLVM) Specializer + (qrng-Python) Library + (IMAGEAI-Python) AI Image Processing Library] towards Design & Development of a Novel DICOM Medical Image Processing Informatics Software Framework.

Key Words/Index Words : LLVM/Python/Specializer/AI//ML/ImageAI/qrng-pyton lib/DICOM/ Medical Imaging *Quantum Mechanics/*IoT/HPC.

[I] Inspiration With R&D Introduction :

" Let's Write an LLVM Specializer for Python! " - Stephen Diehl

LLVM Optimized Python

" The full source for this project is available on Github and comes in at 1000 lines for the whole specializer, very tiny! "

"Python is great for rapid development and high-level thinking, but is slow due to too many level of indirection, hashmap lookups, broken parallelism,slow garbage collector, and boxed PyObject types. With LLVM we can keep writing high-level code and not sacrifice performance. "

IMAGEAI is a remarkable Python based AI Library for Wonderful Applications.
Global reach, case studies and future versions of ImageAI - Moses Olafenwa

qRNG is a python package that generates truly random numbers via quantum mechanics. It does this by using IBM's **QISKit** API to communicate with any one of their 3 publicly accessible quantum computers.

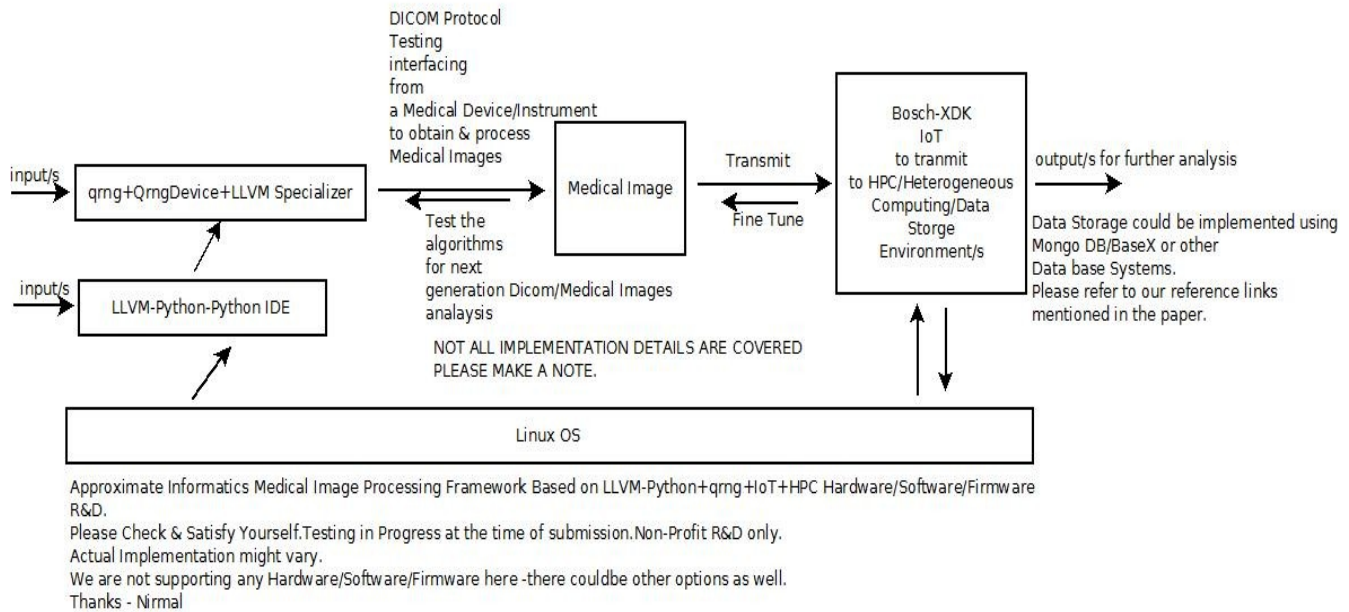**LLVM** is the engine that drives our effort. It is a modern compiler framework and intermediate representation language together with **toolchain** for manipulating and optimizing this language.

http://dev.stephendiehl.com/cfa/slides.pdf – **Very much useful.**

[***Please Check all the references mentioned in this Short Communication. Not all details are presented in this paper – Please Read & Understand. Thanks]

[II] R&D Informatics Framework – DICOM Standards & Medical Imaging Applications :
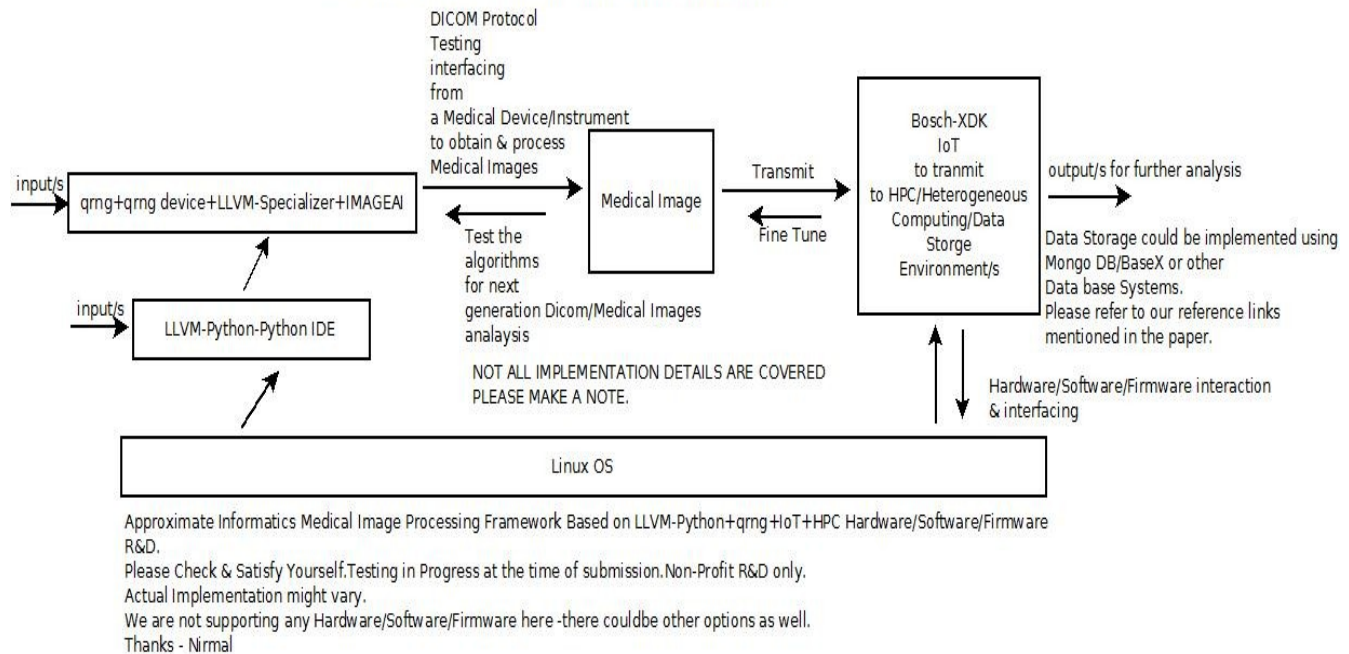
TOTAL OVERVIEW OF THE R&D MENTIONED IN THE SHORT TECHNICAL NOTE - NEXT GENERATION HETEROGENEOUS MEDICAL IMAGING PLATFORM

DICOM Protocol
Testing
interfacing
from
a Medical Device/Instrument
to obtain & process
Medical Images

input/s → qrng+QrngDevice+LLVM Specializer

input/s → LLVM-Python-Python IDE

Test the
algorithms
for next
generation Dicom/Medical Images
analaysis

NOT ALL IMPLEMENTATION DETAILS ARE COVERED
PLEASE MAKE A NOTE.

Medical Image

Transmit
Fine Tune

Bosch-XDK
IoT
to tranmit
to HPC/Heterogeneous
Computing/Data
Storge
Environment/s

output/s for further analysis

Data Storage could be implemented using
Mongo DB/BaseX or other
Data base Systems.
Please refer to our reference links
mentioned in the paper.

Linux OS

Approximate Informatics Medical Image Processing Framework Based on LLVM-Python+qrng+IoT+HPC Hardware/Software/Firmware R&D.
Please Check & Satisfy Yourself.Testing in Progress at the time of submission.Non-Profit R&D only.
Actual Implementation might vary.
We are not supporting any Hardware/Software/Firmware here -there couldbe other options as well.
Thanks - Nirmal

[Figure I – Simple Suggestion & Short Technical Note on LLVM-Python Informatics System for IoT/HPC Applications to Probe Medical Image Processing R&D]

TOTAL OVERVIEW OF THE R&D MENTIONED IN THE SHORT TECHNICAL NOTE - NEXT GENERATION HETEROGENEOUS MEDICAL IMAGING PLATFORM
WITH IMAGE AI - PYTHON LIBRARY FOR ARTIFICIAL INTELLIGENCE

DICOM Protocol
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input/s → qrng+qrng device+LLVM-Specializer+IMAGEAI

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Data Storage could be implemented using
Mongo DB/BaseX or other
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Hardware/Software/Firmware interaction
& interfacing

Linux OS

Approximate Informatics Medical Image Processing Framework Based on LLVM-Python+qrng+IoT+HPC Hardware/Software/Firmware R&D.
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Thanks - Nirmal

[Figure II – Simple Suggestion & Short Technical Note on LLVM-Python Informatics System for IMAGEAI/IoT/HPC Applications to Probe Medical Image Processing R&D]

[III] Related Information on Mathematics & Software Used :

[a] https://pypi.org/project/qrng/ -   **IBM Stuff**

[b] http://dev.stephendiehl.com/numpile/ -   **LLVM Stuff**

[c] https://towardsdatascience.com/the-story-and-future-of-imageai-one-year-anniversary-e63c80f527c8 –
                                                             IMAGEAI Stuff

[d] https://www.python.org/shell/ -   **Python Language Stuff**

[e] https://llvm.org -   **LLVM Compiler Tool Kit Stuff**

[f] An **DeepQuest AI** project deepquestai.com.Developed and Maintained by Moses Olafenwa and John Olafenwa, brothers, creators of TorchFusion, Authors of Introduction to Deep Computer Vision and creators of DeepStack AI Server.
                                                          IMAGE AI Stuff

[g] *https://pydicom.github.io › pydicom › stable › getting_started*   **DICOM Stuff**

[h] *https://pydicom.github.io*   **Python DICOM Stuff**

[i] *https://www.quora.com › How-can-I-read-a-DICOM-image-in-Python*

[j] *https://pyscience.wordpress.com › 2014/09/08 › dicom-in-python-importi.*
   Medical Image Analysis with Deep Learning — I - Taposh Dutta-Roy … *https://medium.com › ...*

[IV] My Acknowledgment/s :

Special Thanks to all WHO made this happen in my LIFE. Non-Profit R&D.

[V] Reference/s :

[a] *vixra.org › author › nirmal_tej_kumar*

[b] *vixra.org › author › nirmal*

[c] *https://www.quora.com › Are-there-any-serious-papers-on-viXra*

[d] viXra:1905.0540

[e] viXra:1908.0356

[f] viXra:1908.0301

[g] viXra:1907.0605

[h] viXra:1904.0487

[i] viXra:1812.0454

[j] viXra:1804.0196

[VI] Special Information - Understanding QRNG/QRNG Devices/Quantum Mechanics :

https://www.idquantique.com › Random Number Generation › Products

https://qt.eu › understand › underlying-principles › qrng

https://cran.r-project.org › package=qrng

Designing of quantum random number generator (QRNG) for security ...
ieeexplore.ieee.org › document

https://www.nanalyze.com › 2017/02 › quantum-random-number-generat.

https://qrng.anu.edu.au

https://qrng.physik.hu-berlin.de

https://interestingengineering.com › first-practical-quantum-random-numb.

https://pypi.org › project › qrng

https://arxiv.org › quant-ph – number of papers on arxiv

https://safenetforum.org › quantum-random-number-generator-qrng-chips

https://www.nature.com › npj quantum information › review articles

https://www.quantiki.org › wiki › quantum-random-number-generators

[VII] Conclusion/s With Future R&D Perspectives :

Finally to conclude our Short Communication : on-the-fly specializing compiler could be used in the following Applications.

Computation kernels for MapReduce

Dense linear algebra & Information Processing

Image processing - Medical Image Processing & cryo-EM Image Processing etc.

[THE END]