

Understanding Random Pixels & Random Numbers in the Context of SEM/TEM/AFM/cryo-Electron Microscopy Image Processing – A Promising Technical Insight into the Interesting World of Randomness & Noisy Images in EM Domains Using a Quantum Device & Image J/Eclipse/JikesRVM Computing Environment.

Nirmal Tej Kumar

Current Member : ante Inst,UTD,Dallas,TX,USA.

Independent Consultant : Informatics/Photonics/Nanotechnology.

R&D Collaborator : USA/UK/Israel/BRICS Group of Nations.

email id : tejdnk@gmail.com

Abstract :

A sincere attempt is made to probe EM domains using Randomness & Random Numbers by using a Quantum Device as stated in the above mentioned TITLE of this technical communication. To the best of our knowledge this is indeed a pioneering R&D technical note using a Quantum Device.

index words : cryo-EM/ImageProcessing/Quantum Device/Random Pixels/Randomness.

Introduction to my Inspiration :

“Although random numbers are required in many applications, their generation is often overlooked. As computers are deterministic, they are not capable of producing truly random numbers. A physical source of randomness is required and since quantum physics is intrinsically random, it is natural to exploit it for this purpose. “

Source : <https://www.idquantique.com/random-number-generation/products/quantis-random-number-generator/>

<https://www.idquantique.com/random-number-generation/overview/>

<https://www.imaging-git.com/science/image-processing/pixel-size-sensitivity>

<https://www.nature.com/news/rift-widens-over-structure-of-hiv-s-molecular-anchor-1.14071>

<http://www.kurims.kyoto-u.ac.jp/~kyodo/kokyuroku/contents/pdf/1384-28.pdf>

Informatics & Image Processing Framework :

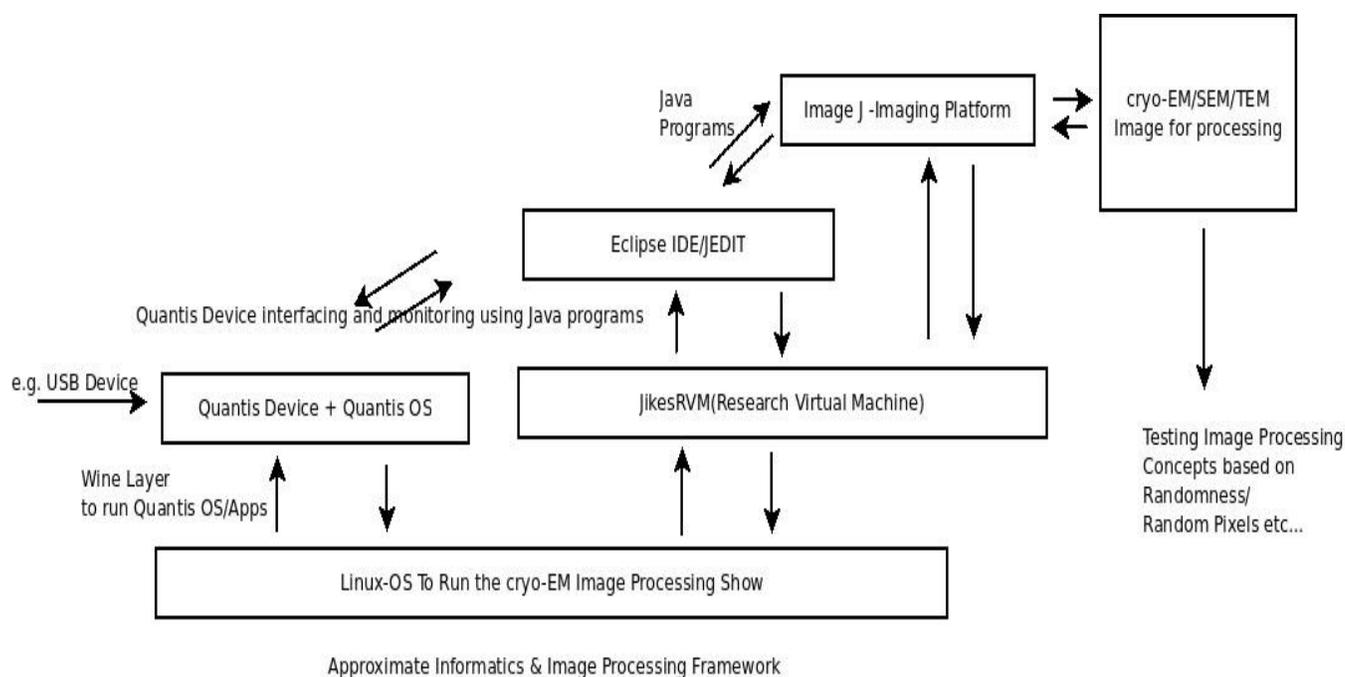


Figure I – Approximate Image Processing Framework to understand Noisy conditions in acquired cryo-EM/SEM/TEM/AFM Images. General Approach applicable to all EM Domains. Actual implementations might vary – Please consult Quantis Device Operating Manual. (USB Quantis Device is from <https://www.idquantique.com/>)

“Quantis Random Number Generator - True random number generator exploiting the randomness of quantum physics”, is our inspiration for an experimental cryo-EM/SEM/TEM/AFM image processing basis. The total communication is based on Refs[1-7] & Figure I.

Concluding Remarks :

An interesting and inspiring technical insight using a novel informatics and image processing is presented. In the context of Ref[7] we need better solutions, hence this simple presentation.

Additional Information on Mathematics & Software Used :

[a] Tej Kumar, Nirmal. (2016). An Insight into Cryo-EM Imaging Process Architecture Using GENTLE Compiler Construction System with an Informatics Design Paradigm. International Journal of Applied Research on Information Technology and Computing. 7. 80. 10.5958/0975-8089.2016.00008.7.

[b] @inproceedings{2017AnII,title={An Insight into Commutative Algebra Based Informatics & Computational Architecture for Cryo-EM Image Processing involving Gröbner Bases Using C++/Java/HOL/Scala/Scalalab/ImageJ Software Environments – A Short Communication on Gröbner Bases With Applications in Signals and Systems Using JikesRVM/JVM},author={}, year={2017}}

Acknowledgement/s :

Thanks to all who helped me both directly and indirectly. Non-Profit Academic R&D Only. No competing financial interests are declared. Only to inspire the novices. Not promoting any commercial product/s in this technical communication. Just discussing the concepts.

References :

[1] <https://math.berkeley.edu/~sethian/2006/Publications/Technical/technical.html>

[2] <https://math.berkeley.edu/~sethian/2006/Applications/ImageProcessing/noiseremoval.html>

[3] <https://www.dyclassroom.com/image-processing-project/how-to-create-a-random-pixel-image-in-java>

[4] Quantum Mechanics & Quantum Signal Processing Framework Based Cryo-EM Image Processing Using Higher Order Logic(HOL)/Haskell/Scala/JikesRVM/IoT Environment - An Innovative & Interesting Approach in the Context of Quantum Computing - <http://vixra.org/abs/1804.0151>

[5] <https://www.idquantique.com/>

[6] Kumar, D.N.T. & Shmavonyan, G.s. (2016). Understanding JikesRVM in the Context of Cryo-EM/TEM/SEM Imaging Algorithms and Applications – A General Informatics Introduction from a Software Architecture View Point. International Journal of Applied Research on Information Technology and Computing. 7. 1. 10.5958/0975-8089.2016.00001.4.

[7] <https://www.nature.com/news/rift-widens-over-structure-of-hiv-s-molecular-anchor-1.14071>