[Python Theorem Provers+Apache-MXNet+Restricted Boltzmann Machine (RBM)/Boltzmann Machines +QRNG/Quantum Device] in the Context of DNA/RNA based Informatics & Bio-Chemical Sensing Networks – An Interesting R&D insight into the World of [DNA/RNA] based Hybrid Machine Learning Informatics Framework/s.

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[I] Inspiration & Introduction :

http://vixra.org/author/nirmal_tej_kumar
http://vixra.org/author/n_t_kumar
http://vixra.org/author/dnt_kumar
http://vixra.org/author/d_n_t_kumar
http://vixra.org/author/nirmal

https://en.wikipedia.org/wiki/DNA_sequencing
https://www.genome.gov/about.../fact.../DNA-Sequencing-Fact-Sheet
https://www.illumina.com/.../sequencing/dna-sequencing.html
https://www.nature.com/scitable/.../dna-sequencing-technologies-690

http://vixra.org/abs/1907.0083 - **"**Revisiting "Nucleic Acids Data Sequencing using Higher Order Logic-A Suggestion of Basic Computational Framework Towards Bio-Sensors and Gene-Chips Design, Implementation and Verification".**Authors:** D.N.T.Kumar"

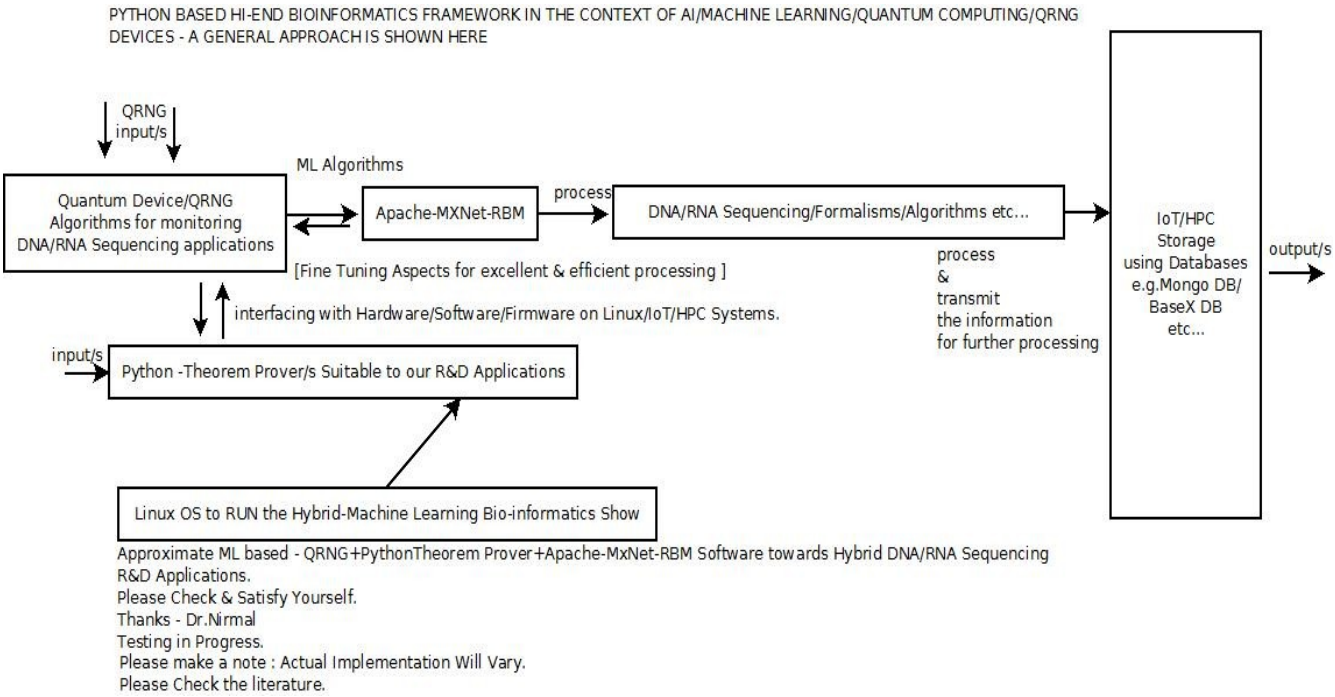
https://pubs.acs.org/doi/abs/10.1021/bi00035a029
https://www.ncbi.nlm.nih.gov/pubmed/18846087 /
https://en.wikipedia.org/wiki/Nucleic_acid_**thermodynamics**
https://www.ncbi.nlm.nih.gov/pubmed/7513557
https://heartbeat.fritz.ai/guide-to-restricted-boltzmann-machines-using- pytorch-ee50d1ed21a8
https://biopython.org/DIST/.../Bio.SeqUtils.MeltingTemp-module.html

http://journaldatabase.info/articles/nucleic_acids_data_sequencing_using.html - **"**Nucleic Acids Data Sequencing using Higher Order Logic-A Suggestion of Basic Computational Framework Towards Bio-Sensors and Gene-Chips Design, Implementation and Verification". **Kumar et al 2012.**

https://www.intechopen.com/.../thermodynamics.../thermodynamics-of- microarray-hybridization
https://academic.oup.com/nar/article/24/22/4501/2385845
https://dasher.wustl.edu/bio5357/readings/annrevbbs-33-415-04.pdf
https://wyss.harvard.edu/technology/toehold-probes/

Lightweight, Portable, Flexible Distributed/Mobile Deep Learning with Dynamic, Mutation-aware Dataflow Dep Scheduler; for Python, R, Julia, Scala, Go, Javascript and more
https://mxnet.apache.org

[II] R&D Informatics Framework Using Python/MXNet/RBM/Boltzmann Machines :



[Figure I – Simple Suggestion for Hi-End Bio-informatics R&D Framework]

"A Boltzmann machine (also called stochastic Hopfield network with hidden units) is a type of stochastic recurrent neural network and Markov random field.[1] Boltzmann machines can be seen as the stochastic, generative counterpart of Hopfield networks. They were one of the first neural networks capable of learning internal representations,[*clarification needed*] and are able to represent and (given sufficient time) solve difficult combinatoric problems."

"They are named after the Boltzmann distribution in statistical mechanics, which is used in their sampling function. That's why they are called "energy based models" (EBM). They were invented in 1985 by Geoffrey Hinton, then a Professor at Carnegie Mellon University, and Terry Sejnowski, then a Professor at Johns Hopkins University."

[**Source :** https://en.wikipedia.org/wiki/Boltzmann_machine]

https://www.semanticscholar.org/...Boltzmann-machines.../ d9020fafd418ec2e592aa71f5b3494d39e9d7554

cocosci.princeton.edu/tom/papers/naturalscenes.pdf

summit.sfu.ca/system/files/iritems1/16836/etd9815_MErbiceanu.pdf

https://github.com/echen/restricted-boltzmann-machines

[III] Acknowledgment/s :

Special Thanks to all my Friends & Mentors. Non-Profit Academic R&D only.
Non-Commercial R&D.

[IV] Useful & Related Information on [Mathematics + Software] Research Tools :

[a] https://github.com/apache/incubator-mxnet/tree/master/example/restricted-boltzmann-machine

[b] https://staff.washington.edu/jon/flip/www/

[c] https://www.stephanboyer.com/.../automated-theorem-proving-in-python

[d] https://arxiv.org/abs/1905.05970

[e] https://github.com/evhub/py**prover**

[f] https://hol-theorem-prover.org/

[g] https://www.semanticscholar.org/...Theorem-Proving-in-Python.../
f2538d286b441cd73be26648dd61439bf099ea2c
[h] https://developer.ibm.com/tutorials/ba-metaprogramming-python/
[i] https://news.ycombinator.com/item?id=4024798
[j] https://en.wikipedia.org/wiki/Automated_theorem_proving

[k] https://en.wikipedia.org/wiki/Restricted_Boltzmann_machine
[l] https://skymind.ai/wiki/**restricted-boltzmann-machine**
[m] https://towardsdatascience.com/deep-learning-meets-physics-**restricted- boltzmann-machines**-part-i-6df5c4918c15

[n] deeplearning.net/tutorial/rbm.html
[o] https://www.cs.toronto.edu/~hinton/csc2535/notes/lec4new.pdf
[p] https://blog.echen.me/.../introduction-to-**restricted-boltzmann-machines**/
[q] https://arxiv.org/abs/1806.07066
[r] https://www.nature.com/articles/s41567-019-0545-1 – **RBM/Quantum Physics.**

[s] https://qrng.physik.hu-berlin.de/
[t] https://www.idquantique.com/

[THE END]