

[rPython+Python+qrng-rlib/QRNG/QRNG Devices/IMAGEAI] Interaction in the Context of Python based Ising Model Graphs - A Simple Suggestion & General Informatics Framework Towards Design+Implementation of IoT/HPC Heterogeneous Environment/s.

[Exploring Large Scale Ising Model Graphs Using (Python+R) Languages for Complex Image Processing & Informatics]

Nirmal Tej Kumar

Independent Consultant : Informatics/Photonics/Nanotechnology/HPC R&D.

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

email id : hmf2014@gmail.com

[I] Inspiration & Introduction :

<https://support.dwavesys.com/en-us/community/posts/3600336228...>

<https://quantumcomputing.stackexchange.com/questions/how-do-you-..>

<https://www.researchgate.net/figure/Chimera-the-graph-of-qubit-interacti..>

[D-wave quantum computing Ising model: A case study for the ...](#)

ieeexplore.ieee.org/document

<https://rajeshrinet.github.io/blog/ising-model>

isingmodelproject.blogspot.com

physics.princeton.edu/~phy209/week5/ising.py.html

<https://blog.rstudio.com/2018/09/12/getting-started-with-deep-learning...>

<http://oops.uni-oldenburg.de/353/1/383.pdf> - *Statistical Mechanical Models for Image Processing*

[Statistical Image Restoration via the Ising Model - Quick2Degrees.com](#)

www.quick2degrees.com/ddata - by M C Kandes.

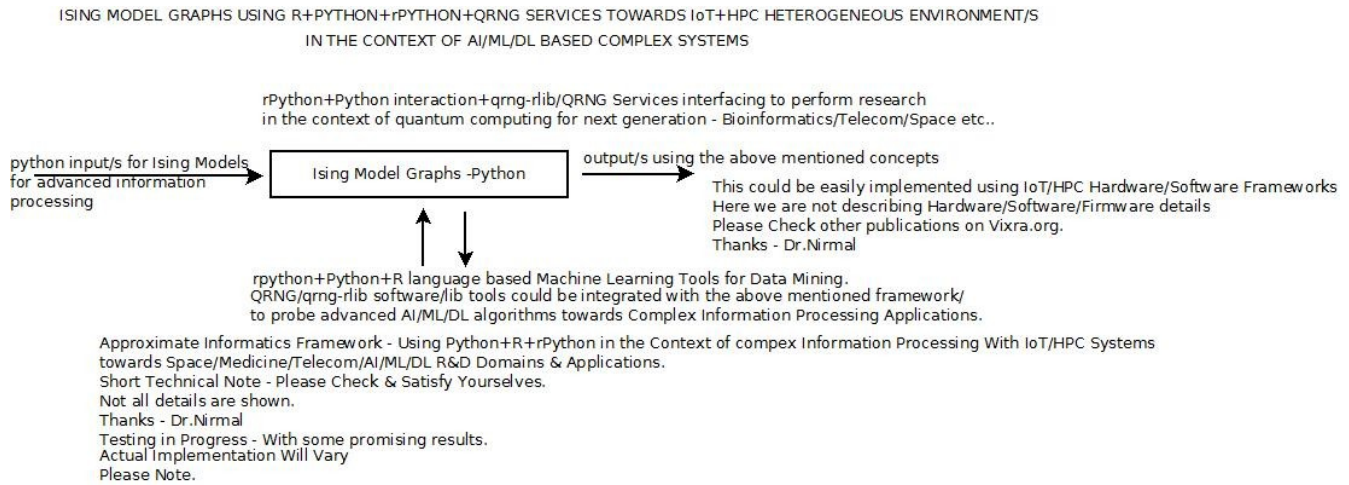
[Optimal structure and parameter learning of Ising models | Science ...](#) - <https://advances.sciencemag.org/content>

by A Y Lokhov - 2018.

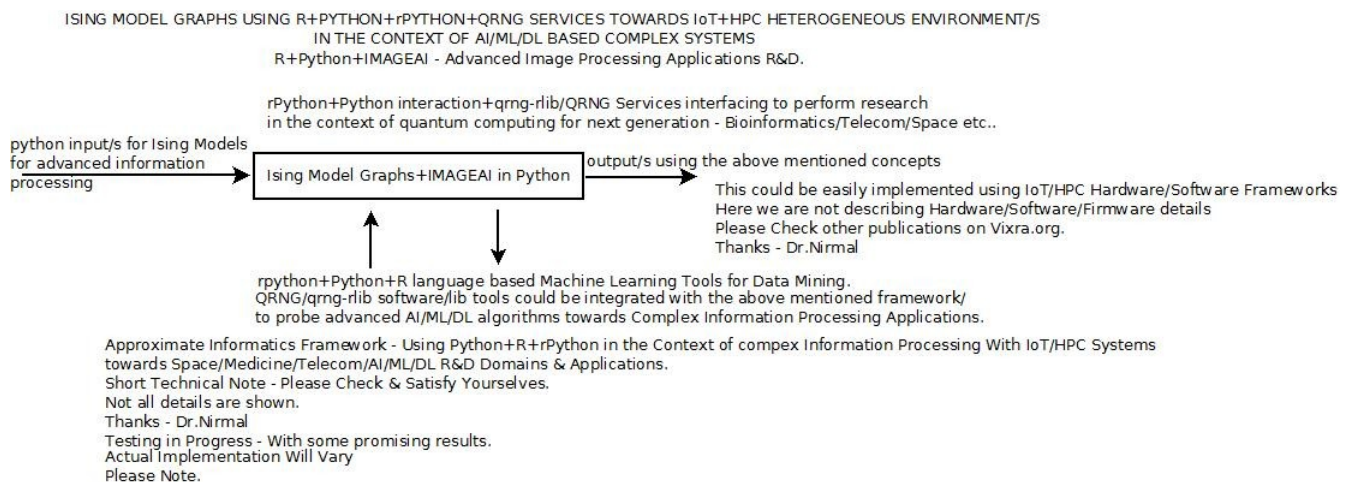
[Inference in Ising Models – arXiv](#) - <https://arxiv.org/pdf>

by B B Bhattacharya - 2015.

[II] R&D Informatics Framework Using Python+R in the Context of Ising Model Graphs :



[Figure I – Approximate Informatics Using Python+R in the Context of Python based Ising Model Graphs]



[Figure II – Approximate Informatics Using Python+R in the Context of Python based Ising Model Graphs /IMAGEAI]

“The Ising model named after the physicist [Ernst Ising](#), is a [mathematical model](#) of [ferromagnetism](#) in [statistical mechanics](#). The model consists of [discrete variables](#) that represent [magnetic dipole moments of atomic spins](#) that can be in one of two states (+1 or -1). The spins are arranged in a graph, usually a [lattice](#), allowing each spin to interact with its neighbors. The model allows the identification of [phase transitions](#), as a simplified model of reality. The two-dimensional [square-lattice Ising model](#) is one of the simplest statistical models to show a [phase transition](#).

The Ising model was invented by the physicist [Wilhelm Lenz\(1920\)](#), who gave it as a problem to his student Ernst Ising. The one-dimensional Ising model has no phase transition and was solved by [Ising \(1925\)](#) himself in his 1924 thesis. The two-dimensional square lattice Ising model is much harder, and was given an analytic description much later, by [Lars Onsager\(1944\)](#). It is usually solved by a [transfer-matrix method](#), although there exist different approaches, more related to [quantum field theory](#). In dimensions greater than four, the phase transition of the Ising model is described by [mean field theory](#). “

[Source : https://en.wikipedia.org/wiki/Ising_model]

[III] Related R&D Information on Mathematics & Software Used :

https://en.wikipedia.org/wiki/Ising_model
www.math.ubc.ca/~andrewr/research/intro.html › [node14](#)
<https://iuuk.mff.cuni.cz/~andrew/Potts>

<https://arxiv.org/pdf>
www2.math.uu.se/~svante/papers

<https://www.frontiersin.org/articles/fphy.2017.00024/full>

<https://advances.sciencemag.org/content>
<https://link.aps.org/doi/10.1103/PhysRevE.96.012132>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5556059>

drops.dagstuhl.de/volltexte/pdf/LIPIcs-APPROX-RANDOM-2017-23
<https://github.com/gavento/graph-ising>
<https://matthierbaum.github.io/ising>

[Learning Planar Ising Models - Journal of Machine Learning Research](#)
www.jmlr.org/papers/volume17

https://www.lanl.gov/projects/dwave/assets/Rogers_00-DWave_Ising
<https://support.dwavesys.com/en-us/community/posts/3600336228..>

[Graph Partitioning using Quantum Annealing on the D-Wave ... - arXiv](#)
<https://arxiv.org/pdf>

<https://rpython.readthedocs.io/latest/getting-started>

<https://pypi.org/project/rpython>
<https://towardsdatascience.com/from-r-vs-python-to-r-and-python-aa25d...>
<https://www.python.org>

<https://www.r-project.org/about>
<https://cran.r-project.org/web/packages/qrng/qrng>
<https://github.com/edzer/qrng>

<https://qrng.physik.hu-berlin.de/download>
<https://rdrr.io/CRAN/qrng>
<https://cognitiveclass.ai/courses/machine-learning-r>

<https://www.analyticsvidhya.com/blog/2016/02/complete-tutorial-lear>
<https://www.kaggle.com/camnugent/introduction-to-machine-learning-i>
<https://lgatto.github.io/IntroMachineLearningWithR/an-introduction-to...>

[IV] Acknowledgment/s :

Special Thanks to all. Non-Profit R&D Only.

[THE END]