A Short Technical Communication on Ising Model as Mathematical Tools to Probe CryoEM /SEM/TEM/Raman Spectroscopy/FTIR Based Images/MRI Pulse Sequences- Using Python – An Interesting Suggestion & Insight into the Promising World of Image Processing Domains.

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Abstract :

A Short Technical Communication on Ising Model as Mathematical Tools to Probe : CryoEM/SEM/TEM/Raman Spectroscopy/FTIR Based Images Using Python – An Interesting Insight into the Promising World of Image Processing.Though we refer to CryoEM Images it is applicable to all the images obtained through SEM/TEM/Raman Spectroscopy/FTIR etc to probe Nano-Bio Machines and their complex Molecular Systems to advance next generation technology, devices and applications.

key words : Refer to the TITLE presented.It explains all.

[I] Introduction & Inspiration :

"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."[Wiki]

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

https://en.wikipedia.org/wiki/Cryogenic_electron_microscopy [Wiki]

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

DOI: 10.5958/0975-8089.2016.00001.4

http://www.quick2degrees.com/ddata/316.pdf – Statistical Image Restoration via the Ising Model

[II] Python Based Informatics Framework Using Ising Model to Process Images :



Approximate Image Processing Frame Work - Ising Models & Computational Platform Based on Python/Linux/HPC

Figure I – Approximate Image Processing Framework For EM Informatics/Data Processing

[III] Conclusions With Future Perspectives :

[IV] Acknowledgment/s :

For Academic R&D only – No competing financial interest/s are declared. Thanks to all who made this happen in my LIFE.

[V] Additional Information on Mathematical Concepts & Software Used :

- [a] http://www.lps.ens.fr/~krzakala/ISINGMODEL.pdf
- [b] http://farside.ph.utexas.edu/teaching/329/lectures/node110.html
- [c] https://nptel.ac.in/courses/115103028/13
- [d] https://rajeshrinet.github.io/blog/2014/ising-model/
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- [g] https://bigtheta.io/2016/02/29/the-ising-model.html
- [h] https://en.wikipedia.org/wiki/Monte_Carlo_method
- [i] http://physics.princeton.edu/~phy209/week5/ising.py.html

[j] http://pages.physics.cornell.edu/~myers/teaching/ComputationalMethods/ComputerExercises/Ising/ Ising.html

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- [l] https://pypi.org/project/gceising/
- [m] https://physics.weber.edu/thermal/isingVPython.html
- [n] http://isingmodelproject.blogspot.com/
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[VI] References :

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- [3] http://vixra.org/author/n_t_kumar
- [4] http://vixra.org/pdf/1710.0021v1.pdf

[5] https://www.journal-hyperion.ro/journal-archive/category/19-volume-9-issue-2-2016? download=42:ising-model-an-analysis-from-opinions-to-neuronal-states

THE END