

# Scala based Image Processing Using Gröbner Bases/Wavelets/Deep Learning – An Insight & Short Technical Notes.

[ Glimpsing into the Future of AI + Interesting Applications ]

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[I] Introduction + Inspiration :

[www.vixra.org/pdf/1709.0389v1.pdf](http://www.vixra.org/pdf/1709.0389v1.pdf) – Grobner Bases and Image Processing.

[www.vixra.org/pdf/1709.0412v1.pdf](http://www.vixra.org/pdf/1709.0412v1.pdf) – Formalizing Image Processing Using HOL.

Gröbner bases and wavelet design – doi:10.1016/j.jsc.2002.06.002 [ J. Lebrun, I. Selesnick/ Journal of Symbolic Computation 37 (2004) 227–259]

[II] Scala based Informatics Framework + R&D Image Processing Algorithms :

[a] Gröbner Bases & Information Processing :

[ Grobner Bases+Wavelets+Deep Learning ] → [ Scala/JikesRVM–Research Virtual Machine/Jam VM/Metascala VM/LLVM ] → [ IoT–Internet of Things/HPC–High Performance Computing/Smart Devices/Akka/CoqTheorem Prover/HOL–Isabelle System ] → Medical Image Processing using the above mentioned Software/Hardware/Firmware Tools.

[ Figure I – Algorithm I ]

[b] Using HOL–Isabelle System :

To verify the correctness we have tested the above idea with HOL–Isabelle System.

[ Grobner Bases+Wavelets+Deep Learning ] → HOL–Isabelle System → verify the Mathematics behind Next Generation Medical Image Processing Platforms.

[ Figure II – Algorithm II ]

[c] Using Coq Theorem Prover System :

To verify the correctness we are testing the above idea with Coq Theorem Prover System.

[ Grobner Bases+Wavelets+Deep Learning ] → Coq TP System → verify the Mathematics behind Next Generation Medical Image Processing Platforms.

[ Figure III – Algorithm III ]

### [III] Additional Reading Materials ((via)) Vixra.org :

[a] [http://www.vixra.org/author/nirmal\\_tej\\_kumar](http://www.vixra.org/author/nirmal_tej_kumar)

[b] [http://www.vixra.org/author/d\\_n\\_t\\_kumar](http://www.vixra.org/author/d_n_t_kumar)

[c] [http://www.vixra.org/author/n\\_t\\_kumar](http://www.vixra.org/author/n_t_kumar)

[d] <http://www.vixra.org/author/nirmal> -> Cryo-EM Image Processing Paper.

[e] <https://www.semanticscholar.org/author/Nirmal-Kumar/12354503/suggest>

### [IV] For Further Reading :

<https://github.com/nightscap/scave> Scave - Scala Wavelets . Scave is a Scala library for Wavelet transform. It started as a port of JWave by Christian Scheiblich.. Features. Transform Algorithms Fast Wavelet Transform Continuous Wavelet Transform and Scale-Based Analysis - ...

<https://www.mathworks.com/help/wavelet/gs/continuous-wavelet-transform...> Continuous **Wavelet** Transform and Scale-Based Analysis Definition of the Continuous **Wavelet** Transform. Like the Fourier transform, the continuous **wavelet** transform (CWT) uses inner products to measure the similarity between a signal and an analyzing function. In the Fourier transform, the analyzing functions are complex exponentials,  $e^{j\omega t}$ . The resulting transform is a function of a single variable,  $\omega$ .

[math - Scala: Haar Wavelet Transform - Stack Overflow](#)

<https://stackoverflow.com/q/41585062> I am trying to implement Haar **Wavelet** Transform in **Scala**. I am using this Python Code for reference Github Link to Python implementation of HWT I am also giving here my **Scala** code version. I am ne...

[The Discrete Wavelet Transform and the Scale Analysis of the ... psc.apl.washington.edu/lindsay/pdf\\_files/Lindsay\\_1996\\_TransGeosRemSens...](#) · PDF file The Discrete **Wavelet** Transform and the Scale Analysis of the Surface Properties of Sea Ice Ronald W. Lindsay, Donald B. Percival, and D. Andrew Rothrock Abstract- The formalism of the one-dimensional discrete **wavelet** transform (DWT) based on Daubechies **wavelet** filters is outlined in terms of finite vectors and matrices. Both the

Published in: Authors: Affiliation: About:

[HashMap in Scala - GeeksforGeeks](#)

[Monads in Scala - GeeksforGeeks](#)

[IEEE Transactions on Geoscience and Remote Sensing · 1996 R W Lindsay · Donald B Percival · D A Rothrock University of Washington Sea surface temperature · Algorithm · Sea ice · Climate change · S-matrix theory · Wa...](#)

[GitHub - wavelets/DeepLearning: Deep Learning \(Python, C/C++, ...](#)

<https://github.com/wavelets/DeepLearning> Deep Learning (Python, C/C++, Java, **Scala**). Contribute to **wavelets/DeepLearning** development by creating an account on **GitHub**.

<https://www.geeksforgeeks.org/hashmap-in-scala> HashMap is a part of **Scala** Collection's. It is used to store element and return a map. A HashMap is a combination of key and value pairs which are stored using a Hash Table data structure. It provides the basic implementation of Map. Below is the example to create HashMap."

**[V] Acknowledgment/s :**

Special Thanks to all WHO made this possible. My Friends+Mentors+Collaborators. Non-Profit R&D.

**[VI] Conclusion/s With Future Perspectives :**

A Simple Algorithm was presented in this Short Technical Notes ((via)) Technically Challenging Ideas.

**[ THE END ]**

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