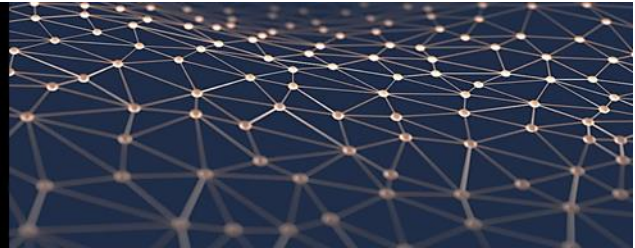




Technology Overview



Iterative CT Image Reconstruction Using Neural Network Optimization Algorithms

OTT # 1639

TECHNOLOGY

Iterative reconstruction methods have attracted more attention in X-ray computed tomography (CT). The availability of large computational capacities, complex 3D CT techniques and the ongoing efforts towards lower doses in CT have made iterative reconstruction a hot topic in AI based analysis in CT systems. Stochastic or model-based iterative reconstruction is able to account for the stochastic nature of the CT imaging process and some artifacts and can provide better image reconstruction quality. It is also, however, computationally expensive. The most acceptable and frequently used technique for reconstructive iteration is coordinate descent which is hard to parallelize, requires longer running time, and is expensive.

The technology developed at UW Milwaukee utilizes some of the neural network training algorithms such as Momentum and Adam for iterative CT image reconstruction. Very positive experimental results indicate that these algorithms provide better results and faster convergence than the basic gradient descent. Additionally, they also provide competitive results to coordinate descent and unlike coordinate descent, they can be implemented in parallel computations, and hence can potentially accelerate iterative reconstruction in practice.

FEATURES AND BENEFITS

- **Fast**- Accelerated iterative reconstruction with better results for high volume data sheets
- **High Performance** - Easy implementation in parallel computation with multiple computational hardware to handle large complex data
- **Adaptable** - Easy workflow integration into ADMM based algorithms such as “Plug-and-Play”
- **Reduced Computation Time** - Faster convergence and competitive results compared to basic gradient descent algorithm

INTELLECTUAL PROPERTY

Provisional Patent Application (PPA) filed March 2019

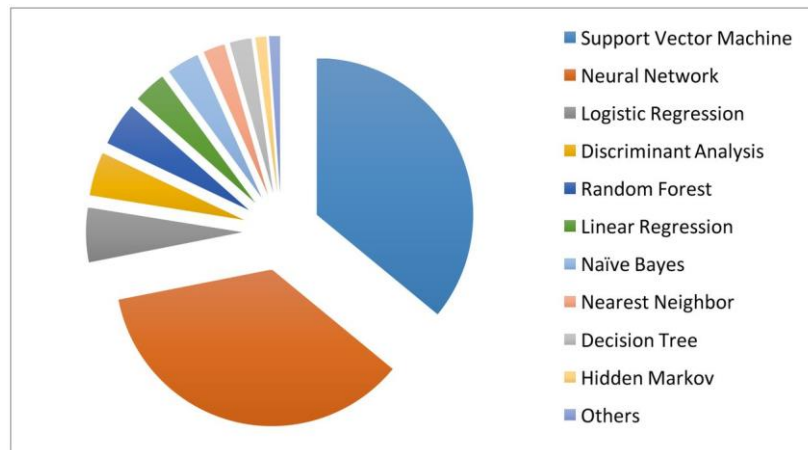
This technology is part of an active and ongoing research program and is seeking partners for further development and testing to demonstrate the acceleration of CT image reconstruction is various other neural network algorithms.

MARKET POTENTIAL

Medical CT Imaging, AI based Medical Software, Algorithm, Physical Science

CURRENT MARKETS

Medical imaging software market is driven by the increasing need for early diagnosis and preventive medicine. AI applications in health care is on the rise. The figure below displays the popularity of supervise AI based learning in healthcare, which clearly shows that SVM and neural network dominate the charts.



(Jiang F et.al, Stroke and Vascular Neurology, 2017)

INVENTOR(S)

Dr. Jun Zhang is a Professor in the Department of Electrical Engineering and Computer Science at University of Wisconsin, Milwaukee. His research interests include image processing and computer vision, signal processing, and digital communications. Dr. Zhang was an Associate Editor of IEEE Transactions on Image Processing during 1994–1998.

For further information please contact:

Smruti Patil, PhD, IPMM
Licensing Associate

UWM Research Foundation
1440 East North Avenue
Milwaukee, WI 53202
Tel: 414-906-4657
Please reference: OTT ID. 1639