**Multi-domain Integrative Swin Transformer network for Sparse-View Tomographic Reconstruction**

* Decreasing projection views to lower X-ray radiation dose usually leads to severe streak artifacts. To improve image quality from sparse-view data, a Multi-Domain Integrative Swin Transformer network (MIST-net) was developed.
* First, MIST-net incorporated lavish domain features from data, residual-data, image, and residual-image using flexible network architectures, where residual-data and residual-image sub-network was considered as data consistency module to eliminate interpolation and reconstruction errors.
* Second, a trainable edge enhancement filter was incorporated to detect and protect image edges.
* Third, a high-quality reconstruction Swin transformer (i.e., Recformer) was designed to capture image global features.
* The experiment results on numerical and real cardiac clinical datasets with 48-views demonstrated that our proposed MIST-net provided better image quality with more small features and sharp edges than other competitors.
* CT became an essential technology to detect and diagnose the COVID-19. Although CT scans provide practical and accurate diagnostic results, they are also increasingly harmful to human bodies with radiation dose.
* The overall of our network architecture consists of three key components: initial recovery, data consistency correction and high-fidelity reconstruction.
* In the initial recovery, a data-extension encoder-decoder block is first employed to extend sparse-view data to full-view projection data by deep interpolation.
* Data consistency module, which consists of two residual sub-networks (one for residual projection estimation, the other for residual image correction), was introduced to reduce errors and improve structural details.
* An encode-decode structure is employed in the initial recovery module to extract deep features in both data and image domains simultaneously.
* Our model was designed and trained in Python using the PyTorch framework. All experiments were run on a PC with 48G NVIDIA RTX A6000 GPU, Intel(R) Xeon(R) Gold 6242R CPU @ 3.10GHz and 128GB RAM.
* This study presented a Multi-Domain Integrative Swin Transformer network (MIST-net) for sparse-view CT reconstruction. Our primary contribution is that we first presented a Multi-Domain Integrative Swin Transformer network (MIST-net) and then it is employed to sparse-view tomographic reconstruction.