

Experimental and Computational Resources for Computed Tomography Research at the University of Helsinki

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Abstract

Computed tomography is an imaging modality in which X-ray projections taken from different directions around an object are combined to form cross-sectional images by using a reconstruction algorithm [?]. Significant theoretical and applied research in these algorithms has been conducted in the FIPS research network. However, there still remains a significant gap between this basic research and putting the algorithms into practical use with real data and applications.

This presentation will give an overview of the experimental and computational resources developed at the University of Helsinki to bridge this gap. Experimental resources include a custom-built cone beam computed tomography scanner specifically designed for collecting datasets for the development of CT algorithms. We can conduct measurements using either a conventional energy-integrating X-ray detector or a photon counting detector. Computational tools include open datasets and HelTomo [?], a Matlab toolbox specifically designed to be used with X-ray data measured our laboratory. It provides an easy yet flexible user interface, designed for researchers to be able to focus on the essential: computing both 2D and 3D CT reconstructions and developing new reconstruction algorithms.