Advancing learned algorithms for 2D X-ray computed tomography

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List of publications

Publications that are part of this thesis:

1. M. B. Kiss, F. G. Bossema, P. J. van Laar, S. Meijer, F. Lucka, T. van Leeuwen, and K. J. Batenburg. “Beam filtration for object-tailored X-ray CT of multi-material cultural heritage objects”. *Heritage Science* 11.1 (2023), p. 130.
2. M. Kiss, S. Coban, K. Batenburg, T. van Leeuwen, and F. Lucka. “2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning”. *Scientific Data* 10.1 (2023), p. 576.
3. M. B. Kiss, A. Biguri, C.-B. Schönlieb, K. J. Batenburg, and F. Lucka. “Learned denoising with simulated and experimental low-dose CT data”. *arXiv preprint arXiv:2408.08115* (2024).
4. M. B. Kiss, A. Biguri, Z. Shumaylov, F. Sherry, K. J. Batenburg, C.-B. Schönlieb, and F. Lucka. “Benchmarking learned algorithms for computed tomography image reconstruction tasks”. *Applied Mathematics for Modern Challenges* 3.0 (2025), pp. 1–43.

Published datasets and code related to this thesis:

1. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices 1-1,000.* June 2023
2. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices 1,001-2,000.* June 2023
3. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices 2,001-3,000.* June 2023
4. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices 3,001-4,000.* June 2023
5. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices 4,001-5,000.* June 2023
6. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices OOD.* June 2023

7. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices 1-1,000 (reference reconstructions and segmentations).* June 2023

8. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices 1,001-2,000 (reference reconstructions and segmentations).* June 2023

9. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices 2,001-3,000 (reference reconstructions and segmentations).* June 2023

10. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices 3,001-4,000 (reference reconstructions and segmentations).* June 2023

11. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices 4,001-5,000 (reference reconstructions and segmentations).* June 2023

12. M. B. Kiss, S. B. Coban, K. J. Batenburg, T. van Leeuwen, and F. Lucka. *2DeteCT - A large 2D expandable, trainable, experimental Computed Tomography dataset for machine learning: Slices OOD (reference reconstructions and segmentations).* June 2023

13. M. B. Kiss, H. Der Sarkissian, and F. Lucka. *2DeteCT - Collection of Python scripts for loading, pre-processing, reconstructing and segmenting X-ray CT projection data of the 2DeteCT data collection.* `https://github.com/mbkiss/2DeteCTcodes/`. Accessed: 2025-09-26. June 2023