Project Flat-Panel CT Reconstruction Motivation

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Pattern Recognition Lab (CS 5)
Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)
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Organization

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Time and place

Thursday, 10:00-12:00

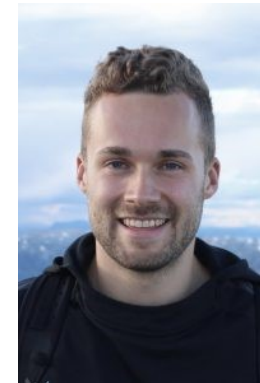Zoom-meeting (link in StudOn)

Supervisors

Prof. Andreas Maier

Dr. Yixing Huang

Fabian Wagner

Participation Options

Hochschulpraktikum / Academic Laboratory (5 ECTS)

- Attend online course

- Finish all exercise sheets (alone or in groups of two)

- Individual presentation about one exercise sheet

Hochschulpraktikum + Forschungspraktikum / Academic Laboratory + Research Laboratory (5+5 ECTS)

- Same as Academic Laboratory
  + Individual research project
  + 6-page report

- Check our website (https://lme.tf.fau.de/teaching/thesis/)

What we expect

You have to write your own code
→ If you copy code, we will find out

**You will not be able to finish the exercises on time
if you only work during our sessions**
→ You need to work between sessions

We will ask questions regarding your code
→ Take notes, as they might be asked again at final presentation

Tentative timetable

Exercise submission via StudOn

During meetings on Tuesdays

- Code and results are checked by a supervisor

StudOn

- For each exercise, a submission is required
- Please upload your scripts

→ StudOn is used to keep track of your individual status, but you will "pass" the exercises based on the individual discussion during the Tuesday meetings
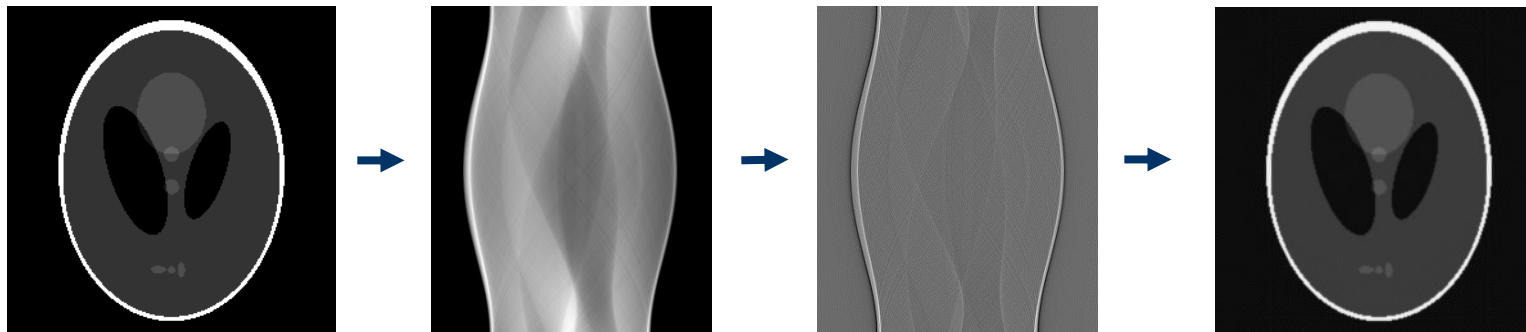
Content of the Exercises

Exercise 1/5 – Basics

- Work with

- World coordinates ↔ Pixel coordinates

- Implement a Grid structure in python
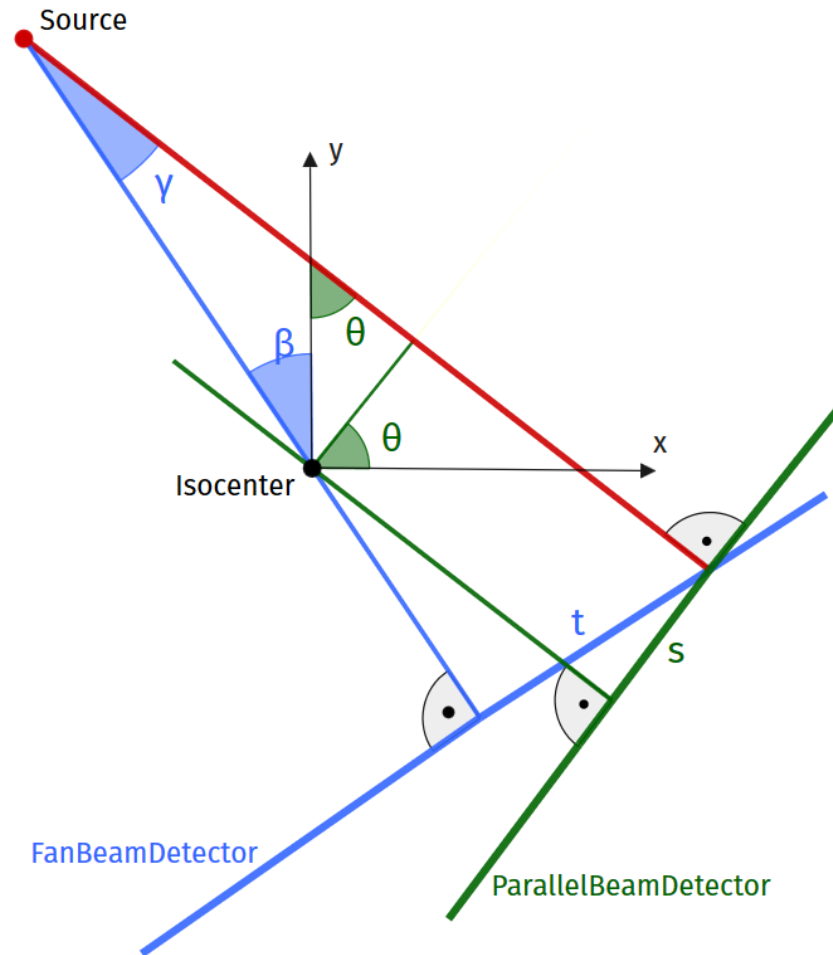
  → 2D phantom

Exercise 2/5 – Parallel-Beam

- Parallel-beam sinogram

- Parallel-beam back-projection

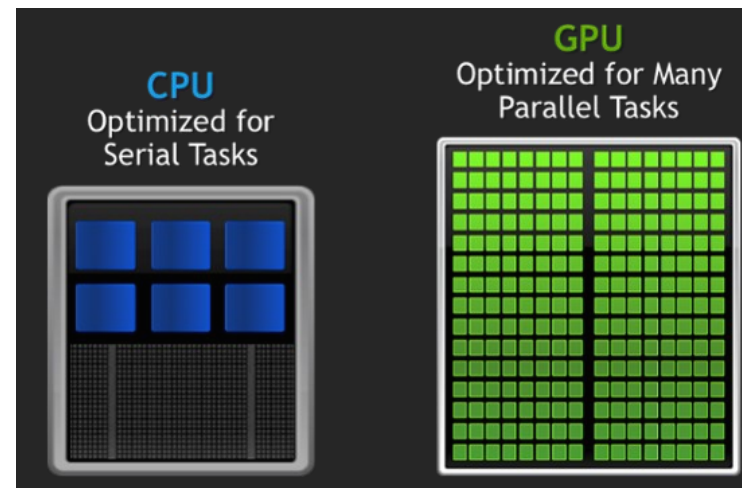- Ramp & RamLak filter in spatial and Fourier domain

Exercise 3/5 – Fan-Beam

- Fan-beam sinogram

- Rebinning:

Fan-beam → Parallel-beam
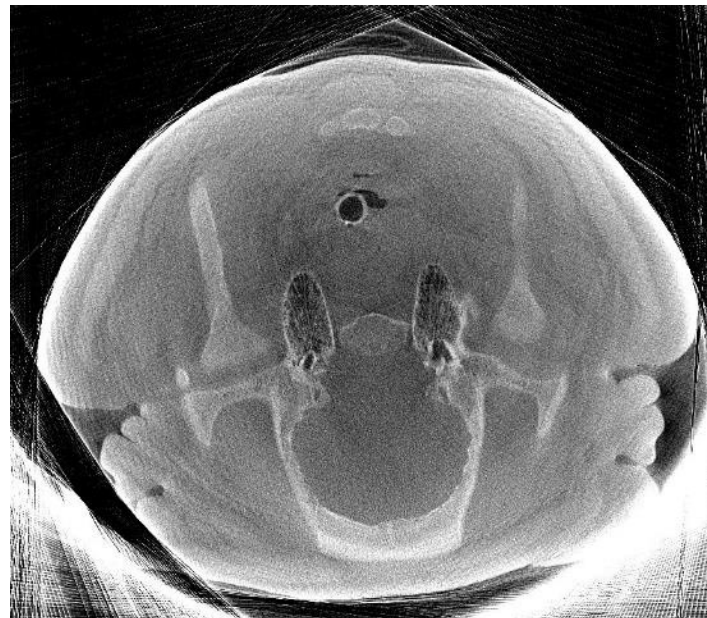
Exercise 4/5 – OpenCL

- Comparison of CPU and GPU runtime

- Parallel-beam back-projection on GPU

whitehatvirtual.com

Exercise 5/5 - Cone-Beam

- Cone-beam reconstruction of real data

- Use framework CONRAD

Questions?

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