Chair of Imaging and Computer Vision

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Bachelor's or Master's Thesis

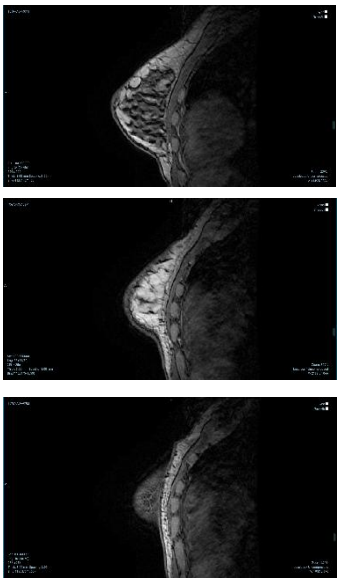
Compression of Whole Slide Images

Background

Medical Imaging is an important tool in the diagnosis of diseases such as breast cancer. To visualize 3-dimensional data acquired e.g. through MRI scans, the data is projected onto multiple 2-dimensional slides. Since these Whole Slide Images (WSIs) have a very high resolution, they represent a large amount of data.

Efficient compression of these images is necessary for storage, and transmission of these images and applications such as remote pathology. Most WSI formats rely on legacy compression techniques such as JPEG or JPEG2000, which do not exploit redundancy between slides.

The objective of this thesis is to explore new methods to compress WSIs. Possible solutions could be existing video codecs such as the Versatile Video Coding (VVC) codec, possibly with additional (learned) pre- or postprocessing steps or entirely learning-based compression approaches.



Whole Slide Image generated through an MRI scan

Tasks

- Investigate existing data formats and compression approaches for WSIs
- Investigate existing metrics to determine the quality of lossy compression techniques
- **Either** develop a framework to compress WSIs using the VVC codec, possibly with the addition of pre- or postprocessing steps
- **Or** develop a learning-based codec for the compression of WSIs

Your Profile

We are seeking a motivated student to join our research team for a thesis focused on the intersection of signal processing, data compression and medical imaging. The ideal candidate should possess a solid foundation in signal processing principles and demonstrate an interest in medical imaging technologies.

Our Offer

Our institute features a cluster with 2000 CPU cores and 100 GPUs. We have more than 12TB of RAM and 1TB of VRAM available for computationally demanding tasks.