

Deep learning within CT imagery for airport luggage scanning



Background

We are developing a new, autonomous scanner that can automatically detect threats, thereby making luggage screening in airports faster and easier. The scanner uses computed tomography (CT) to acquire the interior contents of the scanned luggage. For a reliable detection of threats, obtaining high-quality images is crucial. In this project, we aim at using deep learning to improve image quality when the acquired data is under-sampled (compressed sensing). The objective of this student project is to combine rapid CT scanning technology with filtering techniques extracted via machine learning.

Learning & Research Objectives

- Learn about key data science aspects (e.g., normalization and data augmentation)
- Investigate improvements for image filtering network architectures (based on convolutional neural networks)
- Develop and experiment with new, emerging deep learning architectures
- Contribute to the integration of the results into industrial CT scanning workflows

Requirements

Knowledge in machine learning, image analysis and Python is preferred. Prior experience with deep learning frameworks is advantageous, though this can also be acquired during the project.

Project organization

The project can be carried out individually or in a group. The selected candidate(s) will be supervised by post-doctoral academics in the section of "Image Analysis and Computer Graphics". The project can be flexibly adapted to fit BSc./MSc. thesis projects as well as BSc./MSc. project internships alike.