

Segmentation of the intestine for improved surgical planning

Automation in laparoscopic surgery

Bachelor's or
Master's thesis
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Context

Laparoscopy is the minimally invasive surgery of the abdomen. Rod-shaped surgical instruments are inserted through small incisions in the abdominal wall, reducing the amount of damaged tissue.

Surgical procedures on the bowel are challenging because it is difficult for the surgeon to estimate the course of the intestine from the two-dimensional CT image data. However, the traceability of the anatomy is the prerequisite for optimal planning of the surgical procedure.

Real image data from surgical procedures is used.

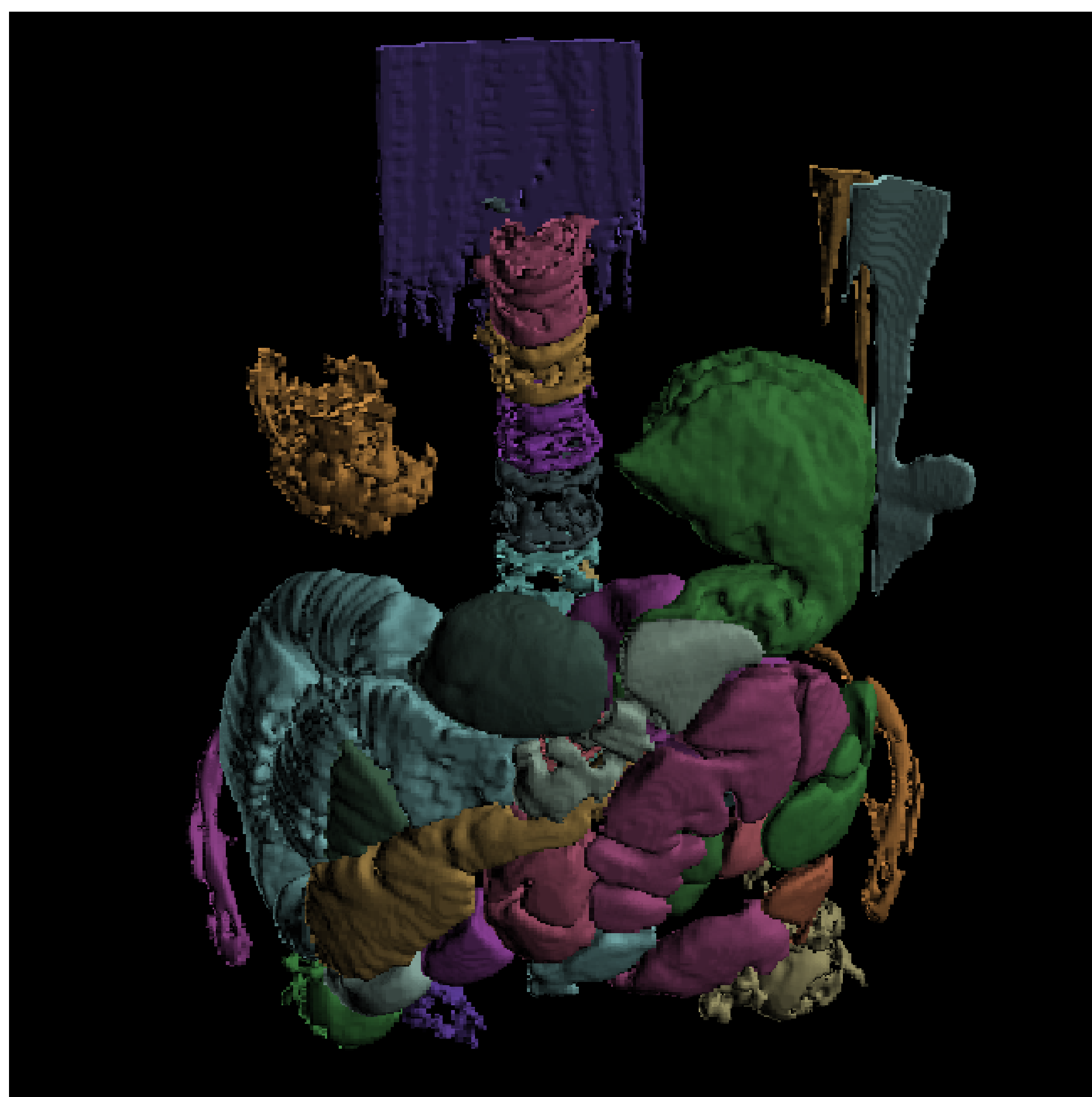


Figure source: Example segmentation of the inner organs.

Objective

The goal of the project is the development of a planning tool that is capable to determine the course of the intestine in 3D and visualize the result to the surgeon.

Task Summary

- Implementation of methods for automated segmentation of the intestine and determination of its course utilizing machine learning approaches
- Visualization of the segmentation result, e.g. using the HoloLens
- Possibility to interact with the created model
- Evaluation of the results in cooperation with surgical experts

Required Skills

- Very good programming skills (C++, C#, Python)
- Good Machine learning, deep learning skills
- Autonomous way of working
- Good English skills

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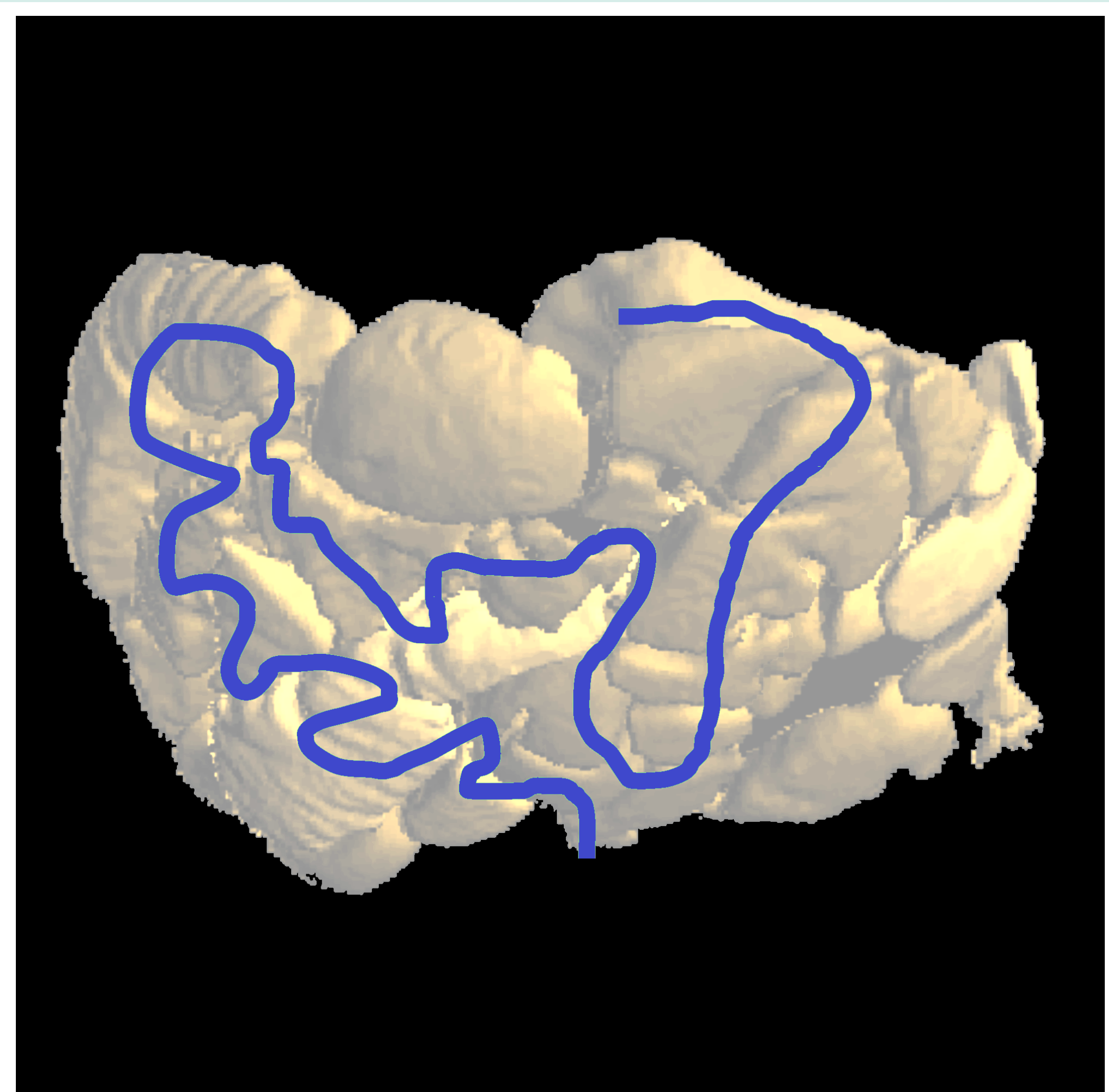


Figure source: Example course of the bowel.