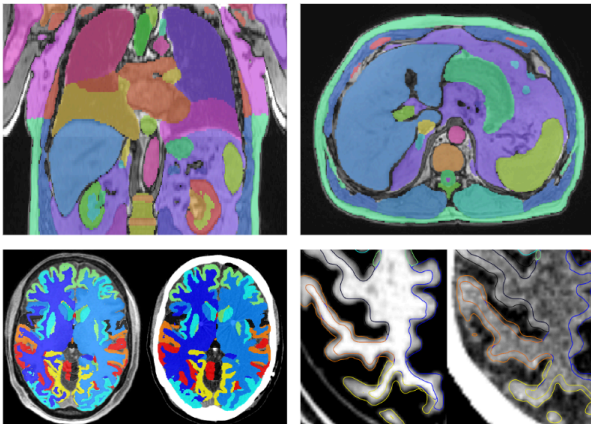




Development of a Semi-Automatic Medical Image Segmentation Tool via In-Context Learning



Medical image segmentation is crucial for diagnosing and treating various diseases, enabling precise localization and quantification of anatomical structures and abnormalities. Despite significant advancements in automated segmentation algorithms, challenges persist due to variability in medical images caused by noise, artefacts, and patient diversity. Semi-automatic segmentation tools that incorporate user input and prior information can enhance accuracy and adaptability in clinical settings and help in labelling and curation of the training corpi [1][2].

Betreuer

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Beteiligte Institute und Firmen

Das Projekt wird in Kooperation mit der Uniklinik Freiburg und dem Institute for Machine Learning and Analytics durchgeführt.

Ziele des Projekts

This project aims to develop a support tool for semi-automatic medical image segmentation by leveraging information from previously annotated slices through in-context learning. The proposed model will condition a U-Net architecture on the image encoding of neighbouring slices that have already been segmented. The tool will be integrated into the web-based medical imaging platform nora-imaging.org.

Diese Werkzeuge/Qualifikationen werden erlernt

- Theorie und Praxis aktueller Methoden zur Segmentierung medizinischer Daten.
- Praktische Entwicklung mit Pytorch / Python Pipelines in realen Projekten
- Methoden angewandter Forschung in realen Projekten

Literatur + Weiterführende Informationen

- [1] Hesamian, M. H., et al. "Deep Learning Techniques for Medical Image Segmentation: Achievements and Challenges." *Journal of Digital Imaging* 32.4 (2019): 582-596.
- [2] Litjens, G., et al. "A Survey on Deep Learning in Medical Image Analysis." *Medical Image Analysis* 42 (2017): 60-88.