Università degli Studi di Genova

DISC

Dipartimento di Scienze Chirurgiche e Diagnostiche Integrate

Titolo: Deep learning applied to endovascular procedures	**SSD:** **MED/22 – Chirurgia Vascolare**	**Responsabile della ricerca:** **Giovanni Spinella**
Finanziamento **(NO PROFIT – NOME DELLA CONTROPARTE)**		
Riassunto	In the last years, deep learning has reached remarkable performances in several tasks related to medical imaging. These artificial intelligence techniques can be applied in different contexts: image classification, detection and segmentation of structures of interest, etc. These automatic techniques remove the intra and inter-operator variability, making the obtained results reproducible, and allow to speed up time-consuming procedures. In this context, the aim of our study is to use deep learning (DL) techniques to support the major steps involved in the endovascular procedures. In more details: • ***Preoperative phase:*** development of DL techniques to automatically segment aortic lumen and thrombus from CT volume. The deep learning model is trained to perform fast and accurate segmentations of structures of interest. This model allows the extraction of geometric information needed for endovascular surgery planning. • ***Intraoperative phase***: in this context, DL is used to predict intraoperative aortic deformations caused by the insertion of a stiff guidewire within the iliacs. The DL model is trained on the results provided by finite element simulation. • ***Postoperative phase***: the segmentation model developed for the preoperative phase is extended to analyze patients with follow-up exams. In this phase, comparative analyses are performed between different follow-ups in order to assess any anatomical changes and to establish the effectiveness of the treatment. Pubblicazioni: 1. Fantazzini, A., Esposito, M., Finotello, A. et al. 3D Automatic Segmentation of Aortic Computed Tomography Angiography Combining Multi-View 2D Convolutional Neural Networks. Cardiovasc Eng Tech 11, 576–586 (2020). https://doi.org/10.1007/s13239-020-00481-z	
Link al protocollo		