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Radiomics-based machine learning classification of bone chondrosarcoma

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Stellingen behorend bij het proefschrift getiteld

“Radiomics-based machine learning classification of bone chondrosarcoma”

Salvatore Gitto

1. CT and MRI radiomic features of cartilaginous bone tumors are reproducible, although some degree of interobserver segmentation variability highlights the need for a preliminary reliability analysis in radiomic studies.
[Chapter 4 of this thesis]
2. 3D and 2D MRI-based texture analyses provide similar rates of stable features. Thus, a 2D approach can be favored in radiomic studies, as this is easier to implement in clinical practice.
[Chapter 4 of this thesis]
3. CT radiomics-based machine learning shows good accuracy in differentiating atypical cartilaginous tumor from higher-grade chondrosarcoma of long bones with no difference compared to an expert radiologist.
[Chapter 5 of this thesis]
4. MRI radiomics-based machine learning shows very high accuracy in differentiating atypical cartilaginous tumor from grade II chondrosarcoma of long bones with no difference compared to an expert radiologist.
[Chapter 6 of this thesis]
5. General and inexperienced radiologists will need artificial intelligence to become reliable when reading X-rays of bone tumors.
[von Schacky CE, Wilhelm NJ, Schäfer VS et al. Multitask Deep Learning for Segmentation and Classification of Primary Bone Tumors on Radiographs. *Radiology* 2021; 301:398-406]
6. The modern radiologist will become more efficient and happier thanks to artificial intelligence, which will alleviate the workload by performing repetitive, time-consuming tasks automatically.
[van Rijn RR, De Luca A. Three reasons why artificial intelligence might be the radiologist's best friend. *Radiology* 2020; 296:159–160]
7. As artificial intelligence systems are emerging in radiology, questions regarding legal responsibility for decision making urgently need to be answered.
[Liew C. The future of radiology augmented with artificial intelligence: a strategy for success. *Eur J Radiol* 2018; 102:152–156]
8. Image-guided interventions around superficial musculoskeletal structures are now alternatives to orthopedic surgical procedures.
[Kamel SI, Freid B, Pomeranz C et al. Minimally Invasive Ultrasound-Guided Carpal Tunnel Release Improves Long-Term Clinical Outcomes in Carpal Tunnel Syndrome. *AJR Am J Roentgenol* 2021; 217:460-468]
9. “It is not his possession of knowledge, of irrefutable truth, that makes the man of science, but his persistent and recklessly critical quest for truth” (Karl Popper).
Incessant criticism is necessary to advance scientific knowledge.