Science & Technology meets Clinical Demands: Challenges and Opportunities

Challenges & advances in biomedical image computing

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Summary of the talk:

The ongoing advances in mathematical modelling, the growing prevalence of very large datasets, ever-increasing computational power and progress in biomedical imaging devices established the biomedical image computing as a mature scientific discipline with rapidly growing number of applications unlocking data's diagnostic potential. These advances not only have enabled to refine existing but also made possible discovery of new biomarkers supporting biomedical research, as well as day-to-day clinical diagnosis and treatment monitoring. The talk focused on description of the key enabling technologies, essential for supporting image computing biomedical applications, including: segmentation, registration and classification methodologies.

A selection of various applications of these technologies were given in a context of the research projects run at the UCLan's Computer Vision and Machine Learning (CVML) Research Group, including: deformation modelling; histopathology mitotic cell detection and delineation of the benign/malignant glands; workflow analysis in laparoscopic surgeries as well as support for endoscopic examinations.

A brief outline of possible joint research between the CVML group and the ELHT's radiology department, focus on applications of artificial intelligence (AI) for anatomical segmentation and detection, was also presented.

A relevant research project completed by the CVML group:
- SEMEiotic Oriented Technology for Individual's CardiOmetabolic risk self-assessmeNt and Self-monitoring (SEMEOTICONS)
- Technology in Radiotherapy Feasibility Studies (TeRaFS)
- Engineering and Computational Science for Oncology Network (ECSON)
- Metrology Guided Radiotherapy (MEGURATH)

Selected Representative References

- ## Biomedical Image Registration

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