PHD STUDENT POSITION (F/M/D) - AI FOR HEALTHCARE / MEDICAL IMAGE ANALYSIS

ihu STRASBOURG | INSTITUT DE CHIRURGIE GUIDÉE PAR L'IMAGE

Contract type: 3 years starting in 2023, temporary

CONTEXTE

A major role of the IHU Strasbourg – Institute of Image-Guided Surgery is to perform medical image analysis for guidance during surgical planning and procedures.

The proposed PhD position is part of the AI-DIAL (Artificial Intelligence – Diagnostic Imaging of Adrenal Lesions) project funded by the French National Research Agency (ANR). During a CT and MRI examination, suspicious masses in the adrenal glands are found in up to 10% of patients. Most adrenal tumours are benign, with a normal or increased hormone production. Malignant tumours include rare and aggressive adrenal cancer, and metastases of other cancers.

Standard imaging analysis techniques to characterise these masses are based on the tissue density and the signal response to an injected contrast agent. If malignancy cannot be excluded, adrenal surgery is performed for diagnostic tumour removal. Overtreatment, especially removal of benign lesions with normal hormone levels, must be prevented. Texture and radiomics analyses are innovative approaches to quantitatively determine lesion characteristics based on image analysis. The use of texture, shape and other information could capture more relevant details than intensity variations alone, to increase non-invasive diagnostic rates. Beyond classical radiomics features, deep learning approaches will be designed for adrenal gland segmentation and accurate classification of adrenal lesions using the segmentation and intermediate deep learning features

OBJECTIVE

The AI-DIAL database will allow for clinical validation of radiomics parameters, which are based on local variations in voxel brightness beyond the range of the human eye to provide measures of heterogeneity. First-order features analyze voxel values irrespective of their location, for instance histograms and shape. Second-order features consider the relationships between voxels and their spatial location.

This way, multiple parameters/features can be extracted to develop quantitative scores or AI algorithms to detect histological subtypes, differentiate between benign and malignant lesions, and potentially develop prognostic biomarkers.

The project AI-DIAL will further focus on developing innovative deep-learning approaches for segmenting and classifying adrenal glands. Unlike other organs, adrenal glands occupy far fewer voxels in the 3D medical imaging scans; therefore, novel attention-based deep learning approaches will be developed to specifically tackle the challenge of segmentation and classification such relatively small organs

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ENVIRONMENT

The position is in Strasbourg, France. Strasbourg is a lively, green and cosmopolitan city in the heart of Europe and is also home to the European parliament. The successful candidate will work with the research group CAMMA and be hosted within the IHU Institute of Image-Guided Surgery at the campus of the University Hospital of Strasbourg. The candidate will thereby have direct interactions with medical and industrial partners and have access to an exceptional international research environment offering unique clinical facilities.

REQUIREMENTS

→ Master's degree in computer science or equivalent

→ Python/C++ programming skills

→ Strong knowledge in computer vision and machine learning

→ Proficiency in English (oral and written)

→ Experience with Deep Learning is a plus

REQUIREMENTS

Period: 3 years starting in 2023, temporary full-time contract

Office: IHU Strasbourg

Contacts:

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To apply: Please send a CV, letter of motivation and academic transcripts to both email addresses indicated below.

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More information on https://euraxess.ec.europa.eu/jobs/57853