2023-06763 - Stage Master/Internship - How does the shape of the hippocampus affect automatic segmentation?

Level of qualifications required: Master’s or equivalent
Function: Internship Research

About the research centre or Inria department

Le centre Inria de l'Université de Rennes est l'un des huit centres d'Inria et compte plus d'une trentaine d'équipes de recherche. Le centre Inria est un acteur majeur et reconnu dans le domaine des sciences numériques. Il est au cœur d'un riche écosystème de R&D et d'innovation : PME fortement innovantes, grands groupes industriels, pôles de compétitivité, acteurs de la recherche et de l'enseignement supérieur, laboratoires d'excellence, institut de recherche technologique.

Context

The hippocampus is a bilateral brain structure of the temporal lobe which is implicated in memory processes, spatial navigation and in various pathologies such as Alzheimer's disease, epilepsy, depression or schizophrenia. The hippocampus is a small structure with an elongated shape (length of 4 to 4.5 cm, width of 1 to 2 cm), and a highly variable anatomical shape, making their segmentation challenging for subsequent analysis, affecting its shape and its volume, and potentially the results.

Assignment

The goal of this internship is to estimate whether anatomical shape variability impacts automatic segmentation algorithms and how, in order to know if there is particular hippocampal shape(s) leading to failed segmentation for a given method. The general idea would be to investigate whether and how errors across various segmentation pipelines relate to ‘ground truth’ variations in hippocampal shape. The selected candidate will have access to manually segmented MRI that would be the ground truth to which automated segmentation methods will be compared. The candidate will then have to analyse the variability of each automated method, and of the ground truth, to then determine particular hippocampal shapes involved in automated hippocampal segmentation fails.

Main activities

- Bibliographic research
- Understanding, implementation and application of automatic segmentation methods
- Data analysis: Definition of adapted metric

additional activities:

- Present the work progress during lab seminar
- Co-writing a scientific paper
- Interact with other researchers

Skills

- Good knowledge in applied mathematics and/or computer science.

General Information

- Theme/Domain: Computational Neuroscience and Medicine
- Town/city: Rennes
- Inria Center: Centre Inria de l'Université de Rennes
- Starting date: 2024-03-01
- Duration of contract: 7 months
- Deadline to apply: 2023-11-30

Contacts

- Inria Team: EMPENN
- Recruiter: Claire Cury / claire.cury@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

Warning

You must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

Instruction to apply

Defence Security: This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy: As part of its diversity policy, all Inria positions are accessible to people with disabilities.
- Strong interest in neuro-imaging.
- Knowledge in image processing.

**Benefits package**
- Prise en charge à 50 % des frais de transport en commun sur le trajet domicile-travail ou FMD.
- Restauration subventionnée
- Prise en charge partielle des frais de mutuelle
- Possibilité de tél-travail (à hauteur de 90 jours annuels) et d'aménagement du temps de travail

**Remuneration**
Gratification: 4,95 €/heure