



## **Internship in Hyperspectral Image Analysis with Deep Learning for Improving Surgery**

### **Topic**

Surgical Data Science (SDS) is a new and exciting research area whose objective is to improve surgery using machine learning and artificial intelligence. The Institute for Research against Digestive Cancer (IRCAD) is an internationally recognized education and training facility with a long history of research in computer assisted surgery, and we are significantly expanding our research in SDS and machine learning. We are advertising one position for an internship starting at the beginning of 2021 to join our team and to work on an exciting SDS project. You will be working on the topic of machine learning-based automatic analysis of hyperspectral images (HSI) captured during surgery. HSI is a technique that acquires multiple 2D images at different bands in the electromagnetic spectrum, generating a 3D image 'cube'. Data contained in this cube can reveal biological characteristics of healthy and cancerous tissue, which can allow surgeons to make better decisions for identifying and resecting tumours. However HSI data cannot be easily understood by surgeons. Machine learning, and in particular Deep Learning is an essential tool to automatically discover patterns in the data and to inform the surgeon during a procedure. Your objective will be to continue the work we have done in IRCAD on this topic and specifically to prototype algorithms with a large-scale dataset captured at our partnered hospital.

### **Work environment**

You will work within a professional team of data scientists, software engineers and surgeons and be supervised by an expert in the SDS field in IRCAD. You will work at IRCAD in Strasbourg, France full time for approximately 6 months, and you will work on various fundamental aspects, including data organization, formulating a machine learning / deep learning hypothesis, algorithm prototyping and training, testing, and code integration. You will experience direct feedback from surgeons to ensure the work is clinically useful and functional according to their needs. This is an excellent opportunity to gain experience in state-of-the-art data science and medical applications, within a professional environment. Good students are often selected by us to continue their work after the internship with good job opportunities within IRCAD.

### **Requirements**

We are looking for a candidate with a good computer science education at the masters level with courses in machine learning and deep learning. We expect you to have experience in Python and ideally experience in machine learning and deep learning frameworks such as Tensorflow or Pytorch. You should be highly self-motivated to solve technically difficult problems, have excellent communication skills (fluency in French and proficiency in English is preferred). Ideally we are looking for candidates with an intention to pursue a career as a professional researcher in applied machine learning and data science to medical applications.

### **Contacts**

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