

The Greyc laboratory has one post-doc position for a one year to work as soon as possible on the development of a multimodal auto-encoder for anomaly detection based on deep learning.

### ### Context :

The detection of anomalies or out-of-domain data has become an important issue in machine learning, especially in the field of video surveillance. It has indeed become important to be able to detect unusual situations in video sequences in order to anticipate and predict potentially dangerous situations. The work proposed in this tender will be carried out as part of a project in preparation for the 2024 Paris Olympic and Paralympic Games. Its objective is to be able to design digital tools for the detection of generic unusual situations in surveillance camera videos in order to effectively alert an operator.

### ### Tasks :

Several approaches have been proposed in the literature to perform anomaly detection. Among these approaches, a set of works is interested in the use of auto-encoders for this task. On the other hand, the use of multimodal data in modern machine learning approaches has led to improved performance on various problems such as image classification. During this post-doc, we will study the possibility of creating multimodal auto-encoders for anomaly detection. For this purpose, we plan to extend our work on multimodal fusion to the auto-encoder. The modal fusion will be performed on levels adapted to each modality. Further work will focus on the use of the proposed solution for anomaly detection in surveillance videos with, for example, applications to the ShanghaiTech, CUHK Avenue and UCSD pedestrian bases.

### ### Presentation of the laboratory :

The GREYC lab is a research lab located in the city of Caen in Normandie (France). The GREYC lab realizes research works in the field of digital science with activities in image processing, machine learning, artificial intelligence, computer security, fundamental computer science, Web science, electronics. The work will be carried out within the Image team, whose research activities are focused on the development of new methods to process and analyze images and signals. The team benefits from a solid expertise in pattern recognition and information retrieval in images/videos using methods based on graphs, neural networks, metrics learning, knowledge engineering ... The team members have different backgrounds (computer science, signal/image processing, applied mathematics, artificial intelligence). This variety of skills is one of our strengths as we can approach image processing and analysis from different scientific viewpoints and paradigms.

### ### Skills :

- PhD in Machine learning or equivalent,
- Experience in Deep learning and in associated frameworks (Pytorch, Tensorflow...),
- Good experience in publishing scientific articles.

### ### General information :

Workplace : Caen (France)

Type of Contract : FTC Scientist

Contract Period : 12 months

Proportion of work : Full time

Desired level of education : PhD

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