Job offer: Research engineer

Computer science/Computer vision/Machine Learning

Social task detection for eye-tracking subjective view video analysis

Profile:

- **Computer vision** and **machine learning** experience, in particular object detection, activity recognition and/or sequence analysis.
- Good **programming skills** (C++/ Python) and experience with Pytorch.
- Strong interest in innovation and research
- Good communication skills to interact with project partners
- Good autonomy in organizing your work

Context: Analysis of eye-tracking data

Eye tracking devices are widely used in psychology and neuroscience to analyze how we treat our visual environment. They allow both to record what the person is seeing (subjective view), but also where they are looking. Often restricted to laboratory studies, eye tracking is now increasingly used to analyze cognition in "real" situations, such as with operators in a factory, athletes during competitions, consumers in a store, etc. However, in these new application contexts the motion of the person wearing the device, the complexity of the environment and the variety of interpersonal behaviors, cause large variations in the acquired data. Today the detection of activities carried out at a time t by the participants in the study (for example: which task an operator performs, which phase of the game for an athlete, which part of the store visits a consumer) is often performed manually frame by frame by the researcher and is a very tedious and time consuming task.

We have recently developed a first automatic activity recognition method for subjective view (or first person view) videos from an eye-tracking device (patent [1]). This previous work assumed the user is able to provide some generic description of the task based on his/her intuition or knowledge about the activities (eg: objects involved in the task, in a specific order...). We now want to go one step further and (i) provide the user with a weakly supervised configuration tool to help the user tune the system for a new task (ii) develop new methods for activity recognition using the gaze information available from the eye-tracking which is of upmost importance to identify social tasks.

This position is part of the EYETRACK action carried out by the Pascal Institute in partnership with the Michelin company, and LAPSCO with the support of I-Site CAP2025 Clermont-Ferrand.

Mission:

The research engineer will join a computer vision and machine learning group at Institut Pascal.
He/she will have access to an eye-tracking system, annotated videos, and the activity recognition software already developed in the first project. He/she will first closely work with a researcher in psychology from LAPSCO to understand the specificity of activity recognition tasks with eye-tracking devices and evaluate the limitations of the current approach. A first goal will be to improve the current software with new features including a weakly supervised configuration tool to help the user tune the system for a new task.
Secondly, the engineer will develop a new automatic activity detection method, taking into account both the image and gaze position, particularly suited to detecting social tasks.
The automatic detection tool and new features will be integrated in the existing GUI, resulting in a software tool facilitating the analysis of eye-tracking data that will be evaluated on different use-cases.

Type of contract: 12 months contract, salary depending on candidate experience

Place: Pascal Institute, 4 av. Blaise Pascal, Aubière, France

Application:
Send CV + cover letter to Céline Teulière: celine.teuliere@uca.fr

References:

[1] Matthieu Lutz, Clément Belletier, Pierre Chausse, Marie Izaute, Ala Mhalla, Diego Navarro, Céline Teulière, *Détection et Reconnaissance Automatique et Egocentrique des Tâches dans des Scènes de Regard*, Brevet n°WO/2023/117613, 29.06.2023