Post-doctoral position in cognitive Neurosciences/Neuroergonomy –

The supervision of automated systems

Biomarkers of the “out-of-the-loop” performance problem during monitoring automated systems

Description:

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<th>Position</th>
<th>Post-doctoral</th>
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<tr>
<td>Duration</td>
<td>12 months</td>
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<td>Start</td>
<td>January 2021</td>
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At GRENOBLE ALPE UNIVERSITY

Psychologie and Neurocognition Laboratory (LPNC, CNRS UMR 5105), Grenoble, France.

In partnership with:

ONERA, The french Aerospace Lab
DTIS - ICNA, Air Base 701, Salon de Provence, France

Research labs

The Psychology and Neurocognition laboratory (partner 1) is a research unit of the CNRS (National Center for Scientific Research, UMR 5105), affiliated to the Grenoble Alpes University. The laboratory carries out research in cognitive sciences according to a multidisciplinary approach combining methodologies from both human and social sciences (Psychology, neuropsychology), as well as life sciences (Neurosciences, Neuroimaging, Medical Sciences) and engineer science applied to cognition (signal processing, bio-inspired modeling, mathematics, computer science). The post-doctoral fellow will be into the “Vision and Emotion” team whose research aims to understand the interactions between sensory informations, active vision and proactive vision to cope with perceptual and emotional events on from behavioral, neurimaging and neurophysiological measurements and the bio-inspired modeling. You will work at Grenoble in collaboration with Dr Aurélie Campagne (Co-coordinator of the project), a researcher specializing in the study of biomarkers (behavioral and neurobiological) specific to mental states (cognitive, emotional) in particular within the context of human-system interactions/cooperations, for health / well-being applications or in affective computing.

The post-doctorate will be carried out in collaboration with ONERA (National Office for Aerospace Studies and Research, partner 2), the main French research center in the aeronautics, space and defense sector, which includes seven scientific departments including the Department of Information Processing and Systems (DTIS) to which the post-doctoral fellow will be associated. The post-doctoral fellow will be into the “Cognitive Engineering and Applied Neurosciences” team (DTIS-ICNA) which carries out cognitive engineering activities for the development of new concepts of Human / System Interaction (IHS), with the aim of managing systems or complex operations (eg integration of humans in the control or decision loop, etc.). These are based on a particularly rich environment in terms of information processing (in particular for the recognition and analysis of human activities), systems control to manage dynamic human / system interactions, as well as interactive simulation (LABSIM means). You will work in collaboration with Dr Bruno Berberian (co-coordinator of the project), a researcher specializing in the study of human factors and cognitive engineering, particularly in the field of aeronautics.

Project

The increase in the automation of systems in our daily lives (e.g. supervisory system, intelligent industrial production system) has radically changed the way we interact with these systems. One of the consequences of the automation of systems is the out-of-the-
loop phenomenon which is characterized by difficulties for the operator to understand the state of the system, to detect its errors and to take it back in hand if failure. A degradation of attentional mechanisms, in particular caused by a state of over-confidence and complacency towards these automated systems, is often put forward to explain this deterioration in operational performance which would ultimately result in a degradation of the system monitoring. These consequences can be particularly problematic in risky environments.

Based on electroencephalography markers, the aim of the research project is to characterize the evolution of the supervision activity of automated systems over time according to the type of automated systems and their reliability. The issue will be addressed in the context of aeronautics.

In collaboration with the co-coordinators of the research project (Aurélie Campagne, LPNC, Grenoble & Bruno Berberian, ONERA, Salon de Provence), the post-doctoral fellow will have to perform the following main functions:

- **Bibliography**
- Implementation of the experimental protocol, inclusion of participants and data collection with the help of research support staff from the 2 laboratories
- EEG data processing (evoked potentials and time-frequency)
- Modeling of the out-of-the-loop phenomenon based on the collected data (depending on the expertise of the candidate).
- Publications and communications

### Restriction or constraints:

Part of the research work (data acquisition) will likely be carried out at the ONERA in Salon de Provence. Travels will be fully funded.

### Required skills

- The post-doctoral fellow should have skills in experimental methodology in cognitive neuroscience, cognitive science or cognitive psychology as well as methodological skills in signal processing.
- Skills in the use of electroencephalography technique (data acquisition, signal processing) and advanced processing of this type of data are also required.
- Experience in the field of neuroergonomics, advanced statistics, programming (e.g. matlab) and/or modeling will be appreciated.
- Good ability to work in a team
- Good adaptation ability
- Good working autonomy
- Good reading and writing skills in scientific English.

### Further information about the project and application

Please contact: Aurélie CAMPAGNE, aurelie.campagne@univ-grenoble-alpes.fr

Applicants are invited to send Curriculum Vitae, a motivation letter, and at least a letter of support.