3D Workshop: Data, Devices, & Diversity

UNIPD principal investigator

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UNIL principal investigator

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Instrument

Joint seminar / conference involving early-stage researchers

Description

The applicants and the involved research groups share strong potential relationships in terms of complementary research activity. The applicants and the involved groups focus on similar objectives in the study of the brain and of sensory information from two different perspectives.

The Sense Innovation and Research Center (The Sense) is a new joint venture of the CHUV, UNIL and University of Applied Sciences of Western Switzerland (HES-SO Valais/Wallis). It was founded in 2021, and Prof. Murray serves as its Scientific and Academic Director. The Sense consists of 14 research units organized along 3 axes: Perception & Cognition, Action & Repair, and Devices & Data. The Sense is the next-generation academic center for innovation, research and training. The Sense's founding principal recognises that sensory processes scaffold perception, cognition, and behaviour. The Sense's mission is to create and disseminate knowledge on human senses and behaviour to the benefit of society. The Sense achieves these innovations by federating synergies across applied, basic, and clinical research. The Sense's impact extends across the lifespan, improving performance or clinical outcome of sensory (dys)function.

At the University of Padova, Dr Atzori's research aims on creating artificial intelligence methods for multimodal biomedical data analyses and multisensory-based robotic control. Dr Sellaro's research focuses on uncovering the factors that modulate cognitive control efficiency and decision-making processes. She is particularly interested in the role that the social context, experiences of social adversity, and emotional awareness and attention can play in biasing perception and cognition both in healthy subjects and in individuals with psychiatric disorders. Her research aims to integrate behavioral, psychophysiological, computational and virtual reality methods.

The research domains of the involved groups thus benefit of the use similar data, acquisition protocols and procedures targeting multiple data analysis modalities (e.g. MRI, OCT, EEG, EMG, text & eye tracking processing). Developing complementary data analysis techniques based on deep neural networks can thus benefit both applicants at UNIL and UNIPD, allowing them to reach more challenging objectives by sharing experiences, objectives, data and algorithms.

Activity

The objective of the project is to create one multiple-days seminar aiming at the definition of joint project submissions involving the applicants and possibly external stakeholders too. The applicants will aim at defining two projects characterized by similar structures, shared data and analysis algorithms, but diverse outcomes & applicative domains (e.g., focused more on the neurophysiological results on one side and on the multimodal machine learning approaches on the other).

The multiple-day seminar will allow partners and involved groups to highlight in detail what they can provide in terms of research, data, experience and algorithms, as well as what their interests are. One day will be dedicated to define two thematic lines for project proposal submission, targeting respectively, e.g., the characterization of multisensory brain networks and the development of deep neural networks for multimodal data analysis.

Expected results from this project include an evaluation of the complementarity of the two groups and a short abstract and scheme for two project proposals, aiming at submissions to national and international calls for proposals. Possible target calls include:

- Swiss National Science Foundation “Sinergia” (Switzerland)
- Projects of National Interest “PRIN” (Italy)
- European Research Council “Synergy” (EU) (if possible according to future regulations)

Research lines for project proposals will target the main research of the participants, e.g.:

- Characterisation of multisensory brain networks
- Development of deep neural networks for multimodal data analysis for the transversal analysis of UNIL - UNIPD datasets

A further possible result might include a scientific publication involving the applicants and aiming at describing the state of the art in the overlapping domain of research or resources offered by the two partners.

Potential for follow-up activities

- Submission of several joint projects (e.g. Swiss National Science Foundation “Sinergia” - Switzerland, Projects of National Interest “PRIN” - Italy, European Research Council “Synergy” - EU - if possible according to future regulations)
- Submission of a joint training network project (e.g. MARIE SKŁODOWSKA-CURIE ACTIONS Doctoral Network)
- Student exchanges between UNIL and UNIPD targeting the research collaboration
- Collaborative release of open source code, developed between UNIL and UNIPD
- Collaborative release of open access data, acquired and curated between UNIL and UNIPD
- Publication of scientific joint publications involving the two institutions.