Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : Pham | Given names : Minh Tu

Status (prof., assistant prof., ...) : associate professor

Laboratory : Ampere, UMR CNRS 5005 | Website address : http://www.ampere-lab.fr/?lang=fr

Institution : INSA Lyon | Website address : https://www.insa-lyon.fr/en/

Scientific competence of the supervisor:

The supervisor's research interests include robot identification, control, haptics and their applications to medical robotics. He is also interested in different aspects of modern control engineering such as observer design and pattern recognition in different fields such as medical robotics, neuroscience, power converter, fluid power systems, and industrial applications.

Two major publications in the field proposed for the PhD :

1. Bahmad, S., Miller, L.E., Pham, M.T. et al. Online proprioception feeds plasticity of arm representation following tool-use in healthy aging. Sci Rep 10, 17275 (2020).
2. Liu F, Licona AR, Lelevé A, Eberard D, Pham MT, Redarce T. An Energy-Based Approach for n-d.o.f. Passive Dual-User Haptic Training Systems. Robotica. 2020;38(7):1155-1175. doi:10.1017/S0263574719001309

Website address of the personal page : https://cv.hal.science/minh-tu-pham

Supervisor's email : minh-tu.pham@insa-lyon.fr

Description of the research work proposed for a PhD | ***Topic # (see list) :*** VI-7

Title : Haptic Devices for Proprioception Assessment

Subject :

Proprioception, the ability to sense the position, movement, and orientation of one's body parts, plays a crucial role in motor control and coordination. Impairments in proprioception are common in various neurological conditions such as stroke, Parkinson's disease, and spinal cord injuries, significantly affecting an individual's functional abilities and quality of life. Traditional methods for assessing proprioception often lack precision and sensitivity, requiring the development of innovative technologies to accurately evaluate and rehabilitate proprioceptive deficits. Haptic devices offer a promising path for enhancing proprioception assessment by providing tactile feedback to users, replicating real-world sensory experiences, and facilitating targeted rehabilitation interventions.

This proposal outlines a comprehensive research agenda focused on the design, development, and evaluation of haptic devices for proprioception assessment in neurological rehabilitation. By combining engineering expertise with insights from rehabilitation science and clinical practice, this research seeks to address the pressing need for accurate and accessible tools to assess and rehabilitate proprioceptive deficits. The proposed study holds significant promise for improving outcomes and enhancing the quality of care for individuals with neurological conditions affecting proprioception.

Keywords :

robotics, haptics, neuroscience

Expected collaborations :

A part of the work will be developed with Lyon Neuroscience Research Centre with the Impact team of Alessandro Farne and Salam Bahmad

Background required from the applicant :

The applicant should ideally have a background in mechatronics and its practical implementation or in mechanical engineering or in electrical engineering.

Knowledge in robot design and modeling would be appreciated. We are looking for an enthusiastic and autonomous student, highly motivated and interested in making connection between theoretical concepts and practical engineering problems.

Existence of a PDF file detailing the proposal ("yes" or "no") : yes

(see guidelines on the website www-csc.utt.fr)