

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 : LAURENT Given names : Hélène

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

Laboratory : PRISME Website address : <https://www.univ-orleans.fr/prisme>

Institution : INSA CVL Website address : <http://www.insa-centrevaldeloire.fr>

Scientific competence of the supervisor:

Member of the Image-Vision (IV) group, H. LAURENT research interests include supervised evaluation of image processing algorithms and the development and validation of dedicated applications. Supervised evaluation which relies on the computation of adequacy scores between results and corresponding ground truths is well suited to the development of application-dependent processing techniques. It has been successfully applied in FUI projects conducted with R&D units of high-tech companies.

Two major publications in the field proposed for the PhD :

1. B. Hemery, H. Laurent, B. Emile, C. Rosenberger, "Evaluation metric of an image understanding result", *Journal of Electronic Imaging*, Volume 24, Issue 1, 2015
2. F. D. Atrevi, D. Vivet, F. Duculty, B. Emile, "A very simple framework for 3D human poses estimation using a single 2D image: Comparison of geometric moments descriptors", *Pattern Recognition*, 71:389-401, 2017

Website address of the personal page :

Supervisor's email : helene.laurent@insa-cvl.fr

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

Title : Specific action recognition through computer vision within the home support framework

Subject :

In recent years, automatic action recognition has attracted a lot of attention in the field of computer vision. Within this context, the proposed PhD subject will focus on key actions such as "feeding", "drinking", "taking medicine", "bedding"... with a view towards helping elderly or needing care people continue living independently while providing assistance in times of need. The PhD subject aims at continuing the research on action recognition in an indoor context previously conducted within different projects (CORTECS-Centralising Operating-Room Tower with Energy-Caring System, SMILE-Sterile Manipulating Interface for Lighting Equipment and CoCAPS-Behaviour sensors) and involving industrial partners from home automation and biomedical sectors. The use of different camera types will be investigated including new sensors ensuring the anonymity of those being observed and only returning images of hot moving objects in a room. Early aims will be to make the correspondence between upper limb movements and actions, match 2D with 3D poses. To that end, the VICON NEXUS motion capture system, set up in the laboratory, could be used to generate reliable ground truths enabling the evaluation of the proposed algorithms in a supervised context. The method will be based on the extraction of informative descriptors and deep learning approaches.

Keywords :

image and video processing and analysis, machine learning, gesture modelling, posture recognition and tracking

Expected collaborations :

co-supervisor : B. EMILE, member of the IV group

Background required from the applicant :

image and video processing, computer programming skills (C/C++/Matlab/OpenCV), machine learning, very good communication skills in English (both spoken and written), speaking French is a plus, willingness to learn is expected otherwise

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

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