

# Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website [www-csc.utt.fr](http://www-csc.utt.fr))

Supervisor's name : Baussard Given names : Alexandre

Status (prof., assistant prof., ...): Professor

Laboratory : Computer Science and Digital Society (LIST3N) Website address : <https://recherche.utt.fr/list3n>

Institution : Université de Technologie de Troyes Website address : <https://www.utt.fr/>

Scientific competence of the supervisor:

Alexandre Baussard received the Ph.D. degree from Ecole Normale Supérieure Cachan in 2003. From 2003 to 2004, he was a CNRS Post-Doctoral Researcher with L2S Laboratory. From 2004 to 2018, he has been associate professor at the Université de Bretagne Occidentale/ENSTA Bretagne and member of Lab-STICC Laboratory. Since 2018, he is full professor at Université de Technologie de Troyes and member of LIST3N laboratory. His research interests include multiscale/multiresolution analysis and machine/deep learning for signal and image processing. The main applications are segmentation, detection, recognition, and classification for electromagnetic, acoustic and optical systems.

Two major publications in the field proposed for the PhD :

1. A. d'Acremont, G. Quin, A. Baussard, R. Fablet. Detection of outliers for deep neural networks trained from synthetic data. Conference on Artificial Intelligence for Defense (CAID), Rennes, November 2020.
2. Z. Lyu, P. Beausery, A. Baussard. Study of an expansion method based on an image-specific classifier and multi-feature for weakly supervised semantic segmentation, ICPRAM, Rome, February 2024.

Website address of the personal page : <https://recherche.utt.fr/research-directory/alexandre-baussard>

Supervisor's email : alexandre.baussard@utt.fr

Description of the research work proposed for a PhD Topic # (see list) : I8, I12, I19

Title : Outlier and novelty detection in classification or segmentation models

Subject :

Recent models for image classification and segmentation have achieved excellent performance. However, to ensure the reliability of the results produced when the data comes from a real uncontrolled environment, it is necessary to be able to decide whether a new observation belongs to the distribution of observations used for training, or not. It is also useful to be able to determine whether these outliers do not come from a new class of data.

The project proposes to tackle these problems using different approaches, with the aim of keeping these models unchanged to guarantee their initial performance. The considered methods could be based on statistical methods or machine learning approaches.

Keywords :

Classification, segmentation, outlier detection, novelty detection

Expected collaborations :

Background required from the applicant :

Mathematics, Statistics, Machine learning, Python would be appreciated

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

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