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 : **KPALMA**   Given names : **Kidiyo**

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

Laboratory : **IETR - Image Department**   Website address : www.ietr.fr

Institution : **INSA de Rennes**   Website address : www.insa-rennes.fr

Scientific competence of the supervisor:

After his PhD in Image Processing from INSA Rennes (1992), Kidiyo Kpalma received his HDR in signal processing and Telecommunications from the University of Rennes 1 (2009). Full Professor at INSA, he teaches signals and systems and signal processing and automatic. As a member of the Image department of the Institute of Electronics and Telecommunications of Rennes (IETR), his research interests include image analysis/segmentation, pattern recognition, saliency detection and facial expression analysis. He has co-supervised 14 PhDs and 17 Masters. He has co-authored more than 100 papers in international journal, international conferences and book chapters.

Two major publications in the field proposed for the PhD :

1. Qiong Wang, Lu Zhang and K. Kpalma, Fast filtering-based temporal saliency detection using Minimum Barrier Distance, IEEE Int. Conf. on Multimedia & Expo Workshops (ICMEW), Hong Kong, 2017

2. Wenbin Zou, Zhi Liu, Kidiyo Kpalma, Joseph Ronsin, Yong Zhao and Nikos Komodakis, Unsupervised Joint Salient Region Detection and Object Segmentation, IEEE TIP, Vol. 24 , No. 11, 2015

Website address of the personal page : http://kpalma.perso.insa-rennes.fr/

Supervisor's email : Kidiyo.Kpalma.@insa-rennes.fr

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

Title : **Semantic Object Detection and Segmentation in Image/Video Using Deep Learning**

Subject :

Artificial intelligence (AI) has gained great attention due its role in our daily life in security, medicine, automatic driving,... Hence, decision-makers have setup various strategies to support research in this domain. The "AI for Humanity" summit held in Paris (March 2018) demonstrates its importance. Object detection and semantic segmentation are the two interleaving topics of AI. The main goal is to locate and detect objects in image/video and semantically segment them, which performance is decisive in the success the system. Recent algorithms have made a breakthrough achievement but there are still opening questions to resolve: 1) current supervised learning algorithms require a lot of labeled data to train the convolutional neural network (CNN) on the condition that the test and training data obey the same distribution. 2) CNN cannot fully learn the semantic feature in labeled training data. Building on the previous studies conducted within our research team, this PhD aims to investigate information propagation in neural networks and develop new algorithms that are able to fuse high-level and low-level semantic features to boost information flow in feature hierarchy.

Keywords :

Saliency analysis and detection, object detection, semantic image segmentation, deep learning

Expected collaborations :

A collaboration with Shenzhen university is planned

Background required from the applicant :

signal processing - image processing - Matlab programming skills - good skils in reading and writing English, The knowledge of French language is a plus.

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

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