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 : Morin | Given names : Luce

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

Laboratory :	IETR	Website address :	www.ietr.fr
Institution :	INSA Rennes	Website address :	www.insa-rennes.fr

Scientific competence of the supervisor:

Prof. Morin has worked a lot on representation of realistic 3D scenes, and immersive medias processing and compression, by combining Structure From Motion (SFM) approaches and video compression tools. More precisely she worked on view-synthesis using image-based rendering approaches, and compression of stereoscopic videos, multi-view videos and multi-view plus depth videos. In collaboration with Dr Lu Zhang, she has worked on quality assessment of stereoscopic videos and light-field images. She is now working on the compression of 3D Gaussian Spaltting (3DGS) models.

Two major publications in the field proposed for the PhD :

1. Z. Zhang, S. Tian, W. Zou, L. Morin, L. Zhang. “A New Benchmark Database and Objective Metric for Light Field Image Quality Evaluation”. IEEE Transactions on Circuits and Systems for Video Technology; October
2. Z. Zhang, S. Tian, W. Zou, L. Morin, L. Zhang. “EDDMF: An Efficient Deep Discrepancy Measuring Framework For Full-Reference Light Field Image Quality Assessment”. IEEE Transactions on Image Processing;

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

Supervisor's email : luce.morin@insa-rennes.fr

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

Title : Immersive media quality assessment

Subject :

With coming era of immersive media, especially in the entertainment domain, the image quality assessment (IQA) appears as crucial for improving the quality of the end-users’ immersive experience and reducing the side effects during the users’ observation. At present, there are several mainstream formats to model immersive environments : Point Clouds (PC), meshes, Neural Radiance Fields (NeRF), and 3D Gaussian Splatting (3DGS). Among them, NeRF and 3DGS are more cutting-edge methods that produce stunning results in realistic immersive environments modeling, offering users a more immersive experience. However, during the processes of generation, compression, and transmission, NeRF/3DGS models inevitably suffer from information loss and various types of distortions, thereby degrading their perceptual quality when presented to human eyes. To this end, a well-performing quality assessment method is essential to ensure a pleasant viewing experience for observers. To the best of our knowledge, there is only one objective metric specifically designed for scenes and objects represented in NeRF, while no metric has been developed for 3DGS models. The design of objective quality metrics for NeRF/3DGS models is thus a challenging topic, which will be the objective of this thesis.

Keywords :

Immersive media, image quality assessment, subjective test, objective model

Expected collaborations :

The thesis will be co-supervised by Ass. Prof. Zhang from INSA Rennes and IETR lab, who has worked a lot on human visual attention modeling and image/video quality assessment. She is also a board member of the international VQEG (Video Quality Experts Group).

Background required from the applicant :

Required : Master in computer science or electrical engineering, signal processing, programming in C/C++, matlab;
Optionnal : image processing, deep learning, programming in python

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

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