EUVIP2021 Tutorial Proposal

Title: Compression of Immersive Media

By

Professor : Ioan Tabus

Institution : Tampere University, Finland

Overview and objectives of the tutorial

The tutorial considers the compression of the new data types arising in the immersive technologies: light field data represented as array of views and point cloud data. The objective of the tutorial is to present the challenges raised by the compression of the new data types and also to show some of the current solutions. We consider in this tutorial the solutions to the common problems of predictive model structure selection for sparse modelling, that arise in the complex settings of plenoptic image compression and point cloud compression, which are nowadays major standardization topics in jpeg and mpeg communities. We have developed the main 4D Prediction mode, which is at the core of the forthcoming JPEG Pleno Light Field standard. We have contributed to the standardization activities several schemes for the compression of both high density camera array images and of plenoptic camera images. The regularities and similarities existing between neighbor angular views were successfully exploited for achieving efficient compression results, within a flexible system having desirable functionalities, such as hierarchical organization allowing random access to the views and a flexible interconnection to the existent 2D image compression standards. We discuss here architectural and algorithmic solutions for the modelling and compression problems, with exemplifications to both plenoptic image compression and point cloud compression.

Biographical Sketch

Ioan Tabus received the Ph.D. degree (with honors) from Tampere University of Technology, Finland, in 1995. He held teaching positions in the Department of Control and Computers, "Politehnica" University of Bucharest from 1984 to 1995. From 1996 he was a Senior Researcher and since January 2000, he has been a Professor in the Department of Signal Processing at Tampere University of Technology, which was merged into University of Tampere in 2019.

His research interests are in light field image processing, plenoptic image compression, points clouds compression, audio, image and data compression, genomic signal processing, and statistical signal processing. He is coauthor of two books and more than 250 publications in the fields of signal compression, image processing, bioinformatics, and system identification.

He served as an Associate Editor of the IEEE Transactions on Signal Processing and for the Signal Processing of EURASIP. He has served as a guest editor of special issues for IEEE Signal Processing Magazine, for Signal Processing of EURASIP, and for IEEE Journal of Selected Topics in Signal Processing. He was the Editor-in-Chief of the EURASIP Journal on Bioinformatics and Systems Biology from 2006 to 2014. Dr. Tabus is the co-recipient of 1991 "Train Vuia" Award of Romania, the 2001 NSIP Best Paper Award, the 2004 NORSIG Best Paper Award, the 2016 3DTv Best Paper Award, and the ICIP 2017 Light Field Image Coding Challenge Award. He is leading the team that designed and implemented the 4D prediction mode of the forthcoming JPEG Pleno Light Field standard.

Personal Webpage : https://homepages.tuni.fi/ioan.tabus/