Workshop on Immersive Visual Signal Processing

Date: July 07 2017 Address: Room 1119, Building F

Center for High Performance Computing

Yo-Sung Ho

Time: 9:30-10:30

Title: MPEG-I Visual & Light Field Camera

The MPEG-I group activity has been started since the 117th Geneva MPEG meeting. The MPEG-I group struggles to provide wide viewpoint images with a concept of omnidirectional media application format (OMAF). In order to display 360 ° video contents perfectly, 6DoF (degree of freedom) video contents encoding and decoding techniques should be developed. During the 118th Hobart MPEG meeting, the MPEG-I Visual group discussed the definition of specific 6DoF cases. The light field camera system is regarded as a solution of the current free-viewpoint image generation technique. In future MPEG meetings, the MPEG-I Visual group will discuss how to generate 3DoF+ and 6DoF test sequences properly for MPEG-I Visual codec standardization.

Dr. Yo-Sung Ho, a new IEEE Fellow, received the Ph.D. degree in electrical and computer engineering from the University of California, Santa Barbara, in 1990. He joined ETRI (Electronics and Telecommunications Research Institute), Daejon, Korea, in 1983. From 1990 to 1993, he was with Philips Laboratories, Briarcliff Manor, New York, where he was involved in development of the Advanced Digital High-Definition Television (AD-HDTV) system. In 1993, he rejoined the technical staff of ETRI and was involved in development of the Korean DBS Digital Television and High-Definition Television systems. Since September 1995, he has been with Gwangju Institute of Science and Technology (GIST), where he is currently Professor of Information and Communications Department. Since August 2003, he has been Director of Realistic Broadcasting Research Center (RBRC) at GIST in Korea. He has served as an Associate Editor of IEEE Transactions on Multimedia (T-MM) and IEEE Transactions on Circuits and Systems Video Technology (T-CSVT). His research interests include Digital Image and Video Coding, Image Analysis and Image Restoration, Three-dimensional Image Modeling and Representation, Advanced Source Coding Techniques, Three-dimensional Television (3DTV) and Realistic Broadcasting Technologies.

徐龙

Time: 10:30-11:30

Title: 太阳观测和太阳大数据处理

太阳是离我们最近的一颗恒星，太阳的剧烈活动 8 分钟后就会到达地球，因此太阳的活动是与人类的生产和生活密切相关的，对于太阳的观测、预报和其他研究也是近年来国内外天文界研究的热点之一。本报告首先介绍太阳观测的基本常识：太阳的基本参数、演化过程以及其在宇宙中所处的位置；太阳观测的历史、基本观测手段和获取的数据情况；太阳射电观测的优越性和太阳射电观测设备的概况、发展历史和近年来太阳射电观测大设备、大项目的兴起。其次，关于太阳观测大数据的处理：介绍太阳观测数据的记录、表现形式、数据规模和数据分析的基本内容；太阳观测大数据处理面临的挑战和大数据处理的需求；重点汇报我们课题组在太阳大数据分类、预报方面的研究工作和研究成果，涉及基于深度学习的大数据分类，该研究对天文观测大数据的筛选和归档至关重要，是解放繁重的人力参与和建立无人值守天文台的关键问题之一，还涉及基于深度学习的太阳活动预报，该研究充分挖掘太阳观测大数据的巨大价值，建立太阳活动的预报模型，为空间天气和空间灾害天气预报提供宝贵的参考资料。

现任中国科学院国家天文台研究员、博士生导师。2009 年毕业于中国科学院计算技术研究所获得博士学位，2009 年 8 月至 2014 年 3 月，先后在香港城市大学、香港中文大学和新加坡南洋理工大学从事博士后研究。2014 年入选中国科学院 “ 百人计划 ”。中国电子学会青年科学家俱乐部会员，以及该俱乐部人工智能与无人系统专委会委员、多媒体技术与虚拟现实专委会委员，中国电子学会虚拟、增强现实技术与产业分会委员。先后主持了国家自然科学基金委青年项目 1 项、面上项目 1 项、教育部留学回国人员科研启动基金资助项目，参加了国家自然科学基金委重点项目 1项。主要研究图像处理、视频压缩、压缩感知、小波分析、机器学习、深度学习和图像质量评价 以及它们在天文学 尤其是在MUSER频谱成像观测中的应用。发表学术论文 50 余篇、专著 1 本。美国专利授权 1 项、欧洲专利授权 4 项。主要研究成果包括：提出了 “ 窗口模型 ” 算法解决网络带宽和缓冲区限制下平滑视频质量的码率控制问题，该算法被联合信源 AVS 高清编码器采用；提出一种通用视频转码的码率控制框架，获得美国专利授权，连续 2 年（2012-2013 ）被香港城市大学选派参加 International ICT Expo（香港 ）和 Eletronica China（上海 ）展会；结合图像质量评价和码率控制，提出视频质量一致性控制算法；较早地引入机器学习、特别是排序算法中的 Rank learning 进行图像质量评价研究，就此方面研究成果出版专著 1 本《Visual quality assessment by machine learning》；引入深度学习算法，开展天文大数据分析和数据挖掘。

杨铀

Time: 14:00-15:00

Title: Illumination Attributes Coding for Virtual Reality Broadcasting System

Objects are described by attributes, and attributes coding is the key problem in object-based video coding. Illumination on object surface is one of the key attribute and it is helpful for scene synthesis, image based rendering and other promising virtual reality applications. How can we extract and encode illumination attribute from images is crucial in facilitating those applications, but so far there is no available method for this goal. In this paper, we propose a method for illumination attribute extraction and coding on image sequences. In this method, ambient illumination attribute is estimated via reconstructed reference images, and then utilized in consequent illumination predictions. Image sequence utilized in the experiments is captured by varied local illumination system, where illumination on object surface varies significantly among images.

博士，IEEE 高级会员。主要从事计算机视觉、计算摄像学、立体视频系统等方面的研究工作，主持和参与国家重点研发计划、国家自然科学重点基金及面上项目、863 项目、国家重大专项、国家重大科技成果转化、博士后特别资助与面上基金等多个项目。在国内外重要的期刊、会议上发表学术论文 60 余篇，获国家发明专利授权 14 项，提交国际 MPEG 提案多项。2011 年于北京数码视讯科技股份有限公司任首席科学家，2013 年于华中科技大学信息工程系任书记，2017 年担任科技部重点研发计划 “ 多业务多网络融合传输关键技术研究与应急通信融合互通设备研制 ” 首席科学家。2011 年起任工信部、广电总局多项立体视频国家标准的起草人、工信部 “ 十二五规划 ” 专家组成员、国家民航安全技术专家组成员、国家新闻出版广电总局大数据领域技术专家、海康威视大数据中心特聘专家、武汉移动互联网智能视频大数据研究所副所长。2012 年获教育部高校科技成果技术发明一等奖；2015 年获联合国 UNITAR “ 杰出贡献 ” 奖、湖北省 “ 楚天学者 ”、华中科技大学 “ 学术新人 ”；2016 年获 “ 华中学者 ”。担任国际期刊 PLoS ONE(2015-)、Neurocomputing 期刊客座编委（2014 ），国际会议 ICIMCS 2013、ICIMCS 2014、MMM 2014、ICME 2014、CVRS2015、VCIP2016 立体视频专委会主席、ICIMCS 2016 执委会委员。

王旭

Time: 15:00-16:00

Title: Research Progress on Deep Learning based Depth Map Enhancement

Depth map of RGB-D data represents the distance information from the viewpoint to the surface of the objects, which can be used to render the virtual viewpoint, synthesize the 3D scene and provide user with immersive experience. Degradation on the depth map will cause annoying virtual experience such as object offset, break boundary of object in the reconstructed 3D scene. Therefore, depth map enhancement is important for the success of 3D application.
In this talk, recently research progress on deep learning based depth map enhancement, especially for compression artifacts reduction, will be discussed. Besides, we propose an intensity guided CNN (IG-Net) model, which learns an end-to-end map between the intensity image and distorted depth map to the uncompressed depth map. To eliminate the undesired blocking artifacts such as discontinuities around object boundary blur, two branches are designed to extract the high-frequency information from intensity image and depth map, respectively. Multi-scale feature fusion and enhancement layers are introduced in the main branch to strength the edge information of the restored depth map. Performance evaluation shows the effectiveness and superiority of our proposed model compared with state-of-the-art methods.

2014 年毕业于香港城市大学，获哲学博士学位，现任深圳大学计算机与软件学院助理教授，未来媒体所所长助理，硕士生导师，深圳市 “ 孔雀计划 “C 类人才。长期从事媒体大数据压缩和处理等方面的研究工作。作为项目负责人主持国家自然科学基金青年基金和腾讯 “ 犀牛鸟 “ 等研究项目 7 项。已发表 SCI 国际期刊论文 22 篇，其中 IEEE Trans. 系列 10 篇。目前 Google Scholar 论文引用数 600 余次。