Chao Huang

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EDUCATION

Nanjing University, Nanjing, Jiangsu, China

- B.Eng. in Telecommunications Engineering — Sep 2015 – Jun 2019

RESEARCH EXPERIENCE

Non-local Attention-based Progressive 3D Point Cloud Denoising

- Virtual Reality and Imaging Research Centre, CUHK — Aug 2019 – Nov 2019
- Supervisors: Prof. Chi-Wing Fu, Philip
  - Explored non-local semantically-related features by formulating the non-local learning unit (NLU) to aggregate features on the whole 3D shape, and designed the graph attention module to consider feature similarity and focus on aggregating features with more similar underlying geometries.
  - Progressively separated the noise features from the cleaned features by cascading a series of NLU and trained the network to encourage the points to become more evenly located on the underlying surface with shape-wise and part-wise regularization.
  - Conducted extensive experiments to quantitatively and qualitatively evaluate our method, and demonstrated its superiority over state-of-the-art method. A first-author paper has been submitted to **CVPR 2020**

Extreme Image Compression

- Vision Lab, Nanjing University — Sep 2018 – Feb 2019
- Supervisor: Prof. Zhan Ma
  - Adopted generative adversarial optimization for extreme image compression that can be used in situations such as communication in depth and web snapshot
  - Proposed a novel Multi-Scale AutoEncoder framework, that constructed a coarse-to-fine image coding pipeline to better preserve the global structure and local details
  - Reconstructed the images with an acceptable perceptual quality at a low bitrate (like 0.03bpp), which is a difficult case for other popular image codecs
  - A first-author paper has been accepted to IEEE VCIP 2019 as an **oral presentation**

Compressive Sampling for Array Cameras

- Camputer Lab, Duke Kunshan University — Jun 2018 – Aug 2018
- Supervisor: Prof. David J.Brady
  - Selected a Compressed-Sensing method to reduce computation in the encoder and processed raw bayer format data from camera
  - Achieved better results than JPEG/JPEG2000: maintaining high quantitative profile like 35dB in PSNR with compression ratio around 1/200
  - Designed an integer kernel strategy for training and reduced the power consumption largely about 10-100 times
  - A co-author paper has been submitted to SIAM Journal on Imaging Sciences

Neural Stitching

- C.I.T.E Lab, Nanjing University — Oct 2018 – Dec 2018
- Supervisors: Prof. Xun Cao and Prof. Yue Tao
  - Used a low-resolution image as guidance and registered high resolution images to the low-res image
  - Combined the plane sweep volume(PSV) method with CNN and accomplished the de-parallax task while maintaining resolution

Optical Flow Compensation for Multi-Frames Super-Resolution

- Vision Lab, Nanjing University — Feb 2018 – May 2018
- Supervisor: Prof. Zhan Ma
  - Stacked multiple deep convolutional neural networks to deal with different kinds of displacements
  - Proposed a U-net shape CNN to estimate the optical flow between two or more neighboring frames
  - Employed image warping in the neighboring two frames to estimate the current frame and achieved a multi-frame super resolution

OTHER WORK EXPERIENCE

Virtual Reality and Imaging Research Centre, the Chinese University of Hong Kong

- Research Assistant, — Jul 2019 – Present
  - Explored in high-level 3D vision especially point cloud understanding for better shape generation and editing

- Developed novel deep neural network based algorithms for 3D point cloud processing like point cloud upsampling and denoising

Aqueti(China) Technology Inc., Co., Suzhou, Jiangsu, China

- Assistant Research and Develop Engineer, Jun 2018 – Aug 2018
  - Established a multi-view camera system and collected image data from different objects and scenes to establish a training dataset
  - Developed novel convolutional neural network based algorithms for the array cameras data processing pipeline

YANSHENG TECHNOLOGY CO., LTD., Guangzhou, Guangdong, China

- Assistant Researcher, Jul 2017 – Aug 2017
  - Improved the storage algorithm and program structure, provided a powerful data analysis function to enhance the Fujian traffic system's efficiency
  - Worked on web page design and helped establish a user friendly interface with a quick response time and concise style of operation

PUBLICATIONS

JOURNALS

[1] X. Yan, D. Brady, J. Wang and **C. Huang** "Compressive Sampling for Array Cameras," *Submitted to SIAM Journal on Imaging Sciences*, Aug 2019.

CONFERENCES

[1] **C. Huang***, R. Li*, and C. Fu "Non-local Attention-based Progressive 3D Point Cloud Denoising," *submitted to **CVPR 2020***, Nov 2019.(* joint 1st authors)

[2] **C. Huang**, H. Liu, and Z. Ma "Extreme Image Compression via Multiscale Autoencoders with Generative Adversarial Optimization," *Accepted to IEEE VCIP 2019 as an **oral presentation***, Aug 2019.

PATENT

Method and apparatus of extreme image compression using multi-scale autoen-coder with generative adversarial optimization,

- Status: In application for US Patent Mar 2019

Compressed sampling in array cameras

- Status: In application for US Patent Nov 2018

CAMPUS ACTIVITIES

Xianyu Sign Language Club, Nanjing University

- Vice President Aug 2016 – Jun 2017
  - Organized and held public benefit activities teaching sign language to students at Nanjing University

Academic Department, Nanjing University

- Vice President Aug 2016 – Jun 2017
  - Organized and hosted a series of academic exchange activities such as professional lectures and experience sharing

AWARDS & SCHOLARSHIPS

- Yang Yongman Scholarship, Nanjing University Jan 2018
- Second-Class People's Scholarship, Nanjing University Dec 2017
- Special-Class People's Scholarship, Nanjing University Dec 2016

LANGUAGES

- English: Fluent (speaking, listening, reading, writing)
- Cantonese: Fluent (reading, listening, speaking); Intermediate (writing).

PROGRAMMING SKILLS

- Language: MATLAB,C/C++,Python
- Frameworks: Pytorch, Tensorflow.

RESEARCH INTERESTS

Computer Vision, Computer Graphics, Deep Learning, Image and Video Processing.