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Weikai Chen

Postdoctoral Researcher, USC ICT

Positions

USC Institute for Creative Technologies, U.S.A
Postdoctoral Researcher, Vision and Graphics Lab — Jun. 2017 - Present

INRIA, France
Visiting Researcher, Alice Team — Jun. 2016 - Aug. 2016

Education

The University of Hong Kong, Hong Kong
- *Ph.D. in Computer Graphics*, advised by Prof. Wenping Wang, — Apr. 2013 - Apr. 2017

Tianjin University, Tianjin, China
- *Mphil. in Wireless Communication*, — Sep. 2010 - Feb. 2013
- *B.S. in Electrical Engineering*, — Sep. 2006 - Jul. 2010

Research Interests

Computer graphics, computer vision and deep learning: face/hair/body modeling and reconstruction, 3D deep learning, deep generative models, unsupervised 3D reconstruction, differentiable rendering, pattern/texture synthesis, digital geometry processing, computational fabrication.

Publications

[13] Zeng Huang, Tianye Li, *Weikai Chen*, Yajie Zhao, Jun Xing, Chloe LeGendre, Linjie Luo, Chongyang Ma and Hao Li, "Deep Volumetric Video From Very Sparse Multi-View Performance Capture", *European Conference on Computer Vision* ***(ECCV)***, 2018.

[12] Yi Zhou, Liwen Hu, Jun Xing, *Weikai Chen*, Han-Wei Kung, Xin Tong, and Hao Li, "HairNet: Single-View Hair Reconstruction using Convolutional Neural Networks", *European Conference on Computer Vision* ***(ECCV)***, 2018.

[11] Shugo Yamaguchi, Shunsuke Saito, Koki Nagano, Yajie Zhao, *Weikai Chen*, Shigeo Morishima and Hao Li, "High-Fidelity Facial Reflectance and Geometry Inference From an Unconstrained Image", *ACM Transactions on Graphics (Proceedings of* ***SIGGRAPH*** *2018)*.

[10] Loc Huynh, *Weikai Chen*, Shunsuke Saito, Jun Xing, Koki Nagano, Andrew Jones, Hao Li and Paul Debevec, "Mesoscopic Facial Geometry inference Using Deep Neural Networks", *IEEE Conference on Computer Vision and Pattern Recognition (****CVPR****)*, 2018, **Spotlight**.

[9] Yajie Zhao, *Weikai Chen*, Jun Xing, Xiaoming Li, Zach Bessinger, Fuchang Liu, Wangmeng Zuo and Ruigang Yang, "Identity Preserving Face Completion for Large Ocular Region Occlusion", *British Machine Vision Conference* ***(BMVC)***, 2018.

[8] *Weikai Chen*, Yuexin Ma, Sylvain Lefebvre, Shiqing Xin, Jons Martnez and Wenping Wang, "Fabricable Tile Decors," *ACM Transactions on Graphics (Proceedings of* ***SIGGRAPH Asia****)*, 2017.

[7] Jonathan Palacios, Lawrence Roy, Prashant Kumar, Chen-Yuan Hsu, *Weikai Chen*, Chongyang Ma, Li-Yi Wei and Eugene Zhang, "Tensor Field Design in Volumes", *ACM Transactions on Graphics (Proceedings of* ***SIGGRAPH Asia****)*, 2017.

[6] *Weikai Chen*, Xiaolong Zhang, Shiqing Xin, Yang Xia, Sylvain Lefebvre and Wenping Wang, "Synthesis of Filigrees for Digital Fabrication", *ACM Transactions on Graphics (Proceedings of **SIGGRAPH**)*, 2016.

[5] Hui Zhang, *Weikai Chen*, Bin Wang, and Wenping Wang, "By Example Synthesis of Three-Dimensional Porous Materials", *Computer Aided Geometric Design **(GMP)***, 2017.

[4] Jonathan Palacios, Chongyang Ma, *Weikai Chen*, Li-Yi Wei, and Eugene Zhang, "Tensor Field Design in Volumes", *SIGGRAPH Asia Technical Briefs*, 2016.

[3] *Weikai Chen*, and Yunhui Chen, "Second-order Differential based Matching Pursuit Method for Compressive Sensing Signal Recovery", in *International Conference on Wireless Communications and Signal Processing **(WCSP)***, 2012.

[2] Kaihua Liu, *Weikai Chen* (corresponding author) and Yongtao Ma, "A compressive sensing method for estimating doubly-selective sparse channels in OFDM system", *Journal of Tianjin University*, Dec. 2012.

[1] Hao Zhang, Wei Pang, Weikai Chen and Chong Zhou, "Design of unbalanced and balanced radio frequency bulk acoustic wave filter for TD SCDMA," in *International Conference on Microwave and Millimeter Wave Technology **(ICMMT)***, 2010.

Manuscripts

[3] Shichen Liu, *Weikai Chen*, Tianye Li, Hao Li , "Soft Rasterizer: Differentiable Rendering for Unsupervised Single-View Mesh Reconstruction ", arXiv:1901.05567, 2019.

[2] Ryota Natsume, Shunsuke Saito, Zeng Huang, *Weikai Chen*, Chongyang Ma, Hao Li, Shigeo Morishima, "SiCloPe: Silhouette-Based Clothed People", arXiv:1901.00049, 2019.

[1] *Weikai Chen*, Xiaoguang Han, Guanbin Li, Chao Chen, Jun Xing, Yajie Zhao and Hao Li, "Deep RBFNet: Point Cloud Feature Learning using Radial Basis Functions", arXiv:1812.04302, 2018.

Recent Research Projects

Unsupervised Single-View Mesh Reconstruction, Sep. 18 - Present

- Present a highly effective differentiable renderer that faithfully approximates the standard graphics renderer in the forward pass of deep neural network. Based on this renderer, we have achieved unsupervised single-view reconstruction with comparable performance to the supervised counterparts.

Single-view based Clothed Human Reconstruction, Aug. 18 - Present

- Present a technique to reconstruct a complete and textured 3D model of a person wearing clothes from a single input image. A new silhouette-based representation is introduced to model clothed human bodies using deep generative models.

Interactive Facial Hair Editing and Synthesis, Feb. 2018 - Present

- Users can design facial hairs of different shapes/lengths/densities via simple sketching, while keeping the style of a target facial hair defined by an exemplar image. The framework is powered by Generative Adversarial Network (GAN).

Perspective Normalization in Portrait Photos, Mar. 18 - Present

- A deep learning based approach to rectify the facial distortion in an unconstrained portrait image shot in a near range. The technique greatly improves the robustness and accuracy of face recognition and 3D face reconstruction from a single portrait photo.

Autocomplete Hair Modeling in VR, Jun. 17 - Present

- Develop a 3D VR authoring system for immersive interaction with the hair models. Our system combines the flexibility of manual authoring, the convenience of data-driven automation and the power of machine learning for high quality hair modeling.

Professional Activities

Program Committee:

- Computational Visual Media Conference (CVM) 2019
- Pacific Graphics 2018

Reviewer:

- CVPR 2019
- ACM SIGGRAPH Asia 2017
- IEEE Transactions on Visualization and Computer Graphics
- International Conference on 3D Vision (3DV) 2018
- Pacific Graphics 2015, 2018
- Computer Aided Geometric Design
- ACM Symposium on Virtual Reality Software and Technology 2018
- International Conference on Machine Vision Applications (MVA) 2019
- 3D Reconstruction in the Wild 2018 (ECCV 2018 Workshop)
- The Visual Computer Journal
- Graphical Models
- IEEE Signal Processing Letters

Awards

HKU Postgraduate Scholarship, 2013 - 2017
National Scholarship by Ministry of Education, 2012
Champion of Presentation in Joint-Hall Academic Symposium, 2015
Champion of Presentation in 4th Morrison Hall Academic Symposium, 2014
First-Class Postgraduate Scholarship, 2010 - 2013
Huawei Scholarship, 2008
Outstanding Student of Tianjin University, 2006 - 2010

Teaching

Teaching Assistant, The University of Hong Kong
- COMP7507: Visualization and Visual Analytics 2014 - 2016

Teaching Assistant, The University of Hong Kong
- CS1117A: Computer Programming 2013 - 2014

Skills

Programming: C/C++, Python, Matlab, Lua, Mel; OpenGL/CV, Tensorflow, Pytorch, Caffe
Languages: Mandarin Chinese (native), English (professional), Cantonese (professional)