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Junqing Huang

Curriculum Vitae

I am a Ph.D. Student (last year) at Ghent Analysis & PDE Center, Ghent University, Belgium, supervised by Prof. **Michael Ruzhansky** and Prof. **Haihui Wang** (Beihang University). Before that, I received my Master's degree in Mathematics, from Beihang University (BUAA), China, in 2015. I also had several years engineering experience at **Beihang University**, **Media Lab, Huawei Technologies Co., Ltd.**, and **Intel China Research Center Ltd.**. My research interest broadly includes image processing and on low-level vision, large-scale optimization, deep learning, applications, etc..

Interests

Low-level Vision **Image Processing:** Filters, Tone Mapping, Enhancement, Matting, Super-resolution, Denoising, etc.
Vision/Graphics: Camera Calibration, Stereo Matching, Optical Flow, Depth, 3D Reconstruction, SLAM.

Optimization Convex and Nonconvex Optimization, Large-scale Optimization, Variational and Monotone Operators, etc.

AI/ML/DL Image Classification, Segmentation and Object Detection, Domain Adaptation and Transfer Learning etc.

Education

2019–Present **Doctoral Candidate in Department of Mathematics**, *Ghent University*, Ghent, Belgium
Thesis: **Semi-sparsity for Signal/Image Processing: Theory, Algorithm and Applications.**
Supervisors: *Prof. Michael Ruzhansky and Prof. Haihui Wang*

2012–2015 **M.S. in Mathematics and System Sciences**, *BUAA University*, Beijing, China
Thesis: **Research on Millimeter and Visible Images Fusion Algorithms Using Multiscale Analysis.**
Supervisor: *Prof. Haihui Wang*

2007–2011 **B.S. in Automation**, *Zhengzhou University*, Zhengzhou, China
Thesis: **The Vehicle Plate Recognization Algorithm Based on Matlab.**
Supervisor: *Prof. Chaohua Jia.*

Experience

Work Experience

2018–2019 **Research Assistant (1 Years)**, *Haihui Big Data Lab*, Beihang University, Beijing
- Low-level image rendering (tone mapping, color, contrast and white balance etc.)
- Image-based 3D reconstruction, structure from movtion.

2015–2017 **Research Engineer (2 Years)**, *Media Lab*, Beijing Huawei Digital Technologies Co., Ltd, Beijing
- Visual SLAM for robot, autonomous driving;
- Camera calibration, stereo matching, optical flow, depth estimation, 3D reconstruction, etc;
- Low-level image rendering, filters (tone mapping, color, contrast and white balance etc.)

Internship

2014–2015 **Research Intern (8 Months)**, Intel China Research Center (ICRC), Beijing
- Non-photorealistic rendering and image stylization (watercolor, oil painting, hatching effects etc.)
- Face deforming and animation based on RealSence.

Research Projects

2013

Inverse Imaging and Rendering for High-quality Perception, *(long-term program)*

- The work aims to low-level image processing, including image demosaicking, denoising, tone mapping, enhancement, dehaze and so on. It also involves several theoretical research fields, including inverse imaging, wavelet analysis, filtering techniques, optimization theory and algorithm, deep learning and so on.
- Design a real-time image rendering framework, which is suitable for low-lighting image and able to improve image clarity and contrast automatically with little artifacts.
- *One patent has successfully implemented on FPGA in an endoscope of Shenda Endoscope Co., Ltd..*
- *Four papers: T-PAMI (1 published and 1 submitted), TIP (1 published), TVCG (1 in progress).*

2014

Artistic Stylization Algorithm for Images and Video

- Develop (deep) learning-based methods for image and video artistic stylization, style transfer, and non-photorealistic image rendering, etc..
- *Three papers: CVPR2024 (1 submitted), T-PAMI (1 in progress), NIPS2024 (1 in progress).*

2016

Deep Learning in Low-level Vision towards Practical Applications

- Develop deep learning methods to solve practical low-level vision tasks, including image demosaicing, super-resolution, denoising, (semantic) segmentation, etc..
- *Image segmentation projects: Spectral plant images segmentation and analysis, Calcium carbonate nanoparticle extraction and analysis.*
- *Image classification project: Parkinson disease diagnostician. Four papers: (2 published and 2 in submission).*

2015 – 2017

SLAM for Indoor Robot Localization and 3D Dense Recontruction

- A real-time SLAM system and 3d dense reconstruction, following the start-of arts lile ORB SLAM, LSD SLAM, SVO SLAM and so on.

2015 – 2017

GPU-based Stereo Matching for Depth Estimation

- A GPU-based real-time stereo matching for high resolution images, which gives a more accurate results in salient edge for the edge-aware preserving property.

2013 – 2014

Research on Millimeter and Visible Images Fusion Algorithms Using Multiscale Analysis

2010 – 2011

The Vehicle Plate Recognization Algorithm Based on Matlab

Publications

[Huang et al., 2023a] **Huang, J.**, Ruzhansky, M., Zhang, Q., and Wang, H. (2023a). Intrinsic image transfer for illumination manipulation. **IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)**, 45(6):7444–7456.

[Huang et al., 2023b] **Huang, J.**, Wang, H., Wang, X., and Ruzhansky, M. (2023b). Semi-sparsity for smoothing filters. **IEEE Transactions on Image Processing (TIP)**, 32:1627–1639.

[Huang et al., 2024a] **Huang, J.**, Wang, H., and Ruzhansky, M. (2024a). Semi-sparsity priors for image structure analysis and extraction. **IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)**. **(Under Submission)**.

[Huang et al., 2024b] **Huang, J.**, Wang, H., and Ruzhansky, M. (2024b). Optimal image transport on sparse dictionaries. In Proceedings of the **IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)**. **(Under Submission)**.

[Huang et al., 2024c] **Huang, J.**, Wang, H., and Ruzhansky, M. (2024c). (Semi)-sparsity for signal/image processing: modeling, algorithms and applications. **SIAM Review**. **(In Progress)**.

[Huang et al., 2024d] **Huang, J.**, Wang, H., and Ruzhansky, M. (2024d). Semi-sparsity on piecewise constant function spaces for triangular mesh denoising. **IEEE Transactions on Visualization and Computer Graphics(TVCG)**. **(In Progress)**.

[Huang et al., 2024e] **Huang, J.**, Wang, H., and Ruzhansky, M. (2024e). Simultaneously image representation and transformation. **IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)**. **(In Progress)**.

[Huang et al., 2024f] **Huang, J.**, Wang, H., and Ruzhansky, M. (2024f). Optimal image transport on convolutional sparse dictionaries. In Advances in **Neural Information Processing Systems (NeuIPS)**. **(In Progress)**.

[Huang et al., 2019] **Huang, J.**, M. R. H. F. H., Zheng, L., and Wang, H. (2019). Feature extraction for license plate location based on l0-norm smoothing. **Open Computer Science**, pages 128–135.

[Wang et al., 2023] Wang, X., **Huang, J.**, Chatzakou, M., Nõmm, S., Valla, E., Medijainen, K., Taba, P., Toomela, A., and Ruzhansky, M. (2023). Comparison of one- two- and three-dimensional cnn models for drawing-test-based diagnostics of the parkinson's disease. **Biomedical Signal Processing and Control**, 87:1746–1754.

[Wang et al., 2023] Wang, X., **Huang, J.**, Chatzakou, M., Medijainen, K., Taba, P., Toomela, A., Nomm, S., and Ruzhansky, M. (2023). A light-weight cnn model for efficient parkinson's disease diagnostics. In **IEEE 36th International Symposium on Computer Based Medical Systems (CBMS) 2023**, pages 616–621, IEEE Computer Society. Best paper award.

Patent

2023 **Semi-dense color filter arrays**, *Junqing Huang, Haihui Wang Michael Ruzhansky*, Ghent University and Beihang University, US patent (in submission)

2017 **An illumination compensation method for endoscope apparatus**, *Junqing Huang and Haihui Wang*, Shenda Endoscope Co., Ltd.., China patent

Activities and Honors

Academic Activities

- Reviewer for Academic Conferences (ICCV, CVPR, NIPS, ECCV, etc.)
- Participant/Organization of Conferences and Workshops in Ghent Analysis & PDE Center, 2019-2023
- Committee member of Department of Mathematics, Ghent University, 2019-2023
- Teaching assistant in Calculus, Linear Algebra and Statistics, Beihang University, 2012-2014

Honors

- Best paper: "IEEE 36th International Symposium on Computer-Based Medical Systems", 2023
- 2022 Chinese Government Award for Outstanding Students Abroad, 2022
- Best paper: "11th Graduates Academic Forum" of Beihang University, 2014
- Excellent Student Scholarship of Zhengzhou University, 2010

Languages

Chinese	Native	
English	Fluent	*Certificate of Proficiency in English*
German	Basic	*Self-learning for 1.5 years in part-time*

Skills

Programming	*Matlab, C/C++ (OpenCV, Eigen, CUDA, etc), Python, LaTeX*
Platform	*Windows (Visual C++), Linux (GDB, Qt), Mac OS (seldom)*
Other Skills	*Photoshop, Dreamweaver*

Interests

Calligraphy, Photographing, Badminton, Table tennis, Swimming, Hiking, etc.

References

Prof. Haihui, Wang

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