Changjiang Cai

Ph.D. Candidate – Department of Computer Science
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About

Being excited about leveraging my knowledge in *Computer Vision* and *Machine Learning* to solve practical and challenging problems in production oriented research and development, I am actively seeking a full-time applied scientist or research engineer role in the area of computer vision. My research experiences cover depth estimation, stereo matching, 3D reconstruction, semantic segmentation and human pose estimation.

Education

○ **Stevens Institute of Technology**   **Hoboken, New Jersey, USA**
Doctor of Philosophy in Computer Science, anticipated in June 2021

Research Interests: Computer Vision and Machine Learning. Specifically, Stereo Matching, Semantic Segmentation and Human Pose Estimation.
Advisor: Philippos Mordohai (`https://mordohai.github.io`)

○ **Stevens Institute of Technology**   **Hoboken, New Jersey, USA**
Master of Engineering in Electrical Engineering, in February 2016

Concentration: Computer Vision and Machine Learning.
Advisor: Gang Hua (`http://www.ganghua.org`)

○ **Xi'an Jiaotong University**   **Xi'an, Shaanxi, China**
Mechanical Engineering

Research Area: Digital Image Processing. **Advisor**: Dehong Yu

○ **Northwestern Polytechnical University**   **Xi'an, Shaanxi, China**
B.E. in Automobile Engineering, in July 2009

Thesis: Structural Design and 3D Modeling of an Assistive Robot. **Advisor**: Renping Shao

Publications

Published

○ **Changjiang Cai**, Philippos Mordohai. *Do End-to-end Stereo Algorithms Under-utilize Information?* In International Conference on 3D Vision (3DV), 2020.

○ **Changjiang Cai**, Matteo Poggi, Stefano Mattoccia, and Philippos Mordohai, *Matching-space Stereo Networks for Cross-domain Generalization.* In International Conference on 3D Vision (3DV), 2020.

- Konstantinos Batsos, **Changjiang Cai**, Philippos Mordohai. *CBMV: A coalesced bidirectional matching volume for disparity estimation.* In CVPR 2018, Salt Lake City, Utah, June 2018.
- **Changjiang Cai**, Haipei Sun, Boxiang Dong, Bo Zhang, Ting Wang, Hui Wang. *Pairwise Ranking Aggregation by Non-interactive Crowdsourcing with Budget Constraints.* The 37th IEEE International Conference on Distributed Computing (ICDCS), June, 2017, Atlanta, GA.
- Haoxiang Li, Mohammed Kutbi, Xin Li, **Changjiang Cai**, Philippos Mordohai, Gang Hua, *An Egocentric Computer Vision based Co-Robot Wheelchair.* IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2016.

Preprints/Submissions

- Ren Li, **Changjiang Cai**, Georgios Georgakis, Srikrishna Karanam, Terrence Chen, Ziyan Wu. *Towards Robust RGB-D Human Mesh Recovery.* arXiv:1911.07383.

Research Projects

- **[Ongoing]** *GAN and DDN based Local Expansion for End-to-end Stereo Matching*
  - Integrating non-differential but geometry-aware local expansion via deep declarative networks (DDN), implicit differentiation and GAN for end-to-end stereo matching.
- **[Ongoing]** *Self-/Un-supervised Robust Presentation Learning*
  - Self- or un-supervised learning for a robust representation which aims to improve semantic segmentation, optical flow estimation and monocular or stereo depth estimation.
- **2020 Project** *Do End-to-end Stereo Algorithms Under-utilize Information?*
  - Incorporated content-adaptive deep filtering techniques into SOTA networks (including DispNetC, GCNet, PSMNet, and GANet) for improved stereo matching.
- **2019 Project** *Matching-space Stereo Networks for Cross-domain Generalization*
  - Proposed a novel family of architectures with domain-invariant generalization.
- **2019 Project** *Depth-Aware Human Mesh Recovery*
  - Proposed a new method using RGB-D data to estimate a parametric human mesh model
- **2018 Project** CBMV_ ROB Entry in the Robust Vision Challenge, CVPR'18 workshop
  - Submitted the CBMV_ROB entry in the stereo challenge, leveraging CBMV volume as in our previous work and local expansion algorithm for optimization.
- **2017 Project** *CBMV: A Coalesced Bidirectional Matching Volume for Disparity Estimation*
  - Generated a matching volume by coalescing diverse evidence from a bidirectional matching process via random forest classifiers.
- **2016 Project** Crowdsourcing: *Budget-conscious Ranking by Non-interactive Crowdsourcing*
  - Designed a crowdsourced ranking algorithm enabling task requester to obtain a good full ranking result from the crowdsourced pairwise comparison, with a limited budget.
- **2015 Project** **Epitome Transform Coding:** *Towards Joint Compression of Images*
  - Proposed epitome transform coding, an approach to joint compression of a set of images.

Intern Experience

Part-time intern   **Futurewei Technologies, Inc. Seattle, WA**
Research Intern   *Sep 2020 – Dec 2020*

Summer intern   **Futurewei Technologies, Inc. Seattle, WA**
Research Intern   *May 2020 – Aug 2020*

Summer intern   **UII America, Cambridge, MA**
Research Intern   *May 2019 – Aug 2019*

Teaching Experience

CS442 - Database Management Systems   **Stevens Institute of Technology**
Teaching Assistant   *Aug 2016 – Dec 2016*

Skills

- **Programming Languages:** Python, C/C++, Python& C++ Hybrid, Matlab
- **Library & APIs:** PyTorch, TensorFlow, Keras, Caffe, CUDA, Cython, OpenCV, Boost C++
- **Database:** MySQL, PostgreSQL
- **Tools:** Vim, Git, CMake, Bash, Tmux
- **OS Platforms:** Linux, macOS, Windows

Languages

- Chinese (native), English (proficient)