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EDUCATION

Portland State University	Ph.D. in Computer Science	GPA 3.92	2012 - present
Portland State University	Master of Science in Computer Science	GPA 3.92	2012 - 2019
Tsinghua University	Master of Engineering in Fluid Mechanics	GPA 3.63	2009 - 2012
Tsinghua University	Bachelor of Engineering in Mechanics	GPA 3.61	2005 - 2009

SUMMARY: Ten years' experience on Computer Vision and Computer Graphics, working areas include HD mapping and localization in autonomous-driving, 3D depth enhancement for single/multi-view system, novel view synthesis using image-based rendering techniques (such as video stabilization and image stitching), and computational photography such as image denoising and quality assessment. Passionate about developing/implementing advanced computer vision/graphics algorithms. Skilled programmer with C/C++/Matlab/OpenCV/OpenGL/Pytorch with solid machine learning and deep learning background.

EXPERIENCE

Computer Vision Engineer - Autonomous Vehicles, NVIDIA, Santa Clara, CA, 2018 - present

- **Autonomous Vehicles:** (C/C++) Develop multi-drive landmark (poles, signs & lanes) fusion algorithms to generate high quality HD maps dedicated for L2/L4 autonomous driving. Implement 2D and 3D HD map visualization/rendering. Develop computer vision-based localization core algorithm in a Kalman Filter-based framework, which is suitable for localization using different types of sensors such as camera, radar and Lidar. Construct localization KPI tracking/visualization using Athena and working on KPI generation using docker cloud computing.

Computer Vision Intern – Lytro Immerge (VR), Lytro, Mountain View, CA, 2017 summer

- **Multi-view depth fine tuning** (C/C++/OpenCV) Developed depth enhancement algorithms for Virtual Reality videos captured by camera arrays (91 cameras) using patch matching, geodesic path expanding & sensor fusion. Reduce 30% of the depth alignment error to pixel level. Integrated into Lytro product pipeline.

Graduate Research Assistant (4 research papers published), PSU, Portland, OR, 2012 - 2018

- **Novel View Synthesis** (C/C++/Matlab/OpenFrameworks/Maya): Developed a pipeline to generate high FPS videos for camera arrays with SOTA performance. By using feature matching & image-based rendering techniques, plausible and parallax-free novel views can be generated for challenging inputs with large camera/object motions. (WACV 2019)
- **Patch Matching for Image Denoising** (C/C++/Matlab/OpenCV): Developed a clustering-based patch searching approach to consistently improve denoising (like BM3D) performance quantitatively (10%) and visually. (WACV 2019)
- **No-reference Image Denoising Quality Assessment** (Matlab/C): Developed a data-driven no-reference quality assessment method (using random forest) that can quickly select optimal denoising algorithm/parameters. (CVC 2019)
- **Depth Enhancement** (C/Matlab/OpenCV/OpenNI/Kinect SDK): Developed a depth enhancement algorithm that performs depth completion and denoising simultaneously for RGBD cameras like Microsoft Kinect, achieving appealing performance, both visually/quantitatively and is robust against different types of input depth. (CVPR 2014)

Graduate Instructor/Teaching Assistant (received overall 4.18/5 rating), PSU, Portland, OR, 2017 - 2018

- **CS447/547-Computer Graphics** (Instructor): give senior level lectures on movies/games/animations/rendering. Teach 2 course projects - a mini-Photoshop (FLTK/OpenCV) and a 3D Amusement Park rendered animation(OpenGL).
- **CS410/510 -Computational Photography** (Instructor): giving senior level lectures on updated research topics in computer vision & graphics, including high dynamic range imaging, panorama stitching, image segmentation & matting, video stabilization, virtual reality basics, deep learning in computer vision etc.

Robocup Team Leader, Tsinghua, Beijing, China, 2007 - 2012

- Developed a robot vision system with real-time (20 FPS) object detection(football/field lines/goals) and ball-locating/self-locating (location error <5 cms) (C++/Windows Mobile SDK/Linux) (ICVRCA 2012 paper).
- Developed a wireless vision parameter tuning interface to allow fast camera calibration before real games. By utilizing this interface, I reduced the parameter tuning time by more than 70% before each game (Matlab, C).

PUBLICATIONS

- Si Lu, Good Similar Patches for Image Denoising. WACV 2019 (Top 10 computer vision conference)
- Si Lu, High-speed Video from Asunchronous Camera Array. WACV 2019 (Top 10 computer vision conference)
- Si Lu, Xiaofeng Ren, Feng Liu. Depth Enhancement via Low-rank Matrix Completion. CVPR 2014 (Top 3 cv conference)
- Si Lu, No-reference Image Denoising Quality Assessment. Computer Vision Conference, Sprint CVC 2019
- Si Lu, et.al.. Field Line Detection Based on Local-precise Extracting and Modified Hough Transform. IEEE ICVRCA 2012

SKILLS & LIBRARIES

C/C++/OpenCV (proficient), Matlab (proficient), Python/PyTorch (working knowledge), FLTK/OpenGL/OpenNI/Kinect SDK, Visual Studio (familiar), Maya (working knowledge), Git (working knowledge)