Xuan Luo

Curriculum Vitae

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Education

2015–now **Ph.D., Computer Science and Engineering**, *University of Washington*, Seattle, WA, US.
- Advised by ***Steven M. Seitz*** in *GRAIL* lab.
- Area of Research: Virtual/Augmented Reality.

2011–2015 **B.S., Computer Science and Technology**, *Shanghai Jiao Tong University (SJTU)*, China.

Program ***ACM Honored Class*** (a pilot computer science class in China), Zhiyuan College
- Rank: All 3 years: 2/27. Sophomore year: **1/27**.
- Major GPA: 3.96/4.3, 91.28/100. Cumulative GPA: 3.95/4.3 , 90.97/100. (All 3 years)
- Good **math** training: 14 out of all 15 math courses are above A and 8 of them are over A+.

9.2014-2.2015 **Visiting Scholar**, *National University of Singapore*, Singapore.

7.2014 **Exchange Student**, *Cornell University*, Ithaca, NY, US.

Work Experience

2016 summer **Software Engineering Intern**, *Google Daydream*, Seattle, WA, USA.

Skills

Languages C++, Python, Matlab, Java, HTML, LaTeX, MySQL, C#,PHP, Verilog, OpenGL,TinyOS

Tools Unity, Photoshop

Research Interests

Augmented/Virtual Reality *3D Display*

Computer Vision *Stereo Matching, Deep Learning, Detection*

Graphics

Honors and Awards

2015 **Distinguished Graduate Scholarship, SJTU** *Top 1%*

2015 **Shanghai Outstanding Graduate** *Top 1%*

2013 **National Scholarship, China** *Highest scholarship in China, top 1%*

2012 **Kai Yuan Scholarship, SJTU** *Top 2%*

2012 **the 2012 University Physics Competition, Silver Medal, USA** *Top 15%*

Publications

Min Lin, Shuo Li, **Xuan Luo**. *"Purine: A Graph-based Deep Learning Framework".* International Conference on Learning Representations (ICLR), 2015.

Xuejiao Bai, **Xuan Luo**, Shuo Li. *"Adaptive Stereo Matching via Loop-erased Random Walk".* IEEE International Conference on Image Processing (ICIP), 2014.

Research Experience

Computational Display

Advisor Steven M. Seitz, University of Washington, US

10.2015-now **Pop-up 3D Display**.

We designed a simple, cheap and glass-free 3D display. It only requires a tablet with gyroscope and a rotational symmetric reflector (a plastic cup, a plastic cone made of a piece of plastic sheet, etc.) to show a 3D hologram inside the reflector.

Stereo Matching

Goal Recover depth information from a pair of images of the same scene. ($disparity \propto 1/depth$)

Advisor Hongtao Lu, Center for Brain-like Computing and Machine Intelligence, SJTU, China

8.2013-1.2014 **Adaptive Stereo Matching via Loop-erased Random Walk, *ICIP 2014***, *http://bcmi.sjtu.edu.cn/∼luoxuan/papers/icip2014.pdf*.

I proposed to use a random tree generated by Loop-erased Radom Walk (LERW) to replace traditional minimum spanning tree in non-local methods. LERW achieves better results especially over curved & slanted surfaces due to its more adaptive support windows (SW). I also provided a mathematical analysis to explain this strength of randomness, giving deeper understanding of SWs of the tree-based algorithms.

2.2014-8.2014 **Fast Non-local Stereo Matching based on Hierarchical Disparity Prediction**.

pdf: http://arxiv.org/abs/1509.08197
code: https://github.com/roxanneluo/Hierarchical-Disparity-Prediction

I proposed a new framework, DPA. Almost all tree-based algorithms can use DPA to improve speed and accuracy. For example, with DPA, the segment-tree-based algorithm is 6.25 times faster and 3.04% more accurate over Middlebury 2006 dataset.

Deep Learning

Advisor Shuicheng Yan, Learning and Vision Research Group, National University of Singapore

8.2014-10.2014 **Purine**.

pdf: http://arxiv.org/abs/1412.6249
ppt: http://bcmi.sjtu.edu.cn/∼luoxuan/slides/purine_introduction.html
code: https://github.com/purine/purine2

Purine is a flexible graph-based parallel deep learning framework. It outperforms current widely-used deep learning frameworks in that its graph-based design allows any kind of parallelism, both data and model parallelism, arbitrary network structure (e.g., recurrent neural network), and can utilize unlimited number of CPUs and GPUs. And it's fast and easy-to-use. I contributed the multi-GPU & multi-machine data copy part, the key bottleneck for all parallel frameworks, testing codes and part of the network definition protocol. It will be released soon.

Robotics

Advisor Zhengping Feng, School of Naval Architecture, Ocean and Civil Engineering, SJTU, China

3.2012–3.2013 **Development of Low Cost Test-bed for Autonomous Underwater Vehicle (AUV) On-board Intelligence**.

I led four other team members to build a toy submarine equipped with an embedded computer, a gyro, a barometer, etc., to autonomously drive itself. I learned the PID controller, designed and implemented a sliding mode control system, assembled the submarine and carried out a series of underwater experiments.

Course Projects

Codes of some projects available at https://github.com/roxanneluo

2016.6 **HoloCook, C#, AR/VR Capstone** *Cooking Tutorial app on Hololens*

2016.6 **Become Brad Pitt, C++, Computer Vision** *Facial Puppetry*

2015.11 **Environment Matting, C++&Python, Graphics** *Composition of Refractive Objects*

2014	**Fatworm Database, Java**	*Designed and implemented a database management system*
2014	**Freebase, PHP+MySQL**	*Small web search engine built over the Freebase database*
2014	**Wireless Multi-hop Routing, TinyOS**	*For telecommunication of wireless sensors*
2013-2014	**Nachos Operating System, Java**	*Nachos Project from UC Berkeley CS162*
2013	**Modern Compiler Implementation, Java**	*Compiler for Simplified C Language*
2013	**Simulated CPU, Verilog**	*MIPS CPU design task from UC Berkeley CS152*
2013	**Galaxy Maze, OpenGL**	*Self-designed 3D Game.*

Specialty

Fine Arts Good at painting. My portfolio available at bcmi.sjtu.edu.cn/∼luoxuan/portfolio/main.html