

Yu SHEN

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EDUCATION

University of Maryland *Doctor of Philosophy; Computer Science Major* 08/2020-N/A

University of Maryland *Master of Science; Computer Science Major* 08/2018-05/2020

- Related Courses: Deep learning, Visual Learning and Recognition, High Performance Computing Systems, AI Planning, Advanced Computer Graphics, Robotics, Advanced Linear Numerical Analysis, etc.

East China Normal University *Bachelor of Engineering; Software Engineering Major* 09/2009-06/2013

- Related Courses: Data Structure and Algorithms, Algorithmic Design and Analysis, Software Engineering Mathematics, Linear Algebra, Foundation of Computation Theory, Computer Composition, etc.

HONORS & AWARDS (national or higher)

- Gold Medal of Asia Regional Contest for the 37th ACM/ICPC (nearly top 100 in China, per year) 10/2012
- IBM Chinese Excellent Student Scholarship (top 80 in China, per year) 09/2012
- National Scholarship 09/2011

WORK EXPERIENCE

Beijing Bytedance Technology Co., Ltd. **Palo Alto, California**

Research Intern 05/2019-08/2019

- Optimized the Landmark AR system, including data collection process, model building module, online localization and tracking module, landmark choosing rules, etc. The Landmark AR features are integrated into the Tik-Tok application in October, which is a mobile software that has nearly 320 million DAU.

HiScene Information Technology Co., Ltd. **Shanghai**

Technical Manager 09/2015-07/2018

- Led the team to accomplish algorithm study, algorithm implementation, performance optimization of the algorithm in various platforms, etc. Algorithms include image recognition and tracking with pose estimation, SLAM, item recognition with deep learning, other AR related algorithms, etc.
- Accumulated experience on computer vision algorithms, engineering processes like software architecture designing and code optimizing, as well as leadership and team management.

SZ DJI Technology Co., Ltd. **Shenzhen, Guangdong**

Vision Algorithm Engineer 05/2014-08/2015

- Implemented or improved the vision algorithms used on unmanned aerial vehicles, including visual odometer, obstacles avoiding and simultaneous localization and mapping. Lead a team to build the stereo camera calibration system (which is widely used on Phantom series and all later drone products in DJI), etc.
- Obtained deep recognition on pose estimation with vision information, camera calibration, etc.

Tencent Technology (Shenzhen) Co., Ltd. **Shanghai**

Software Engineer 07/2013-04/2014

- Developed new features of back-end and maintained a high-performance system for an online shopping platform, which could support over hundreds of millions of users online simultaneously.
- Obtained technology to build high-performance systems supporting a huge amount of users.

BEST PROJECT CASES

QQ-AR Project (in HiScene) 03/2016~08/2016

- A cooperation project between Tencent and HiScene, during the Olympic Games in 2016. As an AR (Augmented Reality) technology provider, our team customized a special version of our commercial AR SDK for them, which had features like recognition and tracking, and had high performance, impressive effects, small size and other advantages. This project applied for a Guinness World Record, which is “Most scans of an Augmented Reality (AR) image in 24 hours”. In this project, I played the role of technical leader in HiScene.

Stereo Calibration Project (in DJI) 04/2014~08/2015

- The first stereo project in DJI, to support the first stereo vision system. Our team improved the stereo calibration algorithm and user calibration process, to make the general user calibration possible. The improved algorithm applied

for patents all over the world, and was awarded as one of the key patents in DJI, while the first author is me. Our team also built the first stereo calibration pipeline in the factory of DJI, and provided related software to factory and general users to calibrate the stereo cameras. I was the direct leader of this project.

RESEARCHES

Research in 3D perception and its application

09/2018-now

- Doing research about 3D obstacle perception in autonomous driving and 3D garment reconstruction with Prof Ming Lin. In the autonomous driving project, we combined the multi-sensor perception (RGB camera, Lidar, etc) and weighted inverse reinforcement learning to achieve the goal of perception and planning. In the garment project, we use generative network to generate 3D garments with arbitrary topology, which can be retargeted easily to any body with the help of our special representation of garment.

Optimization of Recognition and Tracking Algorithm

07/2015-8/2018

- Optimized the recognition and tracking algorithm with pose estimation, i.e., higher accuracy, faster speed, new quantitative metrics like tracking stability, new features like recognizing and tracking multiple objects simultaneously, etc. They are used in commercial AR SDK.

Optimization of Visual Odometer, Simultaneous Localization and Mapping Algorithm

06/2014-06/2015

- Optimized the VO and SLAM algorithm, i.e., higher accuracy, faster speed, and so on. Those algorithms are used on nearly all the following DJI products like Phantom, Inspire, Spark, Mavic, etc.

PUBLICATIONS

GAN-based Garment Generation Using Pattern Image

08/2020

- *ECCV 2020*, Yu Shen, Junbang Liang, Ming Lin

Illumination Insensitive Efficient Second-order Minimization for Planar Object Tracking

06/2017

- *ICRA2017*, Lin Chen¹, Fan Zhou^{1,2}, Yu Shen³, Xiang Tian^{1,4}, Haibin Ling^{3,5}, Yaowu Chen¹

PATENTS

Binocular Camera Calibration (First Author)

- Applied in US (US 15/491,858), China (CN 201480075081.X), Europe (EP 14905290.4), Japan (JP 2016-545318), and PCT (PCT/CN2014/090217), etc.

GUINNESS WORLD RECORD

Most scans of an Augmented Reality (AR) image in 24 hours (participant)

08/2016

- The most scans of an Augmented Reality (AR) image in 24 hours is 1,211,425 times and was achieved by Tencent QQ (China) on 5 August 2016. The campaign on QQ was held across the Olympic Games and ran until the end of the Games. I was the technical leader of the algorithm team in HiScene, the cooperator of Tencent in this project.

SKILLS

- C/C++, CMAKE, Visual Studio/Visual Code, MATLAB, Python, Pytorch, PHP, Continuous Integration, OpenCV, etc.