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Junsheng Fu

GitHub
Patents
Homepage

I am an experienced researcher, a quick learner and a problem solver, passionate about autonomous driving, with 8 patents applications and 4 papers. I like to think “what if” and “how to”, and enjoy applying Computer Vision and Deep Learning techniques to solve the challenges in autonomous driving.

Technical skills
Languages: Python, Matlab, C/C++
Frameworks: TensorFlow, Keras, CUDA, OpenCV, Scikit-learn,
Others: Camera pose estimation, Structure-from-motion, Machine Learning, Tracking, SLAM, Git, Linux

Projects

Vehicle localization Demo 6.2017
- Implemented a real-time particle filter to estimate the position and orientation of a moving vehicle.
- Utilized a given map, a noisy GPS location, and the noisy observation data as the inputs.

Sensor fusion-based tracking Demo 5.2017
- Designed and implemented Extended Kalman Filter and Unscented Kalman Filter for object tracking.
- Utilized fused sensor data from both LIDAR and RADAR sensors.

Vehicle detection Demo 4.2017
- Created vehicle detection and tracking pipeline with two approaches, deep neural networks (YOLO+TensorFlow) and support vector machines (HOG+OpenCV).
- Optimized and evaluated the model on video data from both highway and city driving.

Lane departure warning Demo 3.2017
- Designed and implemented a lane-finding algorithm and a lane-departure-warning system.
- Identified lane curvature and overcame environmental challenges, e.g. shadows, pavement changes.

Driving behavioral cloning Demo 2.2017
- Built and trained a CNN to autonomously steer a car in a game simulator, using TensorFlow and Keras.
- Used optimization techniques to generalize the network for driving on unseen tracks.

Experience

Tampere University of Technology **Doctoral Student** Finland | 1.2014-12.2017
- Implemented 8 autonomous driving demos with OpenCV, Python, Keras, and TensorFlow (videos).
- Working on camera pose estimation with LIDAR and street-view images.
- Served as teaching Assistant for “SGN-13006 Introduction to Pattern Recognition and Machine Learning”, and got the best course reviews award from students in 2016 Fall Semester.

Nokia Research Center (Nokia Tech) **Computer Vision Researcher** Finland | 3.2012-12.2015
- Designed and implemented a 3D Map Augmented Photo gallery application with **HERE** Map (video).
- Developed an Interactive Video Playback System with **HERE** Map (video).
- Implemented 3D reconstruction and visualization systems for indoor 3D smart sensing.

Tampere University of Technology **Research Assistant** Finland | 9.2010-12.2011
- Designed and implemented a real-time video denoising filter with C.
- Embedded a denoising filter into H.264/AVC codecs.

Demola **Software Engineer** Finland | 3.2010-8.2010
- Implemented a face tracking application in Nokia N900 mobile phone with OpenCV and QT.

Education

Tampere University of Technology, Finland - *Computer Vision*, **Ph.D.**	GPA: 4.83 / 5	2017
Tampere University of Technology, Finland - *Signal Processing*, **M.Sc**.	GPA: 4.45 / 5	2012
Hangzhou Dianzi University, China - *Telecommunication*, **B.Eng.**	GPA: 85 / 100	2009
Udacity - *Self-Driving-Car Engineer* Nanodegree		2017

Patents & Publications

- US 20160248985, Device with an Adaptive Camera Array, published 2016 (link).
- WO 2016102768 A1, Monitoring, published 2016 (link)
- EP 3051410 A1, An apparatus and associated methods for provision of wireless power, published 2016 (link)
- US 20160191796, Methods And Apparatuses For Directional View In Panoramic Content, published 2016 (link)
- US 20150155009, Method And Apparatus For Media Capture Device Position Estimate- Assisted Splicing Of Media, published 2015 (link)
- US 20140300775, Method and Apparatus for Determining Camera Location Information and/or Camera Pose Information According to a Global Coordinate System, published 2016 (link)
- US 20150109508, Method And Apparatus For Generating A Media Capture Request Using Camera Pose Information, published 2015 (link)
- J. Fu, L. Fan, K. Roimela, Y. You, and V.-V. Mattila: “A 3d Map Augmented Photo Gallery Application on Mobile Device”, IEEE ICIP 2014, France (link)
- J. Fu, J.-K. Kämäräinen, A. Buch, and N. Krüger: “Indoor Objects and Outdoor Urban Scenes Recognition by 3D Visual Primitives”, ACCV workshop 2014, Singapore (link)
- J. Fu, L. Fan, Y. You, and K. Roimela: “Augmented and Interactive Video Playback Based on Global Camera Pose”, the 21st ACM Multimedia, 2013, Spain (link).
- L. Fan, J. Fu, Y. You, K. Roimela, P. Piippo and V.-V. Mattila, "Deja Vu: A 3D map augmented photo gallery application on mobile devices", In IEEE ICCV 2013, Demo session, Australia.
- J. Fu, E. Belyaev and K. Egiazarian: “Rate-distortion Oriented Joint Video Pre-filtering and Compression”, the 10th conference of FRUCT, 2011, Finland (link).
- Junsheng Fu, Master Thesis 2011: A Real-Time Rate-Distortion Oriented Join Video Denoising and Compression Algorithm (link).

Honors and Activities

· TUT Graduate School Scholarship	2016-2017
· Nokia Foundation Scholarship	2014
· Sisu Award, NRC Multimedia Technology Lab	2013
· Runner-up in IIDA Idea Innovation Competition	2011
· Outstanding Graduate Award	2009
· Chairman of Tampere Chinese Student and Scholar Association	2014-2015
· Chairman of one Badminton Club in Tampere	2012