

I am an experienced researcher, a problem solver and an open source lover, passionate about autonomous driving, with 8 patents applications and 5 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

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Model Predictive Control	<a href="#">Demo</a>	7.2017
<ul style="list-style-type: none"><li>Implemented a Model Predictive Controller (MPC) to drive a car autonomously in a game simulator.</li></ul>		
Vehicle localization	<a href="#">Demo</a>	6.2017
<ul style="list-style-type: none"><li>Implemented a real-time particle filter to estimate the position and orientation of a moving vehicle.</li></ul>		
Sensor fusion-based tracking	<a href="#">Demo</a>	5.2017
<ul style="list-style-type: none"><li>Designed and implemented Extended Kalman Filter and Unscented Kalman Filter for object tracking.</li></ul>		
Vehicle detection	<a href="#">Demo</a>	4.2017
<ul style="list-style-type: none"><li>Created vehicle detection and tracking pipeline with two approaches, deep neural networks (YOLO+TensorFlow) and support vector machines (HOG+OpenCV).</li></ul>		
Camera Pose Estimation	<a href="#">Demo</a>	4.2017
<ul style="list-style-type: none"><li>Estimate the 6 degree-of-freedom camera pose of the query image based on a reference image and point cloud.</li></ul>		
Lane departure warning	<a href="#">Demo</a>	3.2017
<ul style="list-style-type: none"><li>Designed and implemented a lane-departure-warning system based on a monocular camera.</li></ul>		
Driving behavioral cloning	<a href="#">Demo</a>	2.2017
<ul style="list-style-type: none"><li>Built and trained a CNN to steer a car autonomously in a game simulator, using TensorFlow and Keras.</li></ul>		

## Experience

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Tampere University of Technology	<b>Doctoral Student</b>	Finland   1.2014-12.2017
<ul style="list-style-type: none"><li>Implemented 10 autonomous driving demos with OpenCV, Python, Keras, and TensorFlow (<a href="#">videos</a>).</li><li>Working on camera pose estimation with LIDAR and street-view images.</li><li>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.</li></ul>		
Nokia Research Center (Nokia Tech)	<b>Computer Vision Researcher</b>	Finland   3.2012-12.2015
<ul style="list-style-type: none"><li>Designed and implemented a 3D Map Augmented Photo gallery application with <b>HERE</b> Map (<a href="#">video</a>).</li><li>Developed an Interactive Video Playback System with <b>HERE</b> Map (<a href="#">video</a>).</li><li>Implemented 3D reconstruction and visualization systems for indoor 3D smart sensing.</li></ul>		
Tampere University of Technology	<b>Research Assistant</b>	Finland   9.2010-12.2011
<ul style="list-style-type: none"><li>Designed and implemented a real-time video denoising filter with C.</li><li>Embedded a denoising filter into H.264/AVC codecs.</li></ul>		
Demola	<b>Software Engineer</b>	Finland   3.2010-8.2010
<ul style="list-style-type: none"><li>Implemented a face tracking application in Nokia N900 mobile phone with OpenCV and QT.</li></ul>		

## Education

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

## Patents & Publications

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- US20170132843A1, A Method and Technical Equipment for Determining a Pose of a Device, published 2017 ([link](#)).
  - 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

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| • 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, Zhejiang China                  | 2009      |
| • Chairman of Tampere Chinese Student and Scholar Association | 2014-2015 |
| • Chairman of one Badminton Club in Tampere                   | 2012      |