

I am a researcher in the field of computer vision and sensor fusion, with 8 patents, 6 publications and 13 open source projects. I enjoy applying Computer Vision and Deep Learning techniques to solve the challenges in autonomous driving.

## Technical skills

*Languages:* C++, Matlab, Python

*Frameworks:* OpenCV, TensorFlow, Keras, CUDA, Git

## Experience

Zenuity	<b>Senior Algorithm Engineer</b>	Sweden   1.2018-Present
<ul style="list-style-type: none"><li>Working on algorithm research and development of robust localization and road estimation for autonomous vehicles.</li></ul>		
Nokia Research Center	<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>Designed and implemented an Interactive Video Playback System with <b>HERE</b> Map (<a href="#">video</a>).</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>		

## Projects

Vehicle localization	<a href="#">Demo</a>
<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>
<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>
<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>	
Lane departure warning	<a href="#">Demo</a>
<ul style="list-style-type: none"><li>Designed and implemented a lane-finding algorithm and a lane-departure-warning system.</li></ul>	
Driving behavioral cloning	<a href="#">Demo</a>
<ul style="list-style-type: none"><li>Built and trained a CNN to autonomously steer a car in a game simulator, using TensorFlow and Keras.</li></ul>	
Camera Pose Estimation	<a href="#">Demo</a>
<ul style="list-style-type: none"><li>Given a map contains street-view image and lidar, estimate the 6 DoF camera pose of a query image.</li></ul>	
Road Segmentation	<a href="#">Demo</a>
<ul style="list-style-type: none"><li>A neural network is trained to label the pixels of a road in images by using Fully Convolutional Network.</li></ul>	
Traffic Sign Recognition	<a href="#">Demo</a>
<ul style="list-style-type: none"><li>Built and trained a deep neural network to classify traffic signs, using TensorFlow.</li></ul>	
Path Planning	<a href="#">Demo</a>
<ul style="list-style-type: none"><li>Implement a simple real-time path planner in C++ to navigate a car around a simulated highway scenario, including other traffic, given waypoint, and sensor fusion data.</li></ul>	
Model Predictive controller	<a href="#">Demo</a>
<ul style="list-style-type: none"><li>This project uses a Model Predictive Control (MPC) to drive a car in a game simulator.</li></ul>	

## Education

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

- J. Fu, S. Pertuz, J. Matas, and J.K. Kämäräinen: "Performance analysis of single-query 6-DoF camera pose estimation in self-driving setups." CVIU, 2019.
- EP3161802A1, 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](#)).

## Honors and Activities

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|---|-----------|
| • TUT Graduate School Scholarship                             | 2016-2017 |
| • Nokia Foundation Scholarship                                | 2014      |
| • Sisu Award, Nokia Research 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      |