Kirk R. Busche

kbusche2@illinois.edu • 507-261-4380

EDUCATION:

Ph.D. Student in Electrical and Computer Engineering **August 2016 - Present**
University of Illinois Urbana-Champaign
College of Engineering
GPA: 3.94
Relevant Coursework: Pattern Recognition, Digital Signal Processing II, Vector Space Signal Processing, Topics in Image Processing, Random Processes, Optimization for Computer Vision, Digital Imaging

Bachelor of Electrical Engineering **September 2012 - May 2016**
Minors: Product Design, Math
University of Minnesota-Twin Cities
College of Science and Engineering
Honors: Summa Cum Laude with High Distinction

RESEARCH INTERESTS:

- Efficient sensor fusion, particularly for autonomous vehicles
- Real-time video tracking and segmentation
- Intuitive exploitation of sequential nature of videos for perception tasks

AWARDS

- Qualcomm Innovation Fellowship 2018 Finalist

RESEARCH EXPERIENCE:

RADAR-Video Fusion *(UIUC)* November 2017 - Present

- Working with Professor Minh Do to develop fusion algorithms to generate high resolution depth maps from RADAR, video, and egomotion data for autonomous vehicle applications

Video Segmentation *(UIUC)* January 2017 - Present

- Working with Professor Minh Do to develop online, unsupervised video object segmentation algorithm for the DAVIS dataset using clustering of dense optical flow (partnership with Sandia National Laboratories)

VLSI Design and Evaluation of a Massive MIMO Detection Algorithm *(UMN)* September 2015 - May 2016

- Worked with Professor Gerald Sobelman on surveying and evaluating proposed massive MIMO detection algorithms and implementing one in Verilog for VLSI (project for Honors Thesis)

PRIOR WORK EXPERIENCE

Research Assistant *(UIUC)* August 2017 - Present

- Developed online algorithm for unsupervised video object segmentation based on clustering of dense optical flow
- Investigated real-time trackers based on discriminative correlation filters
- Developed RADAR-video fusion algorithms to generate high resolution depth maps using electronically scanning RADAR (ESR) sensors found on modern cars paired with video

Graduate Student in Critical Systems Department *(Southwest Research Institute)* May 2017 - Present

[*]Summer 2017

- Trained and tested convolutional neural networks for methane leak detection and segmentation to be implemented on an NVIDIA Tegra embedded platform
- Implemented a parallelized data simulator from MATLAB code in Python to generate training and testing datasets
- Trained several shallow, efficient networks for preliminary investigation for an internal research project

Summer 2018

- Investigated the use of computer vision features with convolutional neural networks for gas leak flow rate quantification
- Developed algorithms for predicting anomalous events in high dimensional, multi-sensor time series data

Introduction to Electronics Lab Teaching Assistant *(UIUC)* August 2016 - December 2017

- Led basic electronics lab sessions weekly and graded lab reports weekly