# Chengxi Li

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## EDUCATION

**Purdue University**, West Lafayette, IN, USA *Aug. 2016 - May. 2021 (Expected)*
PhD Student in Department of Electrical and Computer Engineering **GPA:4.0/4.0**
Research Interests: Computer Vision, Image Processing and Machine Learning

**Fudan University**, Shanghai, China *Sep. 2012 - Jun. 2016*
B.S. in Electrical and Electronics Engineering **GPA:3.76/4.0, rank: 1/104**

**National University of Singapore**, Singapore *Jan. 2015 - May. 2015*
Exchange student in Electrical and Computer Engineering **GPA:5.0/5.0**

## PUBLICATIONS

**C. Li**, Y. Meng, S. Chan and Y. Chen,"Learning 3D-aware Egocentric Spatial-Temporal Interaction via Graph Convolutional Networks," in *IEEE International Conference on Robotics and Automation (ICRA), 2020.*

**C. Li**, S. Chan and Y. Chen,"Who Make Drivers Stop? Towards Driver-centric Risk Assessment: Risk Object Identification via Causal Inference," submitted to *IEEE International Conference on Intelligent Robots and Systems (IROS), 2020.*

## RESEARCH EXPERIENCE

Honda Research Institute, San Jose, CA, USA *May. 2019 - Present*
*KDI (Knowledge Development Information) Group*
Research Intern, Mentor: **Dr. Yi-Ting Chen**

**Project 1: Risk Perception Modeling in Driving Scene**

- Proposed a two-stage framework based on causal inference for risk object identification.
- Evaluated the proposed framework on the Honda Research Institute Driving Dataset (HDD) and demonstrated a substantial average performance boost over a strong baseline by 7.5%.

**Project 2: Video Representation for Egocentric Activity Recognition**

- Proposed a 3D-aware egocentric spatial-temporal interaction framework for automated driving.
- Validated the proposed framework on tactical driver behavior recognition using Honda Research Institute Driving Dataset (HDD), boosting over baselines on two experimental settings by 3.9% and 6.0%, respectively and published in ICRA 2020 as first author.

Purdue University, West Lafayette, IN, USA *Jan. 2019 - May. 2019*
*Statistical Signal and Image Processing Lab*
Research Assistant, Advisor: **Prof. Stanley H. Chan**

**Deep Learning for QIS Image Reconstruction**

- Designed a deep neural network approach for Quanta Image Sensor (QIS) image reconstruction based on generative adversarial networks (GAN).
- Tested the model on the simulated QIS images generated from CelebA dataset and comapared with the state-of-the-art.

Purdue University, West Lafayette, IN, USA *Dec. 2018 - Aug. 2016*
*Center for the Computational Study of Cognition, Communication, Control, and Perception*
Research Assistant, Advisor: **Prof. Jeffrey M. Siskind**

**Project 1: Video Retrieval Based on Natural Language Dialogue**

- Proposed a framework which takes language queries as input and retrieves video clips based on content from a large-scale dataset. Further extended the system to form clarification and refinement language dialogue with the user in order to retrieve the most desirable clips from multiple results.

- Designed a neural network Feature Refining Module to learn the interactive visual features between subject, predicate and object. Trained and tested the model in Video Visual Relation Detection (VidVRD) dataset with Pytorch implementation.
- Evaluated our approach with metric Precision@1 of 55.94% in comparison with the state-of-art method of 31.4%.

**Project 2: Deep Intermodal Video Analytics**

- Responsible for both spatially and temporally detecting moving vehicle activity in a large-scale surveillance video dataset named VIRAT.
- Designed an angle-based algorithm based on vehicle moving path and applied greedy search for hyper-parameters.
- Built a scene prior that knows that vehicles park in parking lots in parking spaces and parking spaces are aligned in rows with same orientation, boosting the vehicle detection precision by 3.13% while maintaining same recall

**Project 3: Fast Vehicle Detection and Tracking in a Unified Network**

- Designed a novel neural network architecture of Convolutional Neural Networks (CNN) appended with Long-short Term Memory (LSTM) unit to track objects in videos.
- Implemented the model in Caffe and tested on ILSVRC 2015 VID car videos and presented a poster of this work in 2018 Midwest Computer Vision Workshop.

University of California, Los Angeles, CA, USA *Jul. 2015 - Sep. 2015*
*Big Data and Complex Networks Group*
Research Assistance, Advisor: **Prof. Vwani P. Roychowdhury**

**Project 1: Secret of Impressionism, See Like an Android**

- Proposed methods to visualize machines understanding of world (detection, analysis and auto-caption of images).
- Generated 2,406 Impressionism images of celebrities to present machines visual world and published in PNAS.

**Project 2: Performance Analysis of Part Based Algorithms under Different Scenarios**

- Investigated and compared the performance of three part based algorithms (Poselet, Viewlet, Deformable Part Models) under different scenarios by computing Average Precision (AP).
- Utilized SVM modeling, k-means clustering and mean shift clustering and tested in MATLAB and VOC 2007 Development Kit.

## TEACHING EXPERIENCE

**Teaching Assistant**, Purdue University, West Lafayette, IN, USA *Jan. 2019 - May. 2019*
Instructor: Prof. Mary Comer
Course: Probabilistic Methods in Electrical and Computer Engineering

**Lecturer**, Online Course, Shanghai, China *Jun. 2019 - Jul. 2019*
Course: Introduction to Artificial Intelligence

## TECHNICAL SKILLS

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|---|---|
| **Programming Languages** | Python, Matlab, C++, C |
| **Deep Learning Tools** | PyTorch, Tensorflow, Torch, Caffe |
| **Softwares** | OpenCV, LaTeX, OrCAD, Xilinx ISE, Altium Designer |

## AWARDS AND HONORS

Meritorious Winner (top 15%) of Interdisciplinary Contest in Modeling, 2015
Lida Liu Yongling Scholarship (top 3% student), Fudan University, 2014
Academic Award in School of Information Science and Technology, Fudan University, 2014
Shanghai Government Scholarship (top 1% student), Fudan University, 2013