Laixi Shi

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Education

2018 – Pre **Ph.D. Electrical and Computer Engineering** , *Carnegie Mellon University*, Pittsburgh, US.

Honors: The ACM International Workshop on Device-Free Human Sensing (DFHS) Travel Grant (*2019*)
Women in Machine Learning Workshop Travel Grant (*2019*)
Presidential Fellowship granted by Carnegie Mellon University (*2018*)

2014 – 2017 **B.Eng. Electronic Engineering**, *Tsinghua University*, Beijing, China.

Honors: The First Prize in 35th Tsinghua University Academic Challenge Cup (*2017*)
Technology Innovation Excellence Award granted by Tsinghua University (*2015, 2016, 2017*)
National Scholarship granted by the government of China (*2016*)
Outstanding Project of Undergraduate Research Promotion Plan Competition of Tsinghua Unviersity (*2016*)
Qualcomm Scholarship granted by Tsinghua University (*2016*)
The First Prize in National Physics Contest for College Student (*2015*)
The Silver Medal of Chinese Physics Olympiad, ranked 77th nationally (*2014*)

Research & Work Experience

2018.8-Pre **The landscape geometry of nonconvex optimization problems**,
Carnegie Mellon University, Pittsburgh, PA,
Advisor: Yuejie Chi.

**2016.8-
2018.8** **Micro Hand Gesture Recognition System using Ultrasonic Active Sensing**,
Tsinghua University, Beijing, China,
Advisor: Yimin Liu.
We propose a system, which uses micro dynamic hand gestures for recognition to achieve human–computer interaction (HCI). The implemented system, called hand-ultrasonic gesture (HUG), consists of ultrasonic active sensing, pulsed radar signal processing, and time-sequence pattern recognition by machine learning.

2017.7-2018 **Improving Pedestrian Safety in Urban Cities Using a Wearable Acoustic System**,
Intelligent and Connected Systems Lab, Columbia University,
Advisor: Xiaofan Jiang.
This project aims at using acoustic wearable system to detect and localize approaching cars in order to alert the pedestrian of the danger. We realized precise and continuous direction estimation with TDOA and added pedestrian localization into the system to solve vehicle distance estimation and improve power efficiency.

2017.3-6 **Momenta,Beijing China**,
Internship,
Mentor: Gang Sun, Le Shan .
Momenta aims at building the "brains" for autonomous vehicles. Its deep-learning based software in perception, HD semantic mapping, and data-driven path planning enables full autonomy. I worked on displaying the HD semantic mapping of the road condition.

2016.9 **Collaborative Distributed System based on cars/Unmanned Aerial Vehicle Coordinated Formation Design**,
SRT (Students Research Training) program of Tsinghua University,
Advisor: Yuan Shen.
We developed a collaborative distributed location algorithm and a self-made mobile robots implementation platform. The system decides motions for cars respectively through wireless collaborative locations obtained by utilizing UWB(Ultra-wideband). Robots move to their positions controlled by PID and form a predefined formation automatically.

Projects

2016.01-11 **Non-Wearable Three-Dimensional Display and Interaction Cube Based on Multi-Screen**,
(As team leader) Tsinghua University, Beijing, China,
Demo: https://youtu.be/Xa_WMTfhJlo.
We designed a real-time virtual reality cubic interaction metaphor, arranged 5 LED panels into a cube to create a 3D object illusion, utilizing binocular vision to track user's eyes and rendering the perspective of each screen to fit the user's eyes positions. This work is awarded by the **First Prize** in the 35th Academic Challenge Cup, the most outstanding project among Undergraduate Research Promotion Plan Competition.

2016.9-2017.1 **Calculation of Restricted Boltzmann Machines (RBM) Normalizing Constant Using Monte Carlo Methods**,
(As team leader) Tsinghua University, Beijing, China.
The RBM normalizing constant is hard to calcualte directly. We realized several state-of-art methods based on Monte Carlo methods including AIS, TAP, RTS, SAMS algorithms and evaluated their time consuming and accuracy performance.

2016.1-8 **Air Hockey Robot Based on Moving Object Tracking** ,
Tsinghua University, Beijing, China.
We built a robot to play air-hockey game with human, This robot consists a suspension camera (capturing the moving ball) and an executive arm (a striking device with two degrees of freedom). I engaged in the design of hardware of robots using 3D printing and it is rewarded by **Second Prize** of 34th Academic Challenge Cup.

2016.2-6 **TI Automobile Electronic Design Competition**,
Tsinghua University, Beijing, China.
We designed the car capable of automatically collision avoidance, being controlled by smartphone using TI development board and got **Top 2** in the competition.

2016.2-6 **TI Intelligent Car Competition** ,
Tsinghua University, Beijing, China.
We designed image signal processing algorithms for detecting the road condition to automatically run in the specific road and got **Top 4** in the competition.

Technical ability

Languages: C/C++, Python, Java, Matlab, Verilog, etc.

Technologies: Tensorflow, Pytorch, Caffe, OpenGL, OpenCV,Qt, Altium Designer, OpenSceneGraph, OGRE,etc

Publications

[1]   Sang Yu, Laixi Shi, and Yimin Liu. "Micro hand gesture recognition system using ultrasonic active sensing." IEEE Access 6 (2018): 49339-49347.