

## Information

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**Address:** No. 80, Zhongguancun Road, Haidian District, Beijing, China

**Interests:** Computer Vision, Object Detection, Face Detection, Pedestrian Detection



## Educations

2015.09-2020.06 | PhD candidate | State Key Laboratory of Transducer Technology, Institute of Electronics, Chinese Academy of Sciences

- Joint PhD student in Institute of Automation, Chinese Academic of Sciences (CASIA); **Published 10 papers**, 4 papers as first author (CCF-A: 1, SCI: 2); 3 pending patents.

2011.09-2015.06 | Bachelor degree | College of Electrical and Information Engineering, Hunan University of China

## Working & Research Experience

**2019.06-present**      **Research Intern in MSRA**      **Mentor: Fangyun Wei and Han Hu**

- Relation Network for Object Detection

Using the Self-attention mechanism, we study the relation modeling of proposals in object detection.

**2018.01-2019.06**      **Research Intern in SenseTime**      **Mentor: Hongwei Qin and Junjie Yan**

- State-of-the-art Face and Pedestrian Detector

As the most widely used detection sub-tasks, the main difficulty in face and pedestrian detection is the small and occluded targets. We study on these two difficulties, **achieving the state-of-the-art performance on all common face and pedestrian detection benchmarks with GPU real-time.**

- Based on the one-stage face detector, we propose a selective two-step classification and regression module, producing an AAAI 2019 Oral paper.
- By improving the classification ability of the existing high-performance face detector, we improve the detection performance without increasing the inference calculation overhead, and a paper is produced and submitted to TPAMI.
- To jointly and better detect human and head, we propose a joint detection network and learn the relation between them, with a paper produced and submitted to PR.
- Design a pedestrian detector that is robust to crowded scenes without increasing computation in the inference phase, producing a paper submitted to TIP.

- Face Detector on Frontend Chip

Design tiny models to run on ARM chips for surveillance and mobile phone projects, **we support almost all the face products of SenseTime.**

- Design a series of small models to meet different computation requirements
- Solving hard cases in face detection: Dark and Backlighting scene, 360° face detection, etc.
- Cat Face Detection for AR scenes

- Crowd analysis in elevator scenes

Cooperation project with Huawei and Hitachi. We use head and shoulder detection results for crowd analysis, including regional population statistics, crowd direction identification and detention alarms. And baby carriages and wheelchair detection results are utilized to alert.

- As the leader in charge of algorithm R&D, the overall control of project requirements definition, data requirements definition and acquisition, solution provision and algorithm development
- Design head and shoulder detector robust to crowded scenes, and stroller and wheelchair detectors

**2018.08-present    Joint PhD student in CASIA    Supervisor: Junliang Xing**

- Face and Hand Detection on Mobile Device

Cooperation project with Huawei, for face unlocking and gesture recognition on Huawei phones.

**2015.09-present    PhD candidate in IECAS    Supervisor: Xudong Zou**

- Robotic grasp based on visual and tactile information

Utilize the tactile and visual information obtained from tactile sensor and camera on the robotic arm to achieve accurate and stable grasp.

- Utilize visual information to locate objects and determine the location of the grab, and then use the tactile information to prevent the slipping, with an accepted patent produced.
- Design a MWCNT/PDMS-based piezoresistive flexible tactile sensing array, producing two SCI papers.

## Awards

- 2019    1st place in UG2 Challenge on the Dark Face Detection track
- 2019    1st place in Cloudwalk Headcount Competition (validation)
- 2018    3rd place in WIDER Challenge on the face detection track
- 2018    Merit Student

## Preprints

- **Cheng Chi**, Shifeng Zhang, Junliang Xing, Hongwei Qin, Junjie Yan, Zhen Lei, Xudong Zou. PedHunter: Occlusion Robust Pedestrian Detector in Crowded Scenes. Submitted to **TIP**.
- Shifeng Zhang\*, **Cheng Chi\***, Zhen Lei, Stan Z. Li. Boosting Classification Ability for High Performance Face Detection. (\*equal contribution) Submitted to **TPAMI**.
- **Cheng Chi**, Shifeng Zhang, Junliang Xing, Zhen Lei, Xudong Zou, Stan Z. Li. Relational Learning for Joint Head and Human Detection. Submitted to **Pattern Recognition**.

- **Cheng Chi**, Shifeng Zhang, Junliang Xing, Zhen Lei, Stan Z. Li, Xudong Zou. Selective Refinement Network for High Performance Face Detection. Association for the Advancement of Artificial Intelligence (AAAI), 2019. (**Oral Presentation**)
- **Cheng Chi**, Xuguang Sun, Tong Li, Xin Shu, Ning Xue, Chang Liu. A Flexible Tactile Sensor With Good Consistency. IEEE Access (**SCI, IF:3.557**), 2018.
- **Cheng Chi**, Xuguang Sun, Ning Xue\*, Tong Li, Chang Liu\*. Recent Progress in Technologies for Tactile Sensors. Sensors (**SCI, IF:2.475**), 2018.
- **Cheng Chi**, Xuguang Sun, Tong Li, Ning Xue, Chang Liu. Preparation of multi-walled carbon nanotubes/polydimethylsiloxane composite for electronic skin application. 8th IEEE International Nanoelectronics Conference, 2018.
- Xin Shu, Chang Liu, Tong Li, Chunkai Wang, **Cheng Chi**. A Self-supervised Learning Manipulator Grasping Approach Based on Instance Segmentation. IEEE Access (**SCI, IF:3.557**), 2018.
- Ning Xue\*, Guangheng Gao, Jianhai Sun, Chunxiu Liu, Tong Li, **Cheng Chi**\*. Systematic study and experiment of flexible pressure and tactile sensing array for wearable devices applications. Journal of Micromechanics and Microengineering (**SCI, IF:1.888**), 2018.
- Ning Xue\*, Chunxiu Liu, Jianhai Sun, Tong Li, **Cheng Chi**, Hwan-Ing Hee, Yu-Shun Wang\*. Miniature force sensing system for monitoring of optimal cricoid pressure for airway protection. IEEE Sensors Journal (**SCI, IF:2.617**), 2018.
- Ning Xue\*, Deheng Wang, Chunxiu Liu, Zunji Ke, Paz Elia, Tong Li, **Cheng Chi**, Yuhua Cheng, Jianhai Sun. A biodegradable porous silicon and polymeric hybrid probe for neural signal recording. Sensors and Actuators B: Chemical (**SCI, IF:5.667**), 2018.
- Xuguang Sun, Chunkai Wang, **Cheng Chi**, Ning Xue, Chang Liu. A highly-sensitive flexible tactile sensor array utilizing piezoresistive carbon nanotubes-polydimethylsiloxane composite. Journal of Micromechanics and Microengineering (**SCI, IF:1.888**), 2018.
- Tong Li, **Cheng Chi**, Chunkai Wang, Ning Xue, Chunxiu Liu, Chang Liu. Real-time and autonomous grasping operation of manipulator based on tactile sensor array. 2nd IEEE Advanced Information Management, Communicates, Electronic and Automation Control Conference, 2018.