

# Kai Chen

PHD CANDIDATE IN CUHK

SHB 703, The Chinese University of Hong Kong

✉ chenkaidev@gmail.com | 📱 hellock

## Education

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### The Chinese University of Hong Kong

PH.D IN INFORMATION ENGINEERING

- Member of Multimedia Lab, supervised by Dahua Lin

Hong Kong

Aug. 2015 - PRESENT

### Tsinghua University

B.S. IN AUTOMATION

- GPA 89.8/100.0, ranking 18/135

Beijing

Sept. 2011 - Jul. 2015

## Experience

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### Sensetime

RESEARCH INTERN

- Researched on face detection algorithms.

Beijing

Jul. 2014 - Mar. 2015

### Graduation project

UNDERGRADUATE STUDENT

- Designed a lane detection method using a monocular camera and applied it to the auto-balancing bicycle.

Beijing

Feb. 2015 - Jun. 2015

### BigEye Lab, Tsinghua University

RESEARCH ASSISTANT

- Designed an CAPTCHA OCR solution of course registration system that reached an accuracy of 90%.

Beijing

Dec. 2012 - Nov. 2013

## Honors & Awards

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- 2018 Winner, COCO Object Detection Challenge
- 2017 Winner, The DAVIS Challenge on Video Object Segmentation
- 2015 National Virtual Instrument Contest, Grand Prize(top 1)
- 2014 Tsinghua Academic Merit Scholarship
- 2014 The 32nd "Challenge Cup" Undergraduate Curricular Academic Science and Technology Competition of Tsinghua University, 1st Prize
- 2014 HAGE Endeavor Scholarship, Department of Automation, Tsinghua University
- 2013 Tsinghua Academic Merit Scholarship
- 2012 National Physics Competition of College Students, 3rd Prize

## Research Projects

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- **Image object detection and instance segmentation.** We revisited the dense anchoring scheme of modern object detection pipelines. To overcome the shortage of uniform sliding window anchors with predefined scales and aspect ratios, we proposed the Guided Anchoring (GA) scheme, which predicts sparse and arbitrary shaped anchors. It achieves 9.1% higher recall than RPN and improve detection mAP of various methods by 1.2% to 2.7%. We introduce the cascade architecture to instance segmentation, and proposed Hybrid Task Cascade (HTC), which leverages the reciprocal relationship between detection and segmentation. We also explored the spatial context as a strong complement to box and mask branches. With these two methods, we won the 1st place in COCO 2018 Instance Segmentation Challenge. We also released a high quality object detection codebase based on PyTorch named **mmdetection**.

- **Video object detection.** We aimed to seek a better balance between computational cost and performance. The basic idea is to perform expensive detection sparsely and propagate the results across both scales and time with substantially cheaper networks, by exploiting the strong correlations among them. Specifically, we presented a unified framework that integrates detection, temporal propagation, and across-scale refinement on a *Scale-Time Lattice*. It achieved a competitive mAP **79.6%** at 20 fps, or **79.0%** at 62 fps as a performance/speed tradeoff on ImageNet VID dataset.
- **Weakly supervised object discovery and detection.** We explored a new task that automatically discovers and learns new object categories from documentary videos and corresponding subtitles. Towards this goal, we developed a joint probabilistic framework, where individual pieces of information, including video frames and subtitles, were brought together via both visual and linguistic links. On top of this formulation, we further derived a weakly supervised learning algorithm, where object model learning and training set mining are unified in an optimization procedure.

## Publication

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- **Kai Chen**, Jiangmiao Pang, Jiaqi Wang, Yu Xiong, Xiaoxiao Li, Shuyang Sun, Wansen Feng, Ziwei Liu, Jianping Shi, Wanli Ouyang, Chen Change Loy, Dahua Lin. “Hybrid Task Cascade for Instance Segmentation”. *In submission*. (**COCO 2018 Winning Entry**)
- Jiangmiao Pang, **Kai Chen**, Jianping Shi, Wanli Ouyang, Dahua Lin, Huajun Feng. “Libra R-CNN: Balanced Learning for Object Detection”. *In submission*.
- Jiaqi Wang\*, **Kai Chen**\*, Shuo Yang, Chen Change Loy, Dahua Lin. “Region Proposal by Guided Anchoring”. *In submission*.
- **Kai Chen**, Jiaqi Wang, Shuo Yang, Xingcheng Zhang, Yuanjun Xiong, Chen Change Loy, Dahua Lin. “Optimizing Video Object Detection via a Scale-Time Lattice”. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018
- **Kai Chen**, Hang Song, Chen Change Loy, Dahua Lin. “Discover and Learn New Objects from Documentaries”. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017 (**Spotlight**)
- Xiaoxiao Li, Yuankai Qi, Zhe Wang, **Kai Chen**, Ziwei Liu, Jianping Shi, Ping Luo, Xiaoou Tang, Chen Change Loy. “Video Object Segmentation with Re-identification”. Workshop of DAVIS Challenge on Video Object Segmentation, CVPR 2017 (**Winning Entry**)

## Reviews

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- Conference on Computer Vision and Pattern Recognition (CVPR) 2019
- European Conference on Computer Vision (ECCV) 2018
- ACM Multimedia Conference (ACMMM) 2018
- The British Machine Vision Conference (BMVC) 2018

## Skills

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**Programming** Python, C/C++, Matlab

**Web** Flask with Python, HTML, Javascript, PHP