Qi Han

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Research Interest

Computer vision, Deep learning

Education

Xidian University **Sep. 2015 – June 2019**
Bachelor of Science in Computer Science (Elite Class) *Xi'an, China*

Nankai University **Sep. 2019 – June 2022 (expected)**
Bachelor of Science in Computer Science, supervisor: ***Prof. Ming-Ming Cheng*** *Tianjin, China*

Professional Activities

- Reviewer for IEEE CVPR 2021 and IJCAI 2021

Experience

MicroSoft Research Asia (MSRA) **Feb 2021 – August 2021**
Research Intern, mentor: Jingdong Wang *Beijing, China*

- Demystify Local Self Attention. We point out the view that the popular local self attention resembles depth-wise convolution from the sparse connection, weight sharing and dynamic weight prediction. (submit to NeurIPS 2021)

Research Projects and Publications

# means equal contribution. (Totally 3 first authors, 1 second author, 1 third author)

1. **Deep Hough Transform for Semantic Line Detection**: **Qi Han#**, Kai Zhao#, Jun Xu, Ming-Ming Cheng European Conference on Computer Vision **(ECCV)**, 2020.
   - Incorporating the classical hough transform into deep representations, namely deep hough transform.
   - A new end-to-end pipeline which uses the nature of lines with SOTA performance.
   - A new evaluation metric to measure the similarity of lines.

2. **Deep Hough Transform for Semantic Line Detection**: Kai Zhao#, **Qi Han#**, CB Zhang, Jun Xu, MM Cheng IEEE Transactions on Pattern Analysis and Machine Intelligence **(TPAMI)**, 2021.
   - An extended version of ECCV 2020.
   - A detail study of the evaluation.
   - A new dataset for semantic line detection, namely NKL, which contains 6,500 images with annotations.

3. **Global2Local: Efficient Structure Search for Video Action Segmentation**: Shang-Hua Gao#, **Qi Han#**, Zhong-Yu Li, Pai Peng, Liang Wang, Ming-Ming Cheng. **CVPR**, 2021.
   - A expectation guided iterative local search scheme enables searching fine-grained receptive field combinations.
   - A global-to-local search discovers effective receptive field combinations better than hand-designed patterns.

4. **Representative Batch Normalization with Feature Calibration**: SH Gao, **Qi Han**, Duo Li, MM Cheng, Pai Peng. IEEE/CVF Conference on Computer Vision and Pattern Recognition **(CVPR) oral**, 2021.
   - A Representative Batch Normalization (RBN) by adding the centering and scaling calibrations to the BatchNorm.
   - RBN can replace the BatchNorm in existing methods to boost the performance of various tasks: ImageNet recognition (+1.4%), COCO detection (+1.5%), COCO panoptic segmentation(+2.0%).

5. **CDNet: Complementary Depth Network for RGB-D Salient Object Detection**: WD Jin#, Jun Xu#, **Qi Han**, Yi Zhang, MM Cheng. IEEE Transactions on Image Processing **(TIP)**, 2021.

Manuscripts

1. **Dependency Aware Filter Pruning**: Kai Zhao#, Xin-yu Zhang#, **Qi Han#**, Ming-Ming Cheng
   https://arxiv.org/abs/2005.02634 (2020).

2. **Delving Deep into Label Smoothing.**: Chang-Bin Zhang#, Peng-Tao Jiang#, Qibin Hou, Yunchao Wei, **Qi Han**, Zhen Li, Ming-Ming Cheng
   https://arxiv.org/abs/2011.12562 (2020).

Invention Patents

Totally 6 invention patents including neural architecture design, pruning, normalization and distillation.

Honors

SK Scholarship.	**2020.12**
First-Class Scholarship of NKU.	**2020.10**
Outstanding graduates in XDU.	**2019.6**
National Scholarship	**2018.9**
Meritorious Winner of Interdisciplinary Contest In Modeling.	**2018.2**
Bronze Medal of ICPC National Invitational Contest Xi'an Station.	**2018.5**
Second Prize of ShanXi Province Collegiate Programming Contest.	**2018.5**
Silver Medal of Group Programming Ladder Tournament.	**2017.5**
First-Class Scholarship of XDU.	**2016,2017**
Outstanding Student in XDU.	**2016,2017,2018**

Technical Skills

Languages: Python, C++, C
Technologies: Linux, Git, Latex
English: CET-6

韩 琦

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研究领域

计算机视觉, 深度学习

教育背景

西安电子科技大学 **2015 年 9 月 – 2019 年 6 月**

计算机科学与技术本科 *(教改班)* 中国, 西安

南开大学 **2019 年 9 月 – 2022 年 6 月 (预计)**

计算机技术硕士, 导师: **程明明教授** 中国, 天津

科研活动

- 担任 IEEE CVPR 2021 与 IJCAI 2021 审稿人

实习经历

微软亚洲研究院 (MSRA) **2021 年 1 月 – 2021 年 8 月 (预计)**

研究实习生, 导师: 王井东 中国, 北京

- 探究 Local Attention 的工作机制. 从网络正则化的角度分析验证 Local Attention 与 depth-wise 卷积的关系, 极其性能差异, 从稀疏链接, 权重共享, 动态权重三个角度研究分析了问题. 预期投稿于 NeurIPS 2021.

科研项目与论文

表示共同第一作者. (共计 3 篇第一作者, 1 篇第二作者, 1 篇第三作者)

1. **Deep Hough Transform for Semantic Line Detection**: **Qi Han#**, Kai Zhao#, Jun Xu, Ming-Ming Cheng
European Conference on Computer Vision **(ECCV)**, 2020.

- 将传统霍夫变换与深度学习相结合, 提出了全新的深度霍夫变换.
- 全新的端到端学习框架，利用自然场景下直线的特性，给出了全新的解决方案，并达到了语义线检测任务的最好效果.
- 用于评价直线相似度的全新指标.

2. **Deep Hough Transform for Semantic Line Detection**: Kai Zhao#, **Qi Han#**, CB Zhang, Jun Xu, MM Cheng
IEEE Transactions on Pattern Analysis and Machine Intelligence **(TPAMI)**, 2021.

- ECCV 2020 文章的拓展.
- 关于评价体系与评价指标，展开深入分析和实验.
- 构建了该领域最大的全新数据集，NKL，包含 6500 张自然图像，用于语义线检测任务.

3. **Global2Local: Efficient Structure Search for Video Action Segmentation**: Shang-Hua Gao#, **Qi Han#**,
Zhong-Yu Li, Pai Peng, Liang Wang, Ming-Ming Cheng. **CVPR**, 2021.

- 全新的基于期望指导的迭代式局部搜索，用于搜索更好的感受野组合方式.
- 从全局到局部的搜索方法，用于搜索神经网络感受野，使其优于人工设计的模式.

4. **Representative Batch Normalization with Feature Calibration**: SH Gao, **Qi Han**, Duo Li, MM Cheng, Pai Peng. IEEE/CVF Conference on Computer Vision and Pattern Recognition **(CVPR) oral**, 2021.
   - 在 BN 的基础上引入中心化修正和尺度放缩修正，构建了新的归一化方法 RBN.
   - RBN 能够直接替代 BN，在分类、检测、分割任务中取得更好的实验效果: ImageNet recognition (+1.4%), COCO detection (+1.5%), COCO panoptic segmentation(+2.0%).

5. **CDNet: Complementary Depth Network for RGB-D Salient Object Detection**: WD Jin#, Jun Xu#, **Qi Han**, Yi Zhang, MM Cheng. IEEE Transactions on Image Processing **(TIP)**, 2021.

已公开在投文章

1. **Dependency Aware Filter Pruning**: Kai Zhao#, Xin-yu Zhang#, **Qi Han#**, Ming-Ming Cheng
   https://arxiv.org/abs/2005.02634 (2020).

2. **Delving Deep into Label Smoothing.**: Chang-Bin Zhang#, Peng-Tao Jiang#, Qibin Hou, Yunchao Wei, **Qi Han**, Zhen Li, Ming-Ming Cheng
   https://arxiv.org/abs/2011.12562 (2020).

发明专利

共有六项国家发明专利处于公开阶段，包括神经网络结构搜索、剪枝、归一化方法、蒸馏等领域。

Honors

SK 人工智能奖学金.	**2020.12**
南开大学公能一等奖学金.	**2020.10**
西安电子科技大学优秀毕业生.	**2019.6**
本科生国家奖学金	**2018.9**
美国大学生数学建模竞赛一等奖.	**2018.2**
ACM/ICPC 全国邀请赛西安站铜奖.	**2018.5**
陕西省程序设计竞赛二等奖.	**2018.5**
中国高校计算机设计大赛-程序设计竞赛银奖.	**2017.5**
西安电子科技大学一等奖学金.	**2016,2017**
西安电子科技大学优秀学生.	**2016,2017,2018**