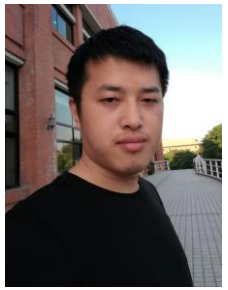
MSCOCO Keypoints Challenge 2018

Megvii (Face++)

Face++ 旷视

Team members:


Zhicheng Wang

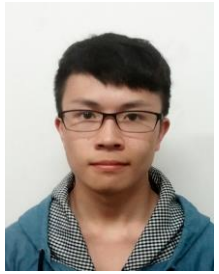

Wenbo Li


Binyi Yin


Qixiang Peng

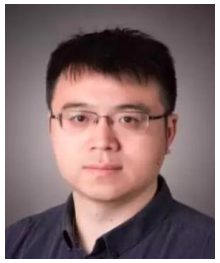

Tianzi Xiao


Yuming Du


Zeming Li


Xiangyu Zhang


Gang Yu


Jian Sun

Megvii (Face++)

Results on COCO 2018

Year	2016	2017	2018
mmAP	60.5	72.1	76.4(ours)

Results on COCO test challenge recent years

Results on COCO 2018

Year	2016	2017	2018
mmAP	60.5	72.1	76.4(ours)

Results on COCO test challenge recent years

	test_challenge	test_dev	mini_validation
Ensemble model	76.4(final submission)	78.1	80.0
Single model	-	77.1	79.0

Results of our method

Overview

- Pipeline
- Proposed Method
- Experiments
- Summary

Overview

- Pipeline

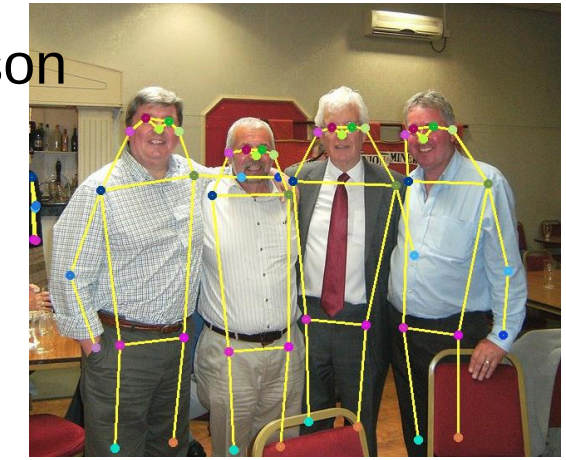
Pipeline

MegDet[1]

Human AP 66.0

crop

Single Person Pose Estimation Network



[1] Megdet: A large mini-batch object detector： C Peng, eta. (CVPR2018)

Overview

- Pipeline
- Proposed Method

Proposed Methods

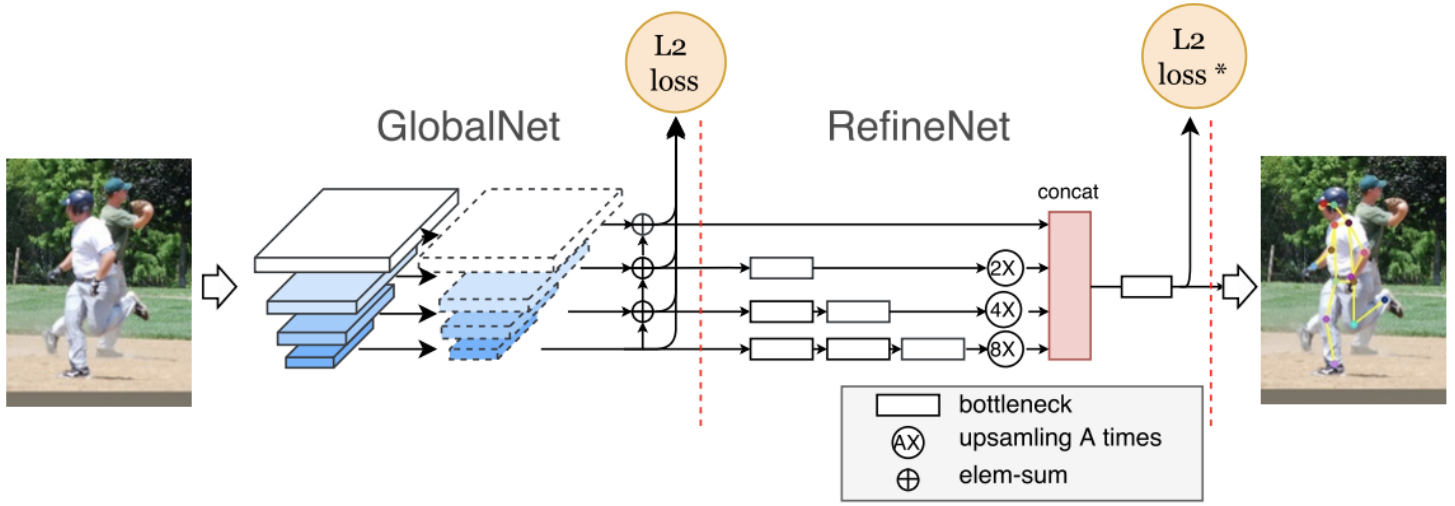


Figure 1. Cascaded Pyramid Network. "L2 loss*" means L2 loss with online hard keypoints mining.

Cascade Pyramid Network[1]

[1] Cascaded pyramid network for multi-person pose estimation: Y Chen eta. (CVPR2018)

Proposed Methods

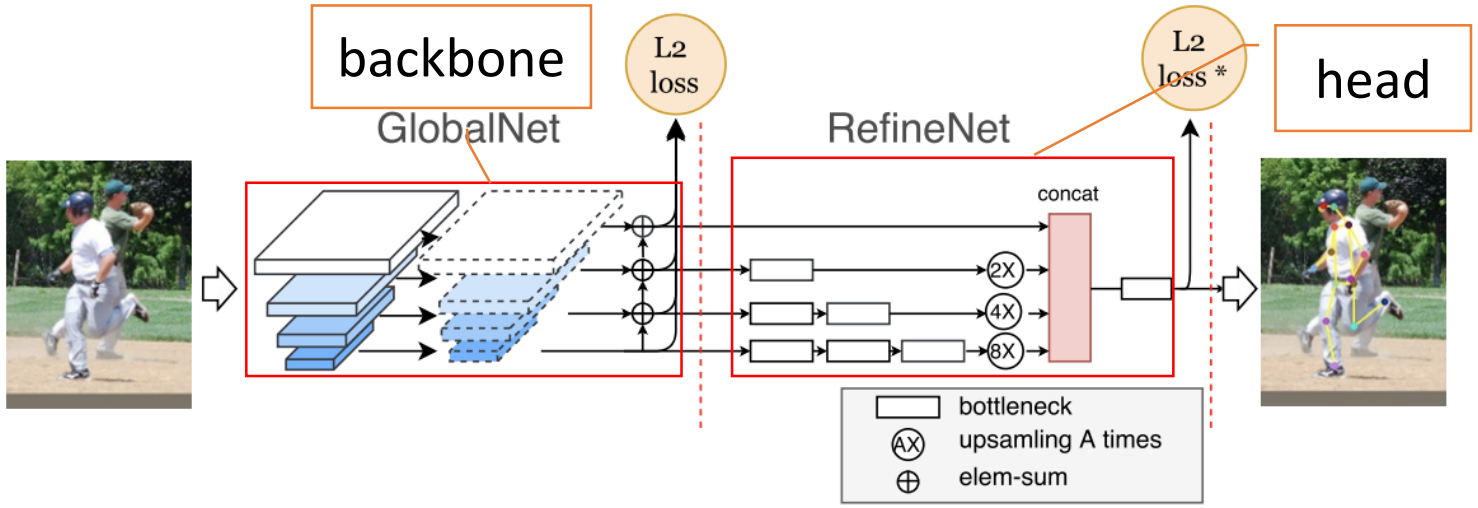


Figure 1. Cascaded Pyramid Network. "L2 loss*" means L2 loss with online hard keypoints mining.

Cascade Pyramid Network[1]

[1] Cascaded pyramid network for multi-person pose estimation: Y Chen eta. (CVPR2018)

Proposed Methods

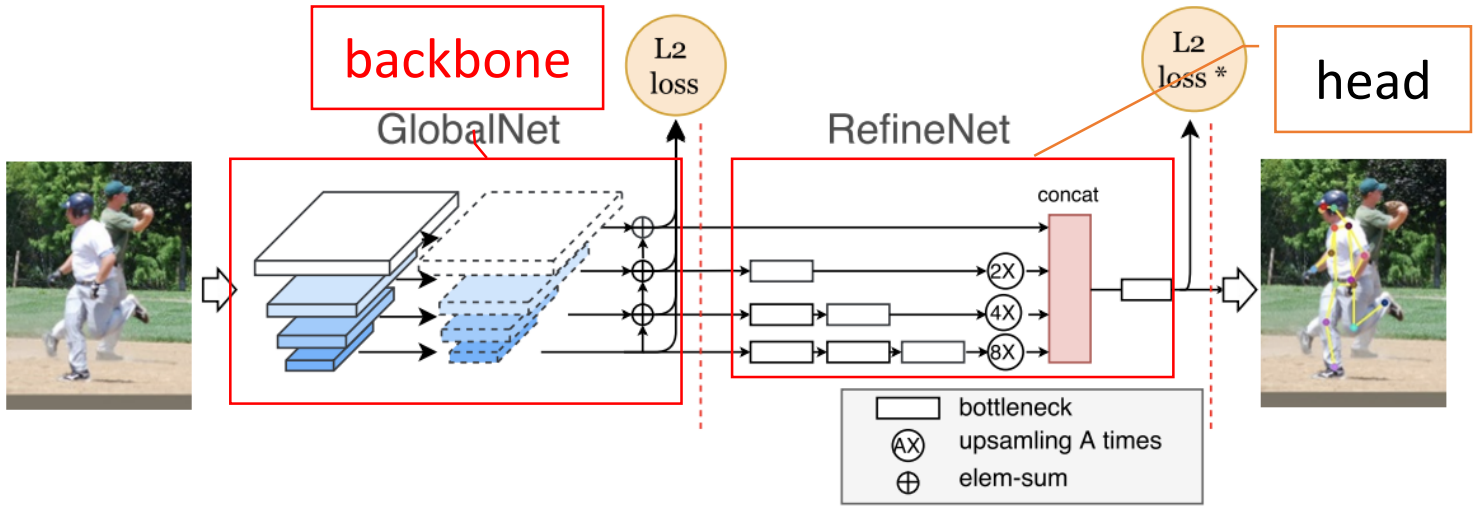
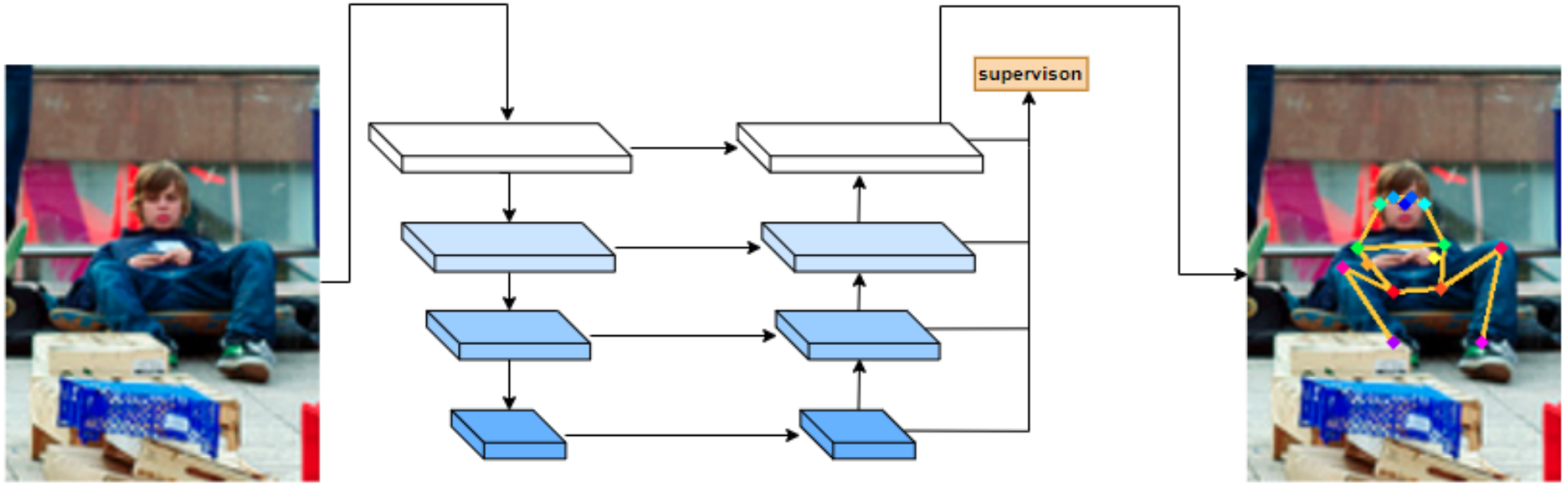


Figure 1. Cascaded Pyramid Network. "L2 loss*" means L2 loss with online hard keypoints mining.

Cascade Pyramid Network[1]

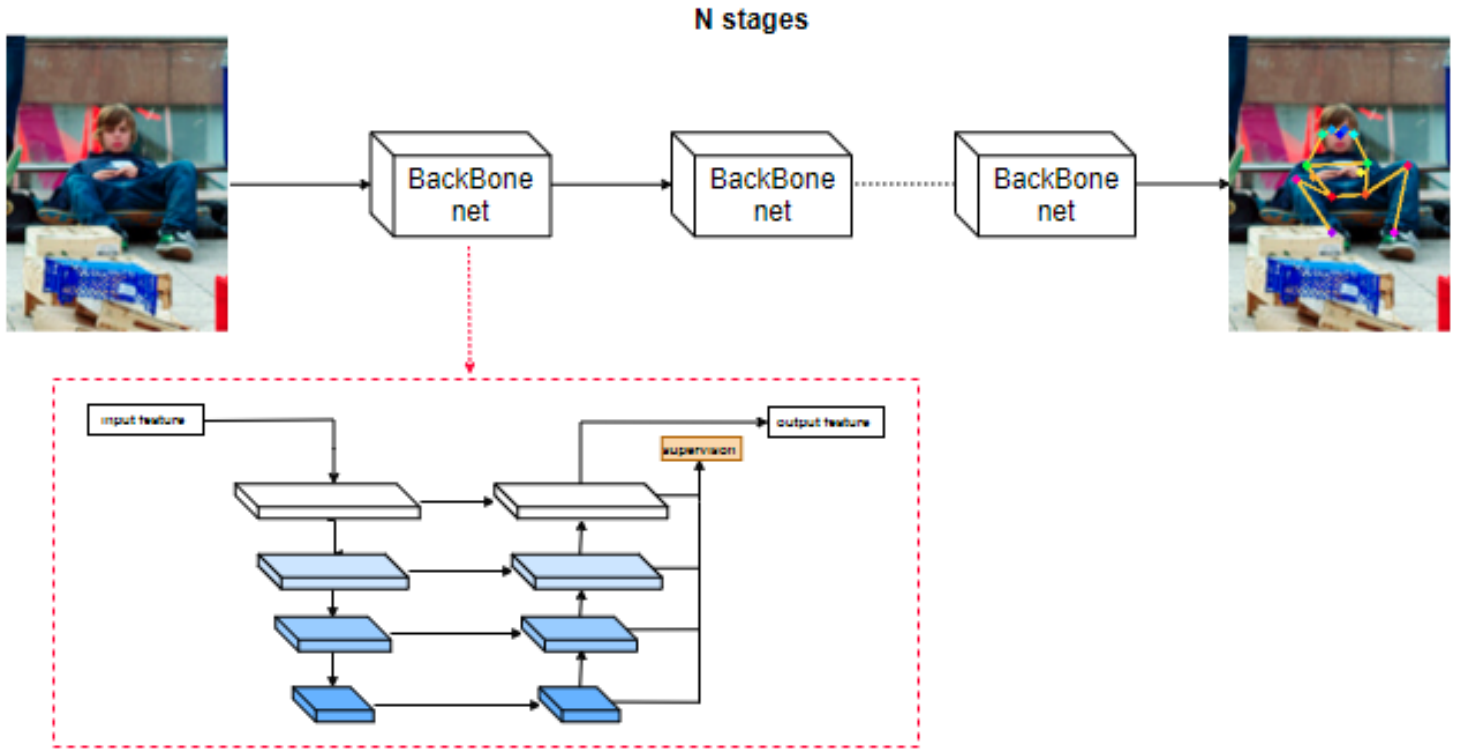
[1] Cascaded pyramid network for multi-person pose estimation: Y Chen eta. (CVPR2018)

Proposed Methods



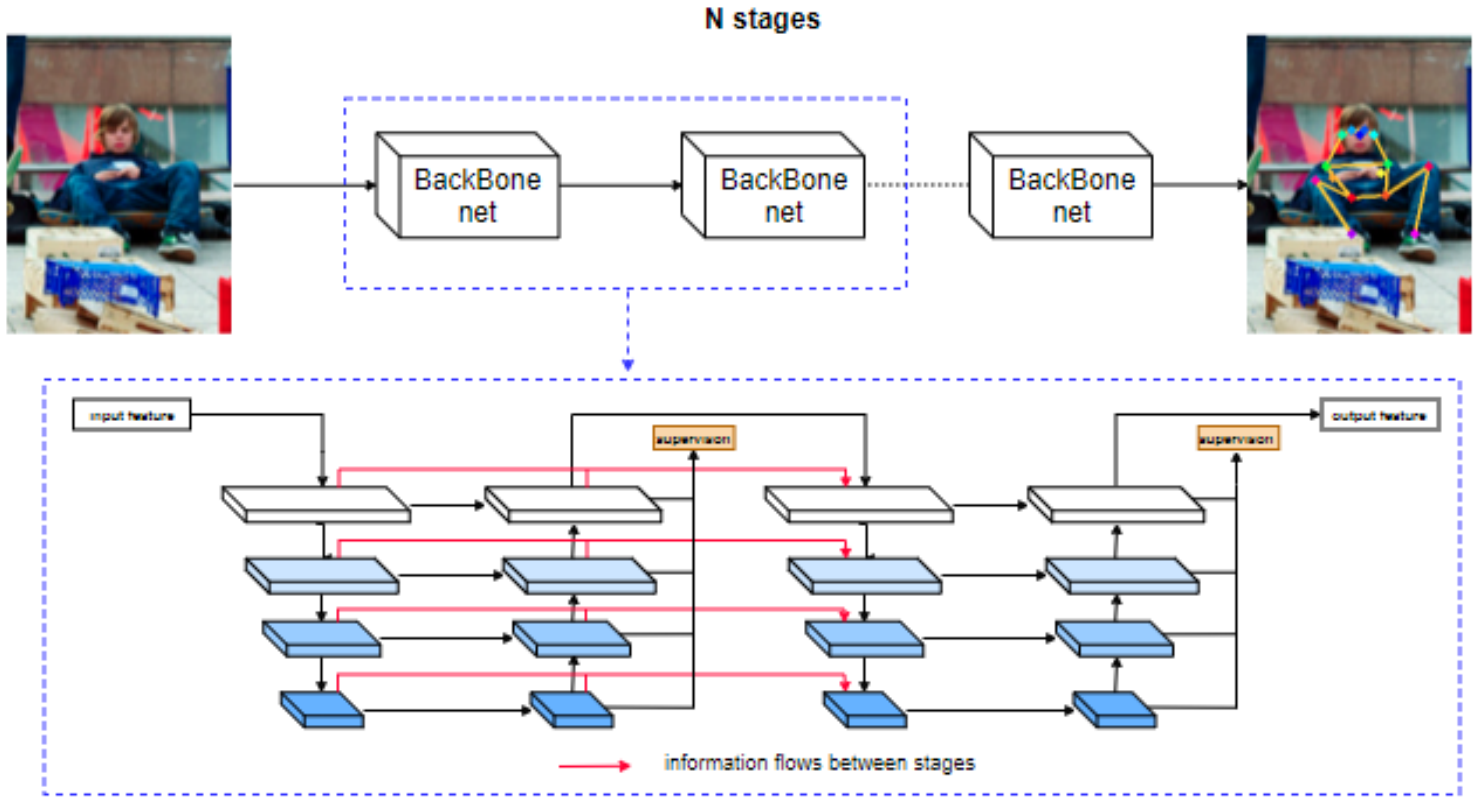
BackBone of CPN

Proposed Methods



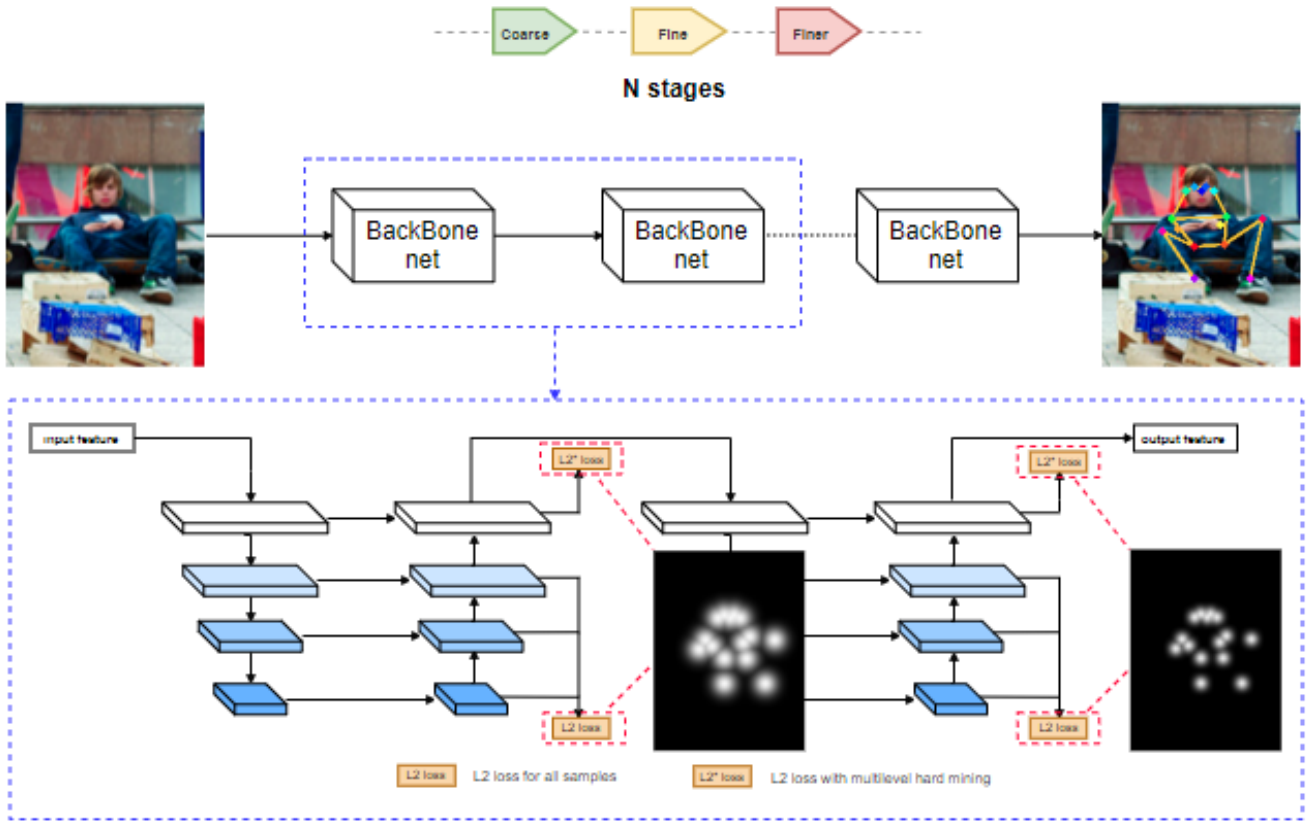
Cascade Backbone Network

Proposed Methods



Cascade Backbone Network with skip connection

Proposed Methods



Cascade Backbone Network：

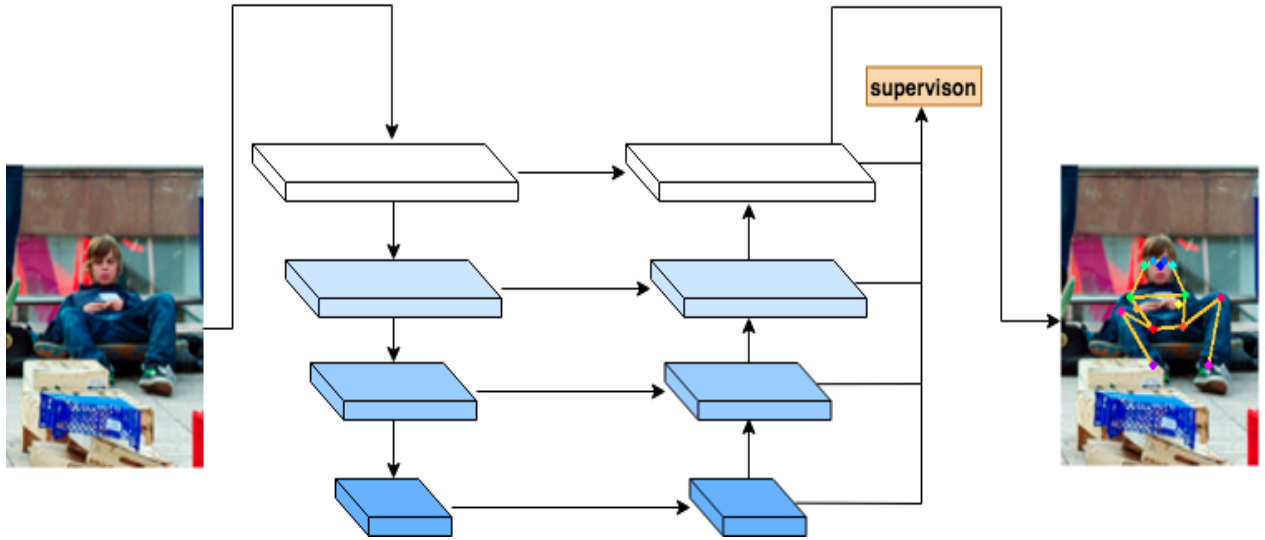
- Online Hard Keypoints Ming (OHKM) supervision
- Coarse to fine supervision

Overview

- Pipeline
- Proposed Method
- Experiments

Experiments

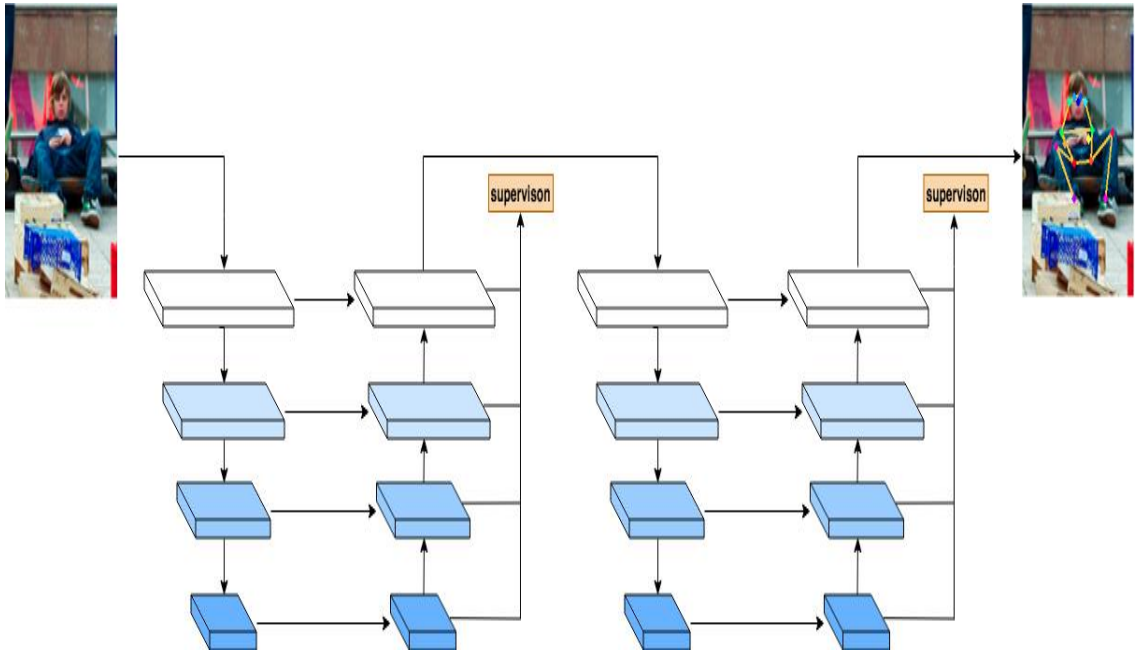
- Ablation experiments



Baseline(backbone res50)	72.3	256x192

Experiments

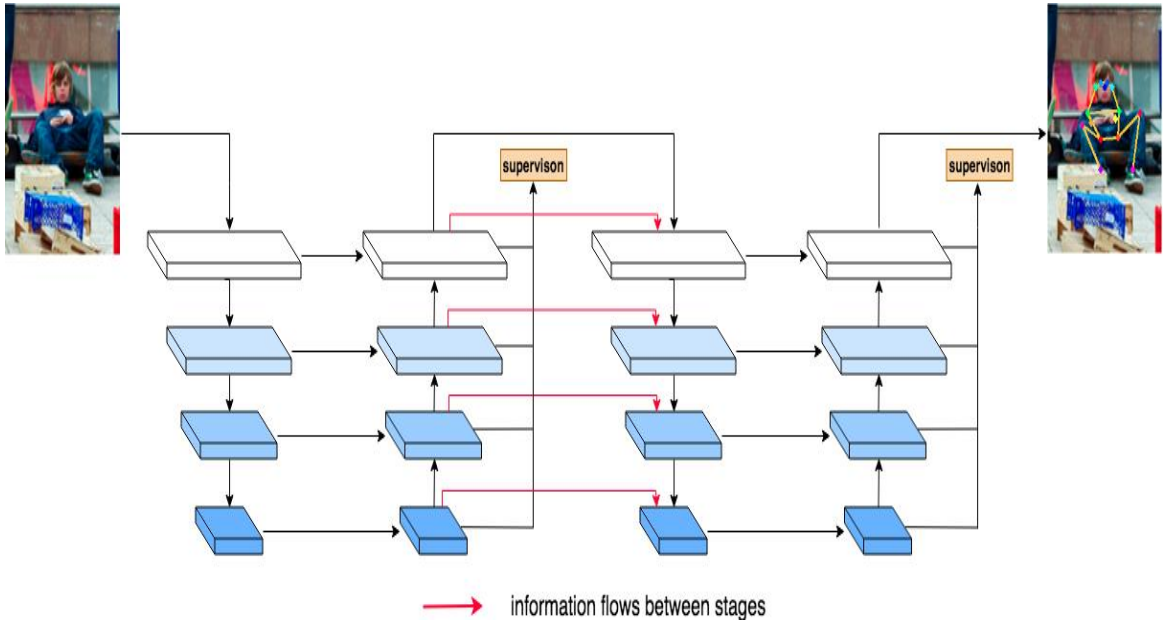
- Ablation experiments



Baseline(backbone res50)	72.3	256x192
2res50	72.8	256x192

Experiments

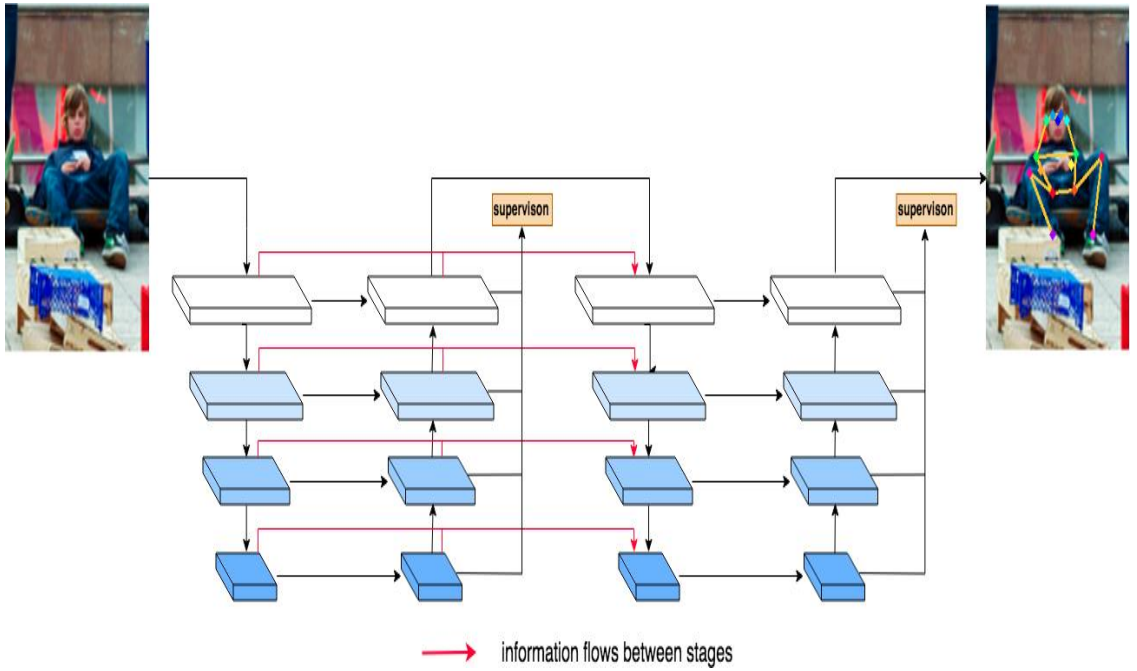
- Ablation experiments



Baseline(backbone res50)	72.3	256x192
2res50	72.8	256x192
2res50+up-skip	73.4	256x192

Experiments

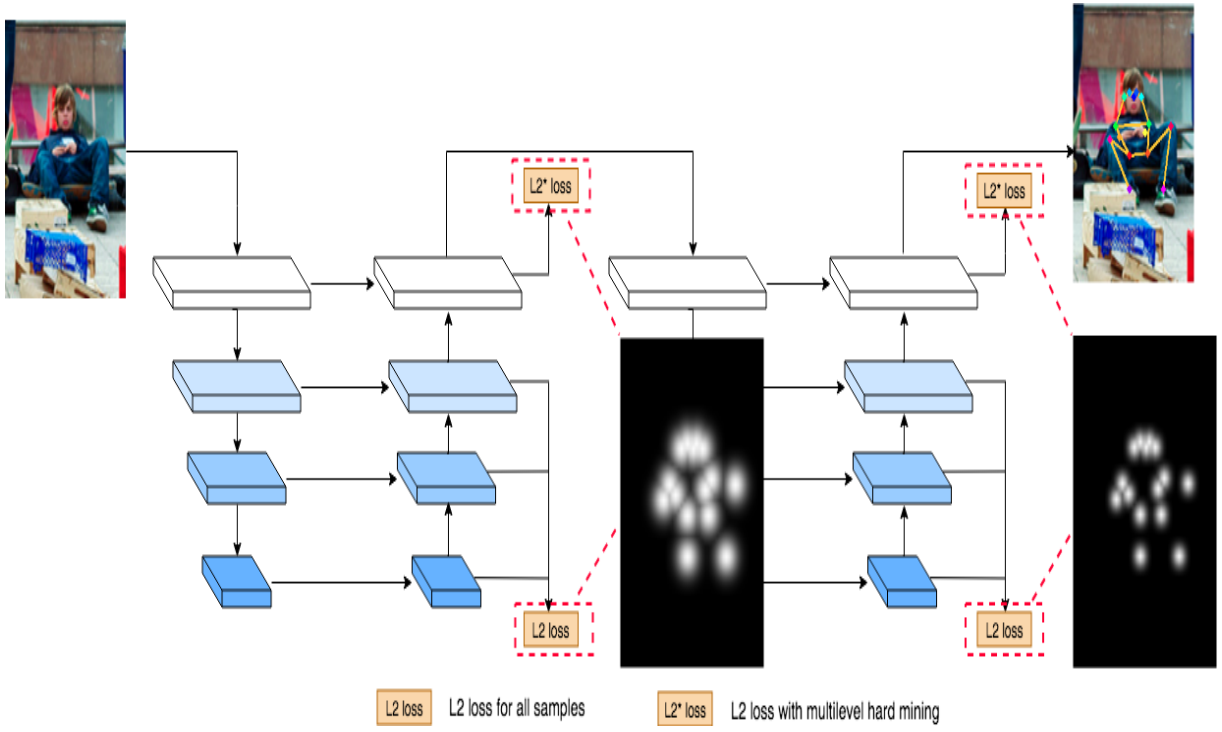
- Ablation experiments



Baseline(backbone res50)	72.3	256x192
2res50	72.8	256x192
2res50+up-skip	73.4	256x192
2res50+up-skip+down-skip	74.8	256x192

Experiments

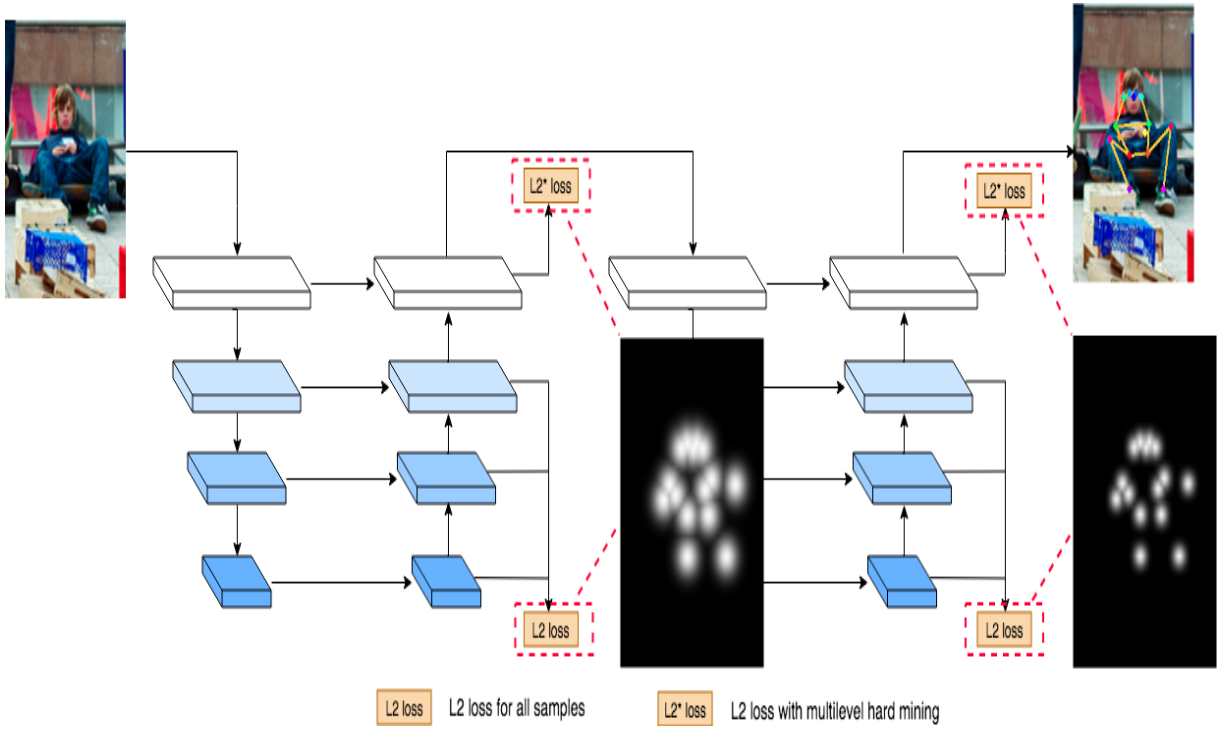
- Ablation experiments



Baseline(backbone res50)	72.3	256x192
2res50	72.8	256x192
2res50+up-skip	73.4	256x192
2res50+up-skip+down-skip	74.8	256x192
2res50+skip+coarse to fine loss	75.0	256x192

Experiments

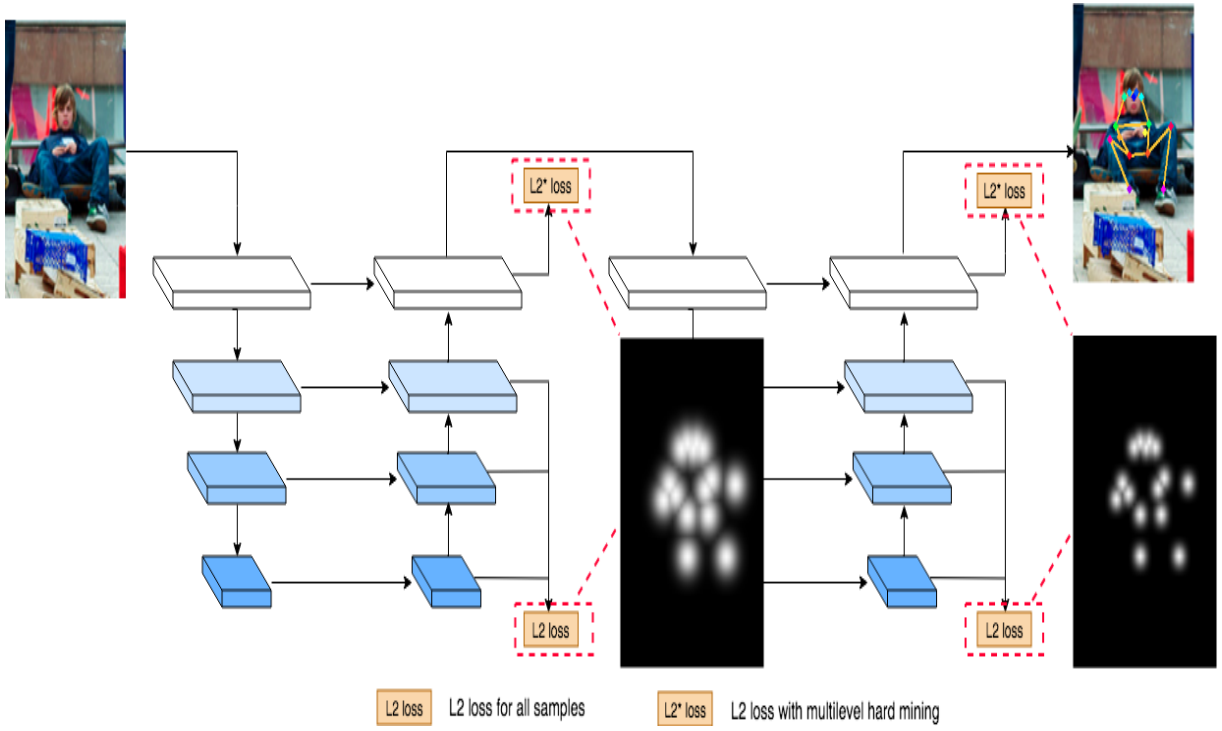
- Ablation experiments



Baseline(backbone res50)	72.3	256x192
2res50	72.8	256x192
2res50+up-skip	73.4	256x192
2res50+up-skip+down-skip	74.8	256x192
2res50+skip+coarse to fine loss	75.0	256x192
2res50+skip+coarse to fine loss	75.8	384x288

Experiments

- Ablation experiments

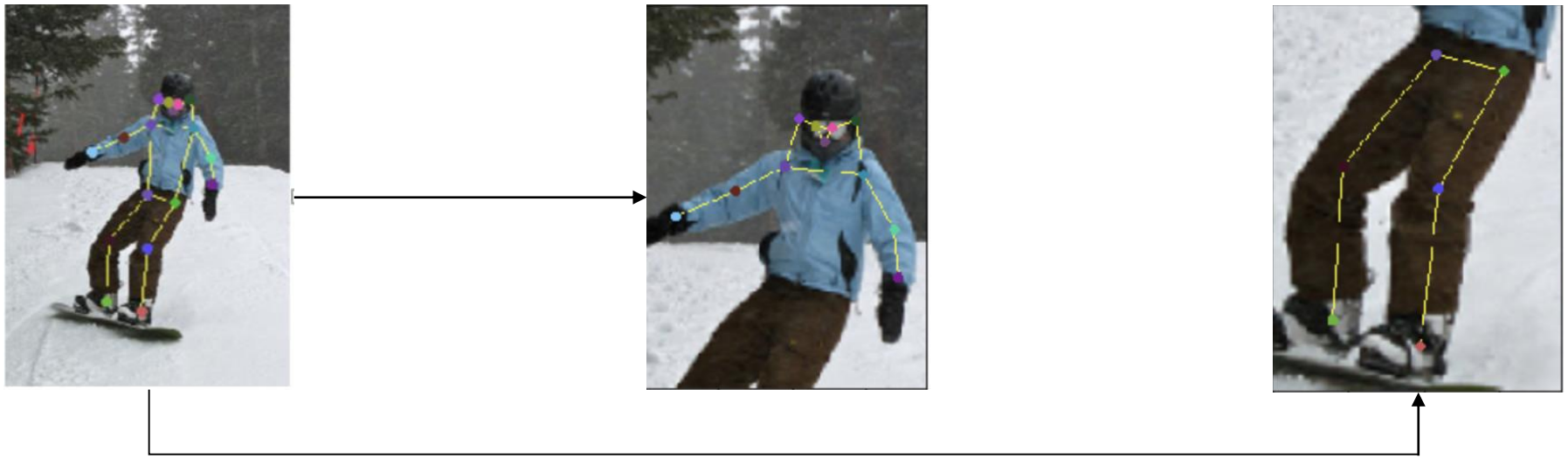


Baseline(backbone res50)	72.3	256x192
2res50	72.8	256x192
2res50+up-skip	73.4	256x192
2res50+up-skip+down-skip	74.8	256x192
2res50+skip+coarse to fine loss	75.0	256x192
2res50+skip+coarse to fine loss	75.8	384x288
3res50+skip+coarse to fine loss	77.5	384x288
4res50+skip+coarse to fine loss	79.0	384x288
Ensemble	80.0	-

Experiments

- Data augmentation
  - Half body augmentation(+0.4 AP)

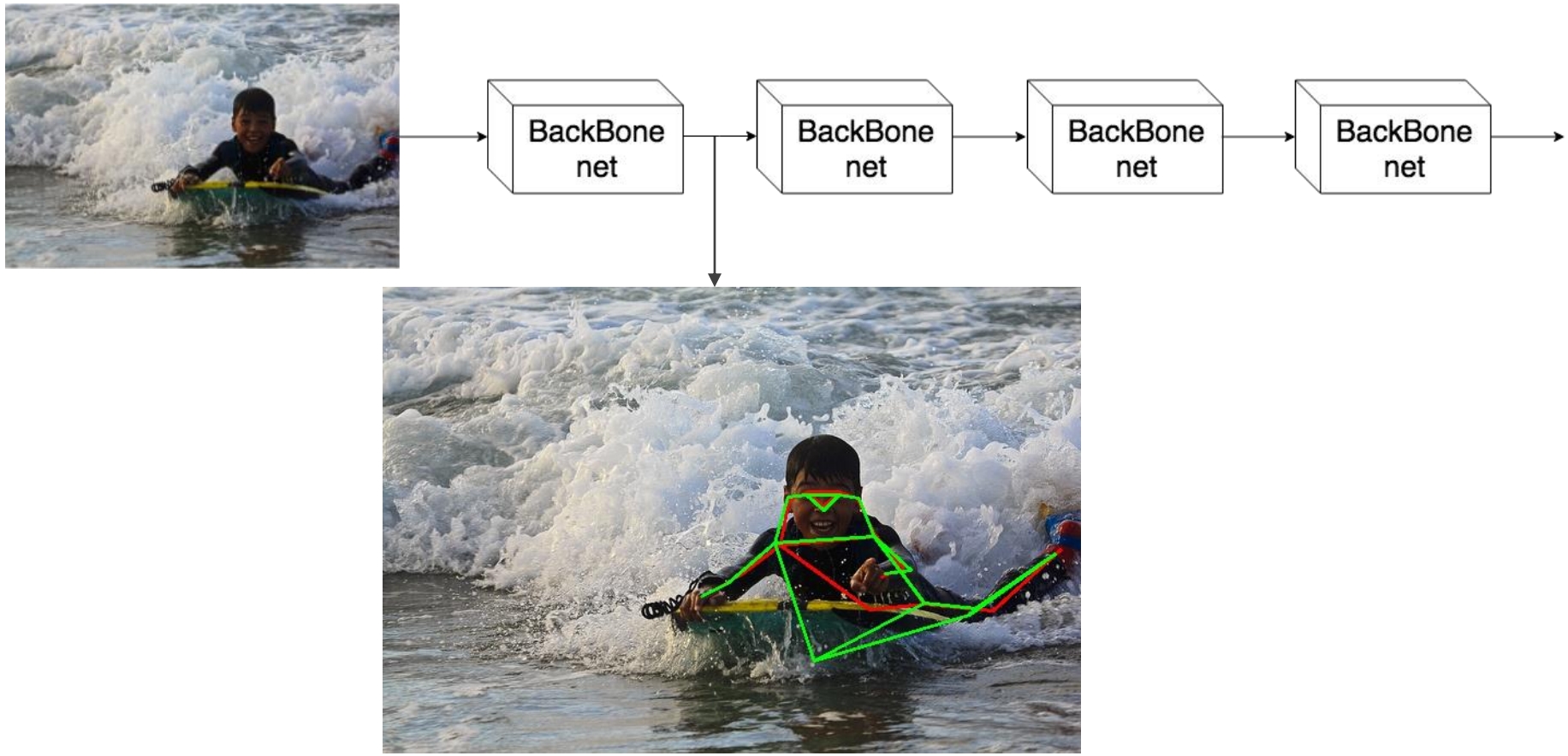
30% probability if more than 8 labeled keypoints



Experiments

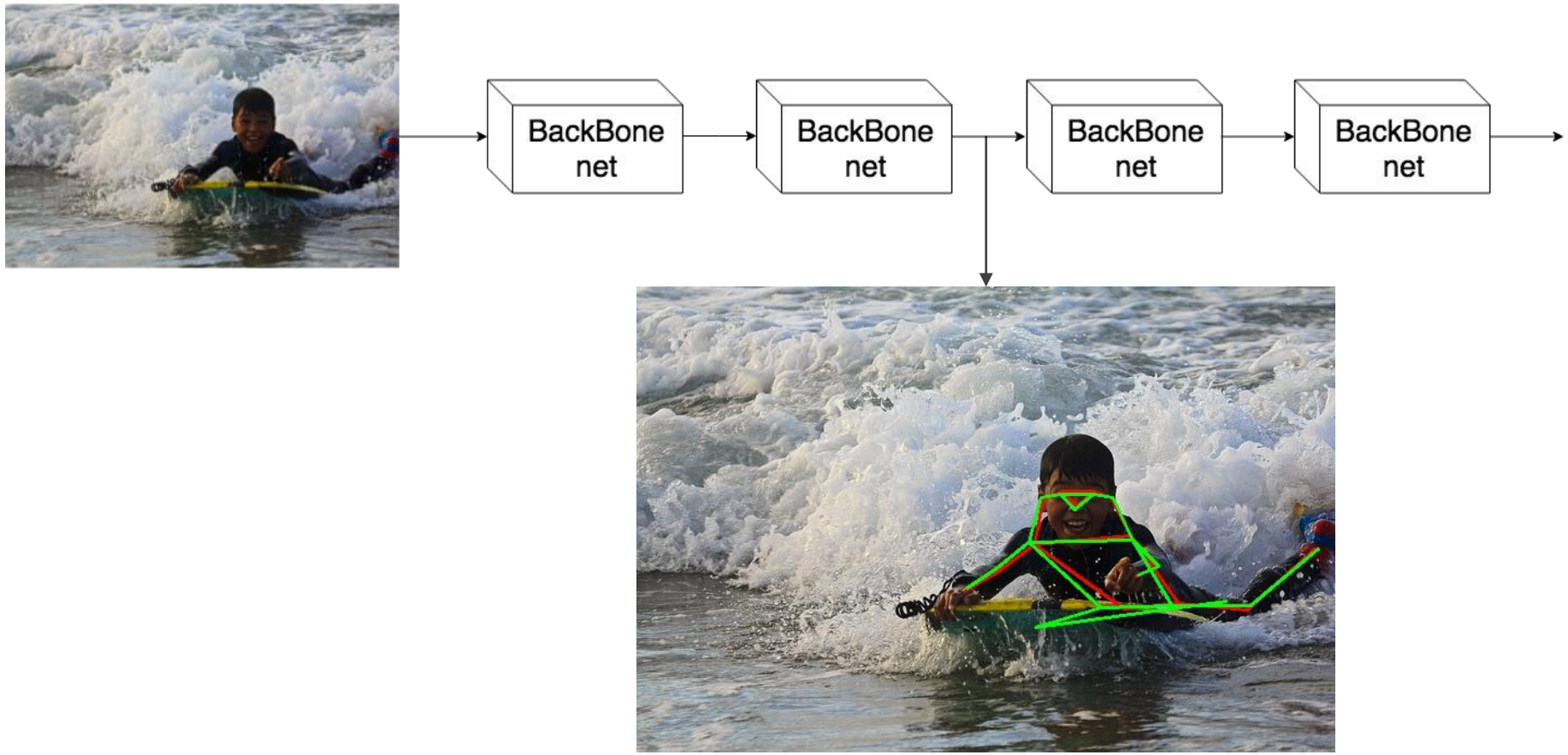
- Data augmentation
  - Half body augmentation(+0.4 AP)
  - Others(+0.4 AP)
    - Random scales(0.7 ~ 1.35)
    - Rotation (-45º ~ 45º)
    - Random flip
- Ensemble(+1.0 AP)
- External data(+0.7 AP)
  - Private data with 10W boxes

Results



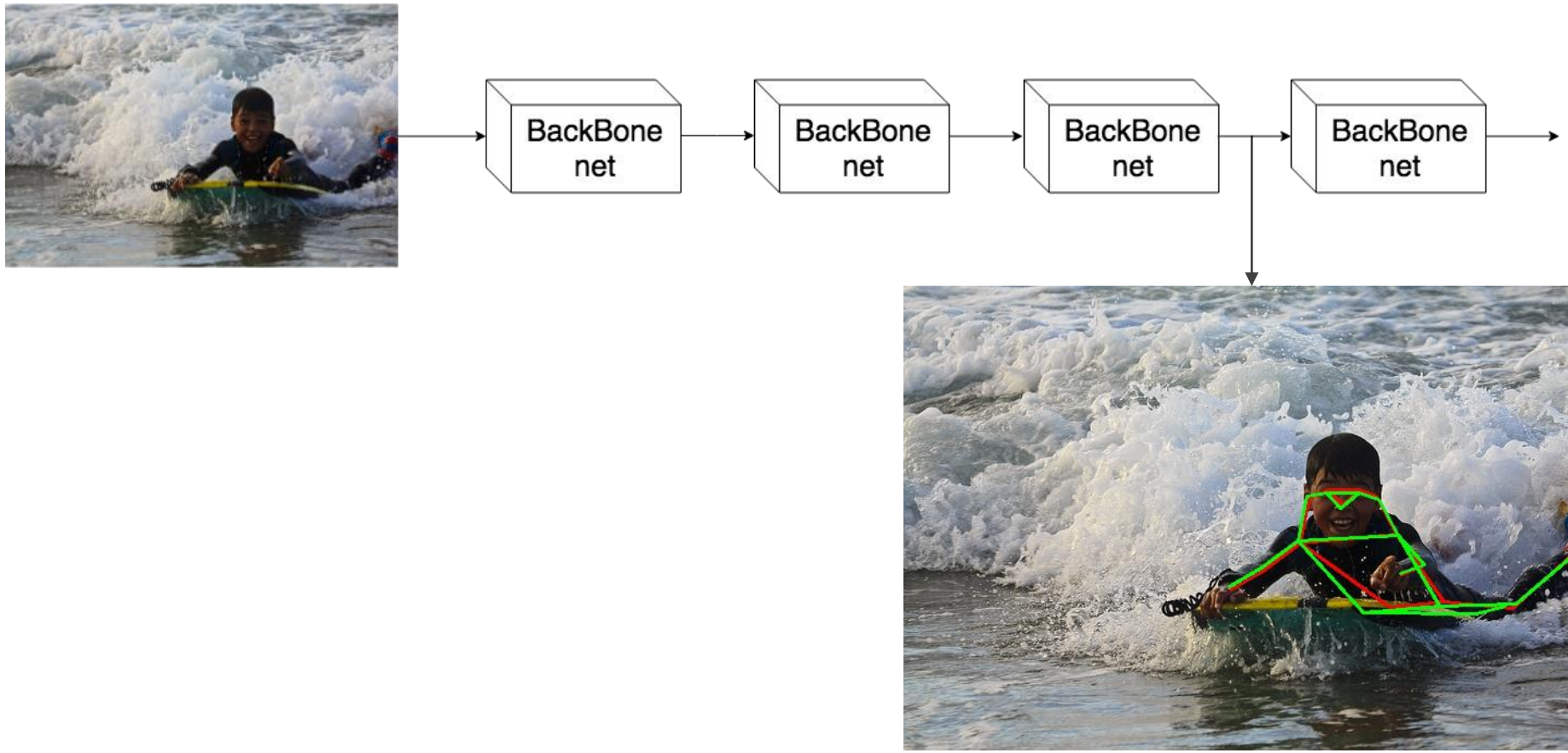
Prediction
Ground truth

Results



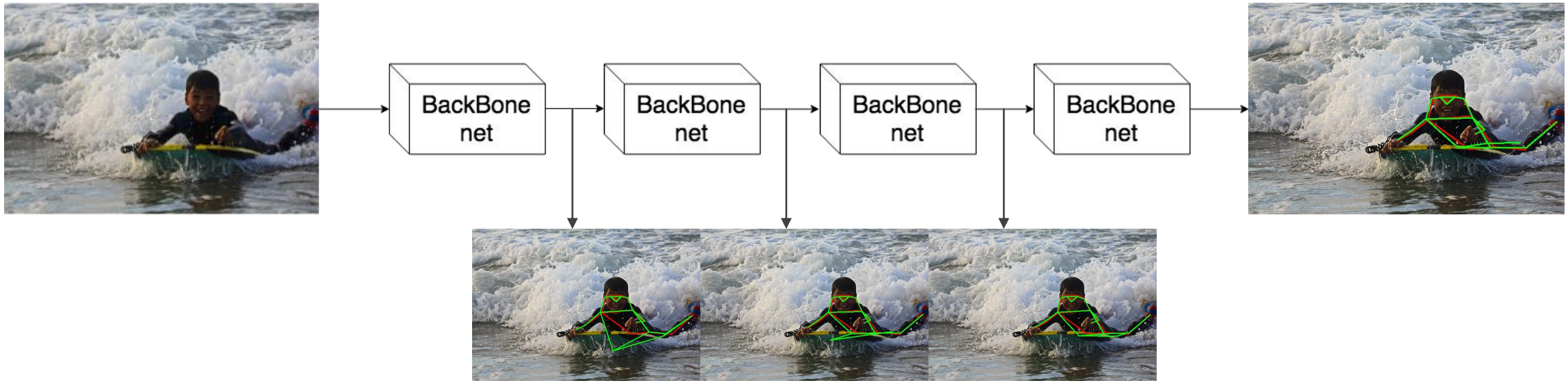
Prediction
Ground truth

Results



Prediction
Ground truth

Results



Prediction
Ground truth

Overview

- Pipeline
- Proposed Method
- Experiments
- Summary

Summary

- Cascade backbone
- OHKM and coarse to fine supervision
- Skip connections cross stages.

Looking for Intern, Researcher, Research Engineer

career@megvii.com

yugang@megvii.com