

COCO + LVIS

Joint Recognition Challenge

<http://cocodataset.org/workshop/coco-lvis-eccv-2020.html>



Workshop organization committee

- COCO
 - [Alexander Kirillov](#) (FAIR)
 - [Tsung-Yi Lin](#) (Google Research)
 - [Yin Cui](#) (Google Research)
 - [Matteo Ruggero Ronchi](#) (Caltech)
 - [Natalia Neverova](#) (FAIR)
 - [Vasil Khalidov](#) (FAIR)
 - [Ross Girshick](#) (FAIR)
 - [Piotr Dollar](#) (FAIR)
- LVIS
 - [Agrim Gupta](#) (Stanford)
 - [Ross Girshick](#) (FAIR)

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Schedule today

- 0:00 – 0:10 COCO tracks introduction + results
- 0:10 – 0:25 COCO invited talk
- 0:25 – 0:35 LVIS track introduction + results
- 0:35 – 1:05 LVIS invited talks
- 1:05 – 1:30 LVIS spotlight talks

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COCO tracks

- COCO
 - [Object detection \(instance segmentation\)](#)
 - [Panoptic segmentation](#)
 - [Key-points detection](#)
 - [DensePose](#) (0 submission)
- Rules
 - Each team must submit technical report
 - All the reports will be available at <http://cocodataset.org> after the workshop

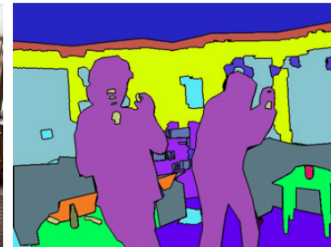
Detection
(instance segmentation)



Keypoints



Panoptic



DensePose

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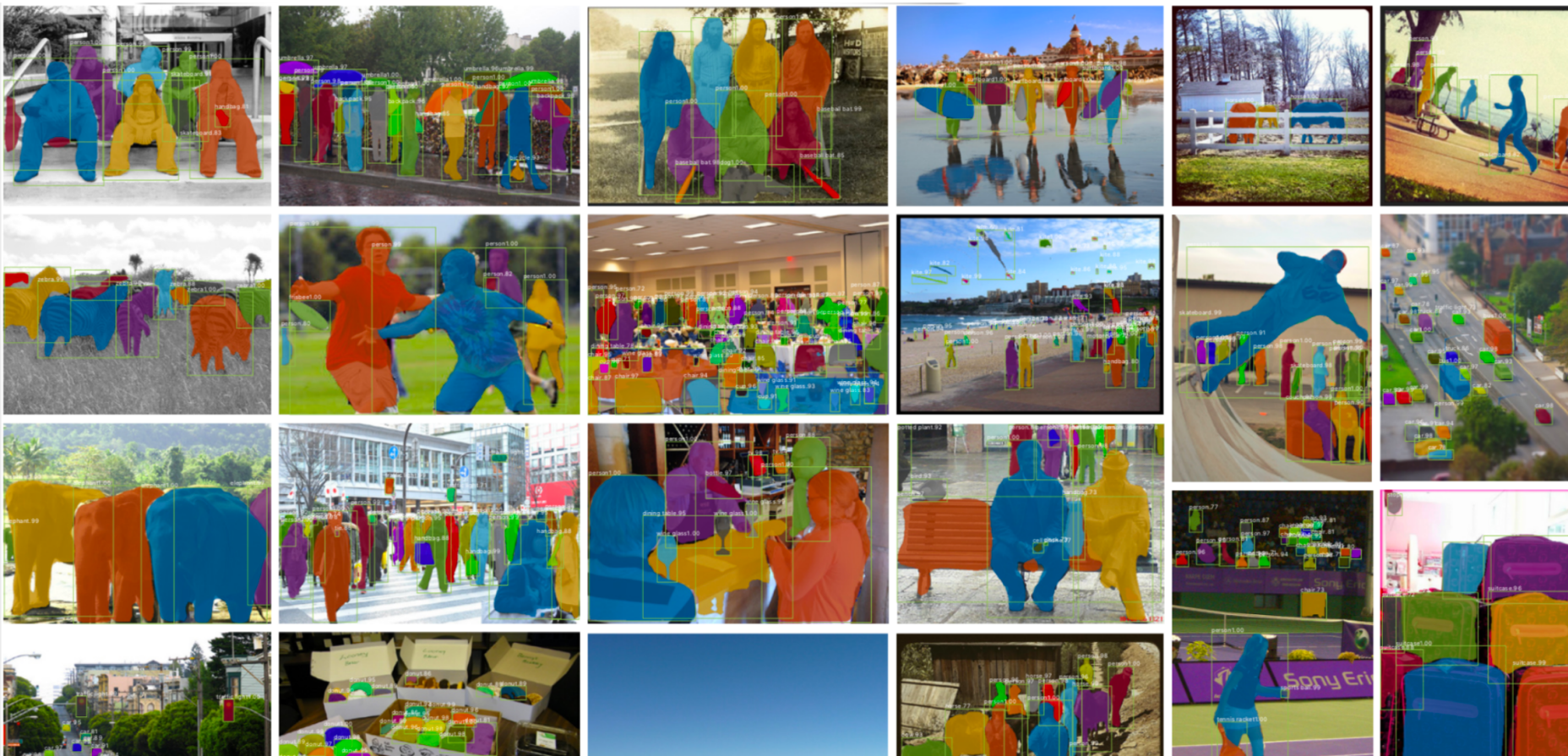
- Lower participation rate than the last year
- Performance saturation
- The format of COCO challenge will be changed next year

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Object detection track



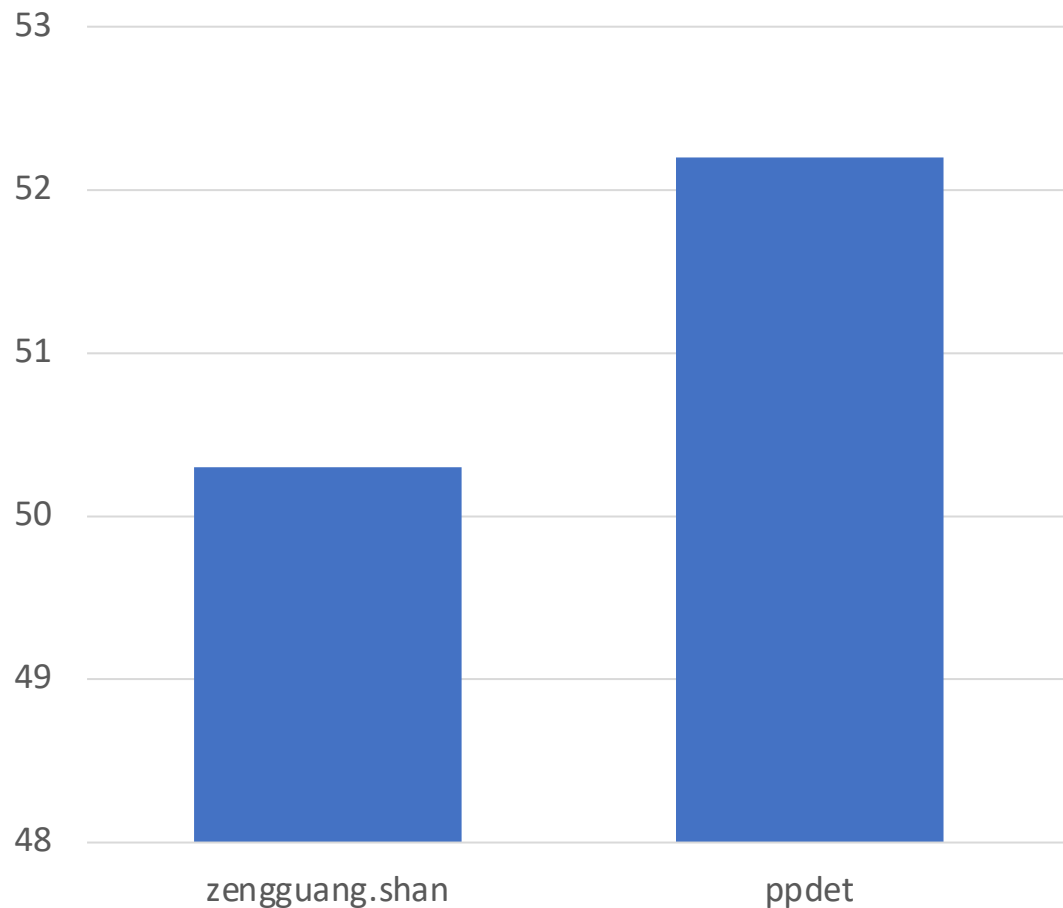
- train: 118k, val: 5k, test-dev: 20k, test-challenge: 20k
- 80 categories
- COCO mask AP (IoU@0.50:0.05:0.95)

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2020 COCO object detection challenge



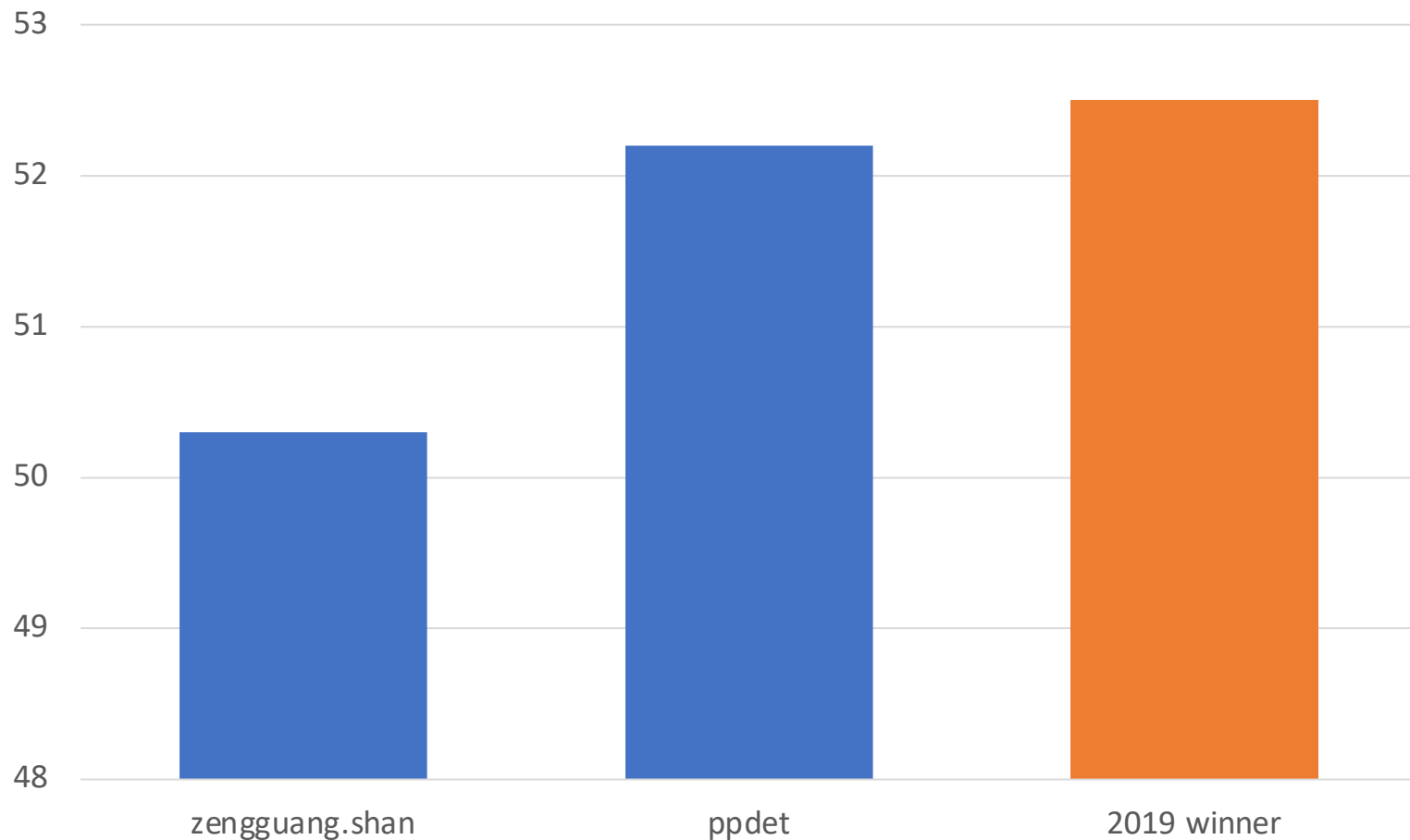
- 10 teams submitted their entries
- only top 2 teams provided the technical report

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2020 COCO object detection challenge



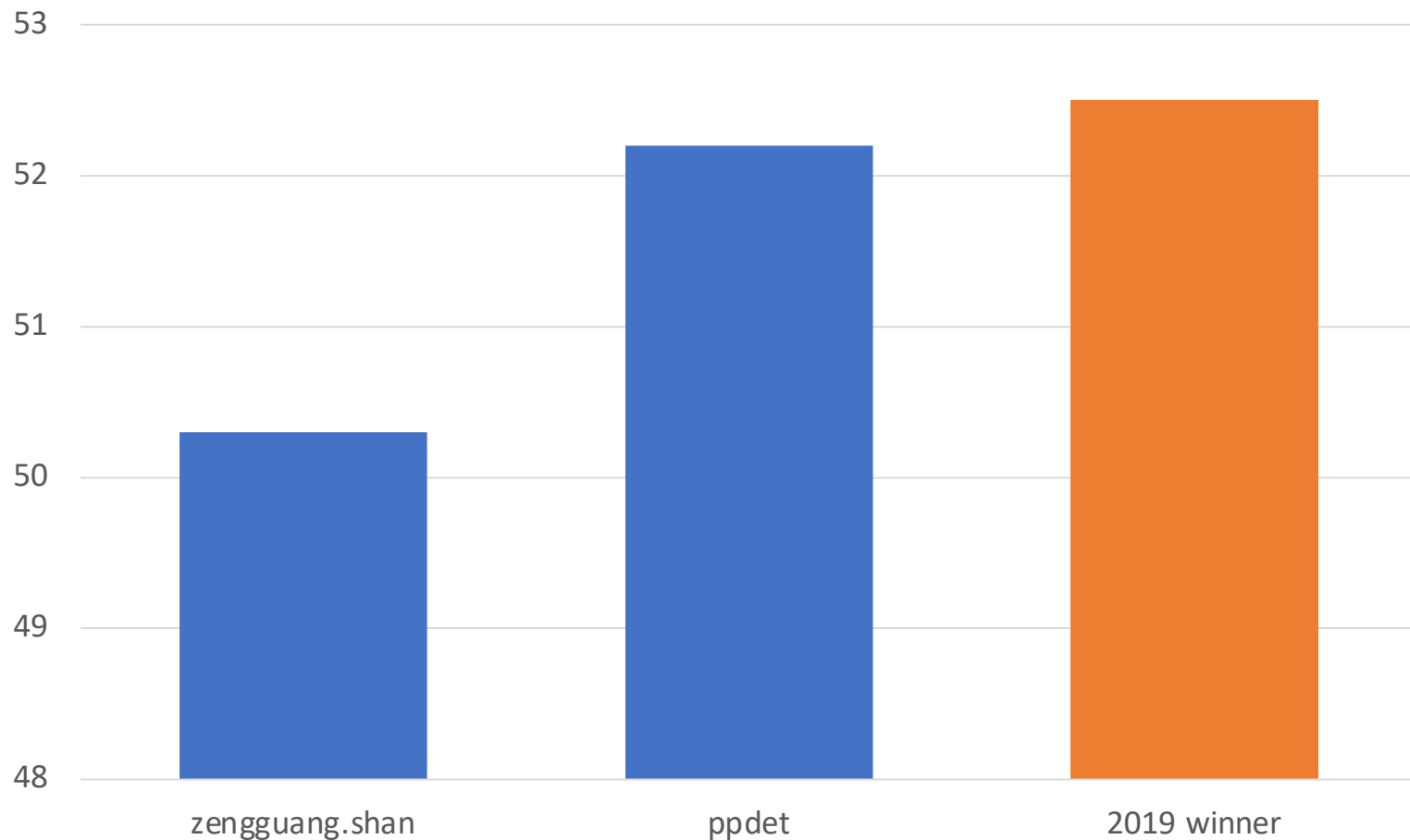
- The best result is lower than the last year's winner
- Same as last year's winner, both teams pre-trained their models on Objects365 dataset

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2020 COCO object detection challenge



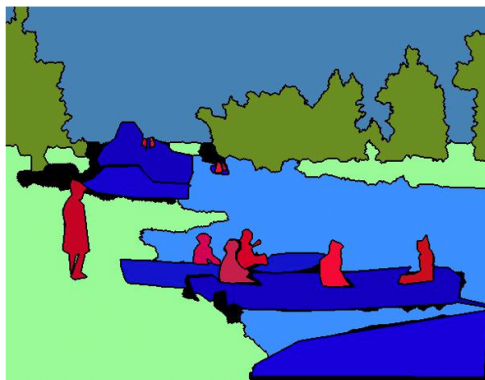
- This year winner is “ppdet” team (researchers from Baidu Inc., ICT, CAS and Beihang University)
- Enhanced segmentation head with ensemble of bounding box predictions

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Panoptic segmentation track



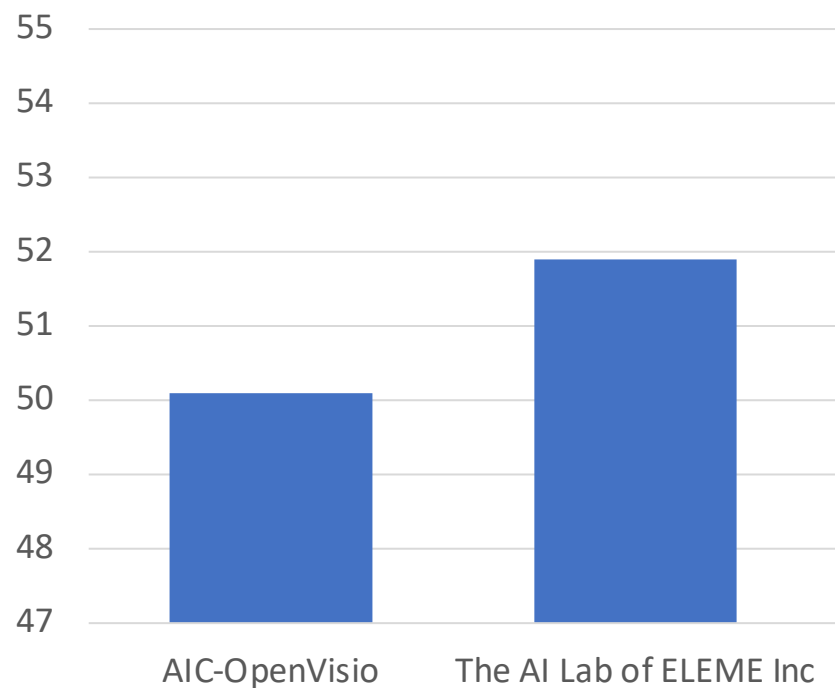
- train: 118k, val: 5k, test-dev: 20k, test-challenge: 20k
- 80 things categories, 53 stuff categories
- no overlaps between segments
- panoptic quality (PQ) performance evaluation

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2020 COCO panoptic challenge



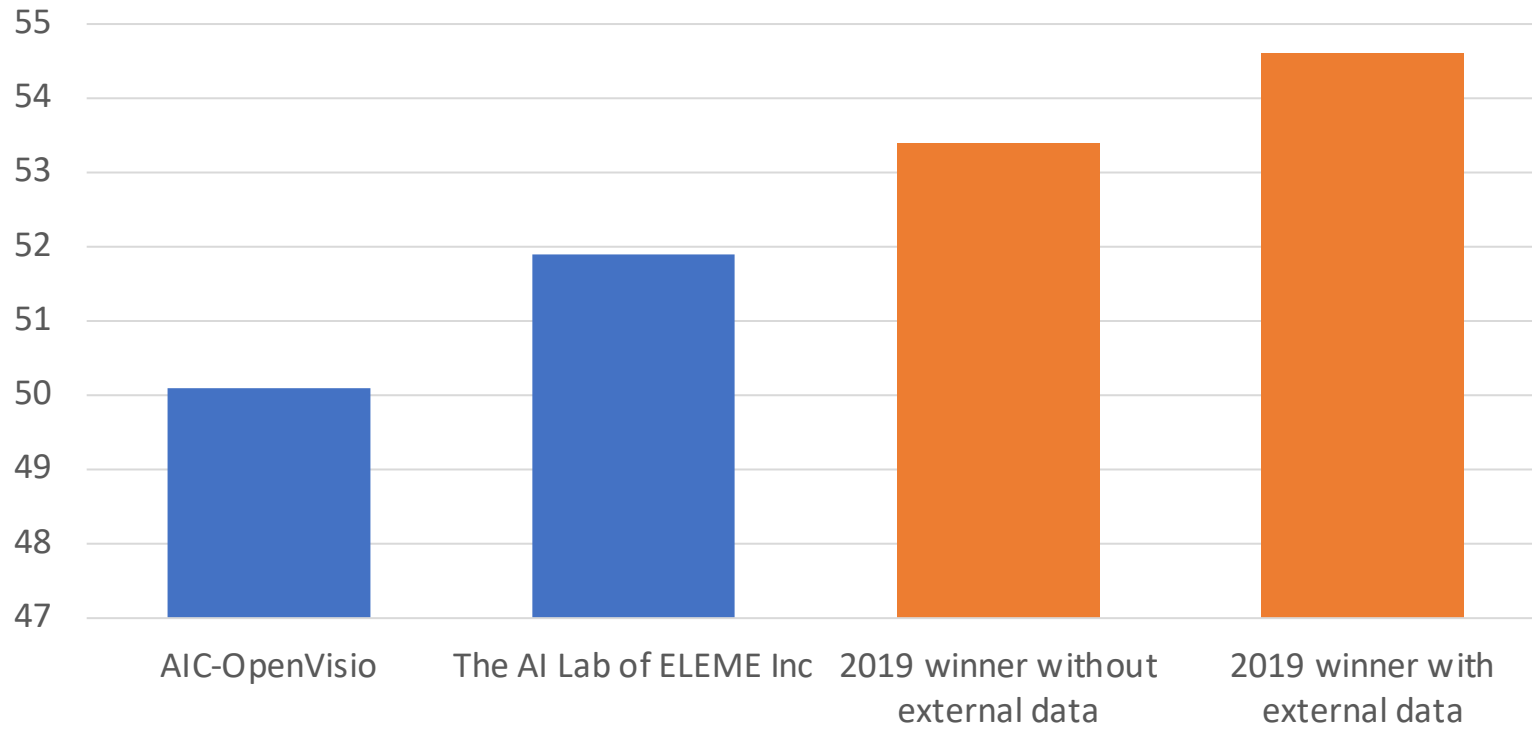
- 5 teams submitted their entries
- only 2 provided the technical report

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2020 COCO panoptic challenge



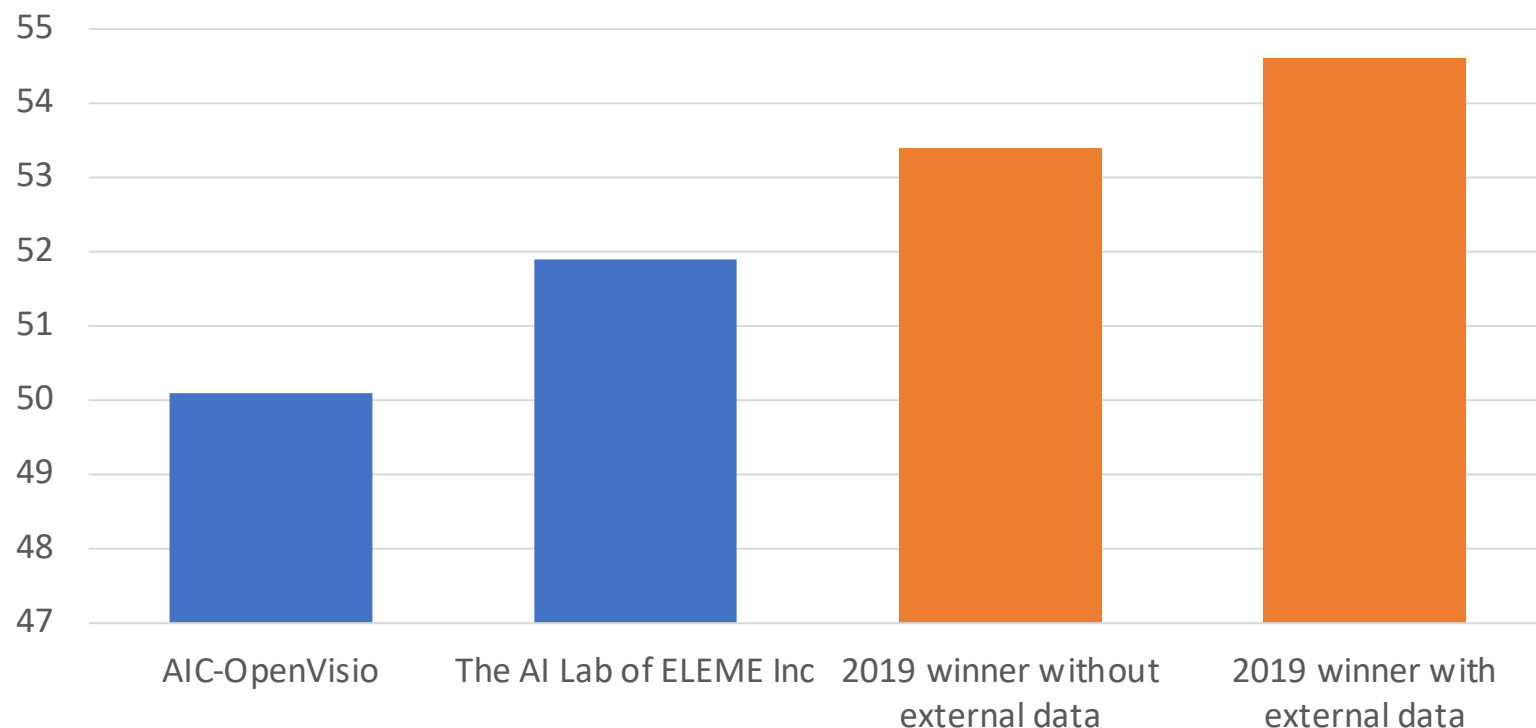
➤ The best result is lower than the last year winners

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2020 COCO panoptic challenge



- This year winner is “The AI lab of ELEME Inc” team
- Ensemble approach with stuff and things heads unified by panoptic head + DenceCRF

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Key-points detection track



- 59k annotated images with 156k annotated people
- 17 types of key-points
- COCO AP at Object Keypoint Similarity (OKS=0.5:0.05:.95)

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2020 COCO keypoints detection challenge

The COVID-19 effect:

1. First time that the number of submissions decreased (13 entries).
2. Only 3 technical reports submitted (1st, 4th, 7th).

Comparison to 2019:

1. Two teams had marginal improvement over 2019 winners (Megvii).
2. COCO AP on test-dev surpassed 80%.

Rule violations: (<http://cocodataset.org/#guidelines>)

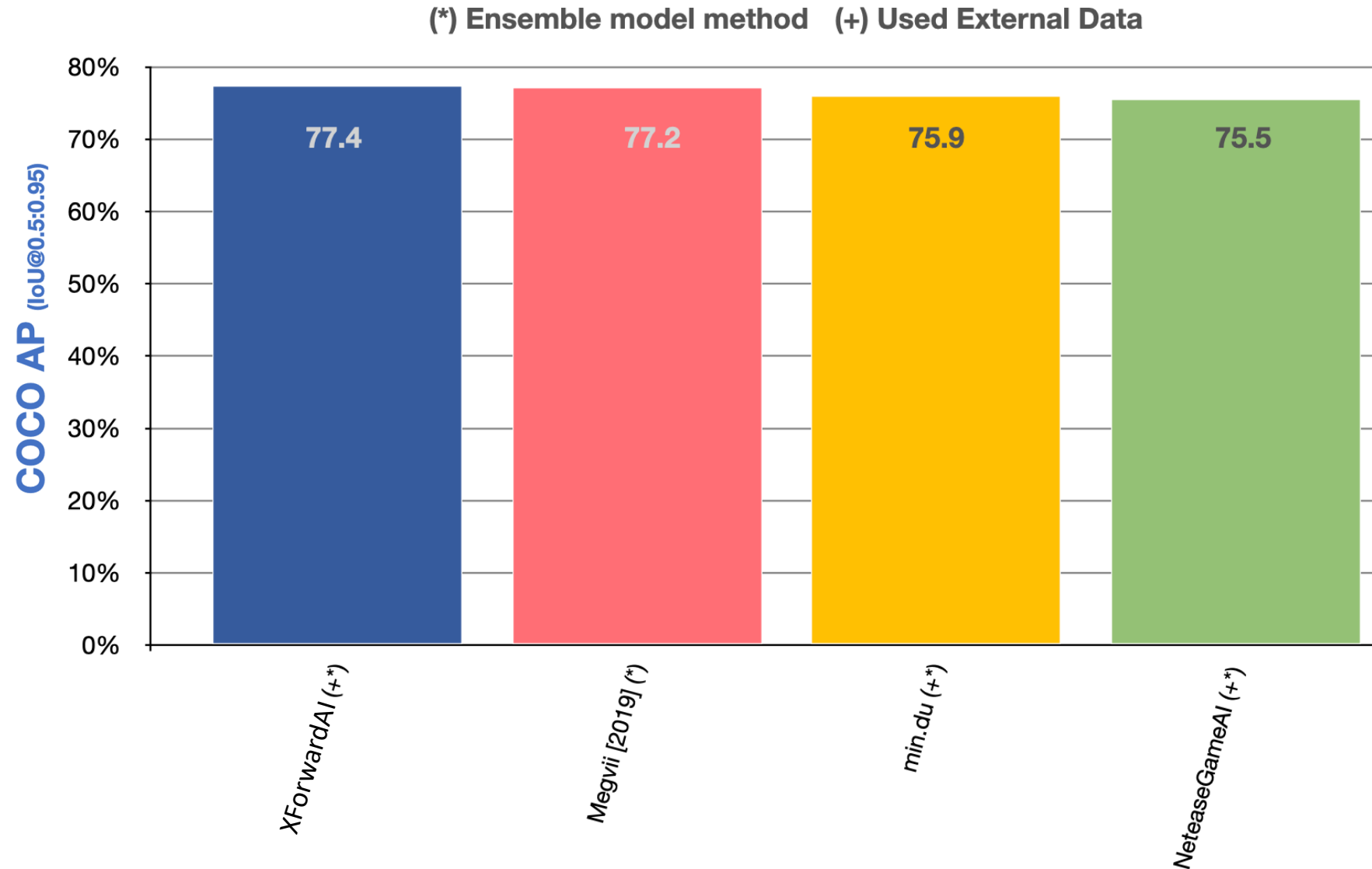
1. Netease Game AI: Used 3 CodaLab accounts (only 1 permitted) and made 6 submissions to test-challenge (only 5 permitted).
2. Meta-meta: Separated the results on test-dev and test-challenge.

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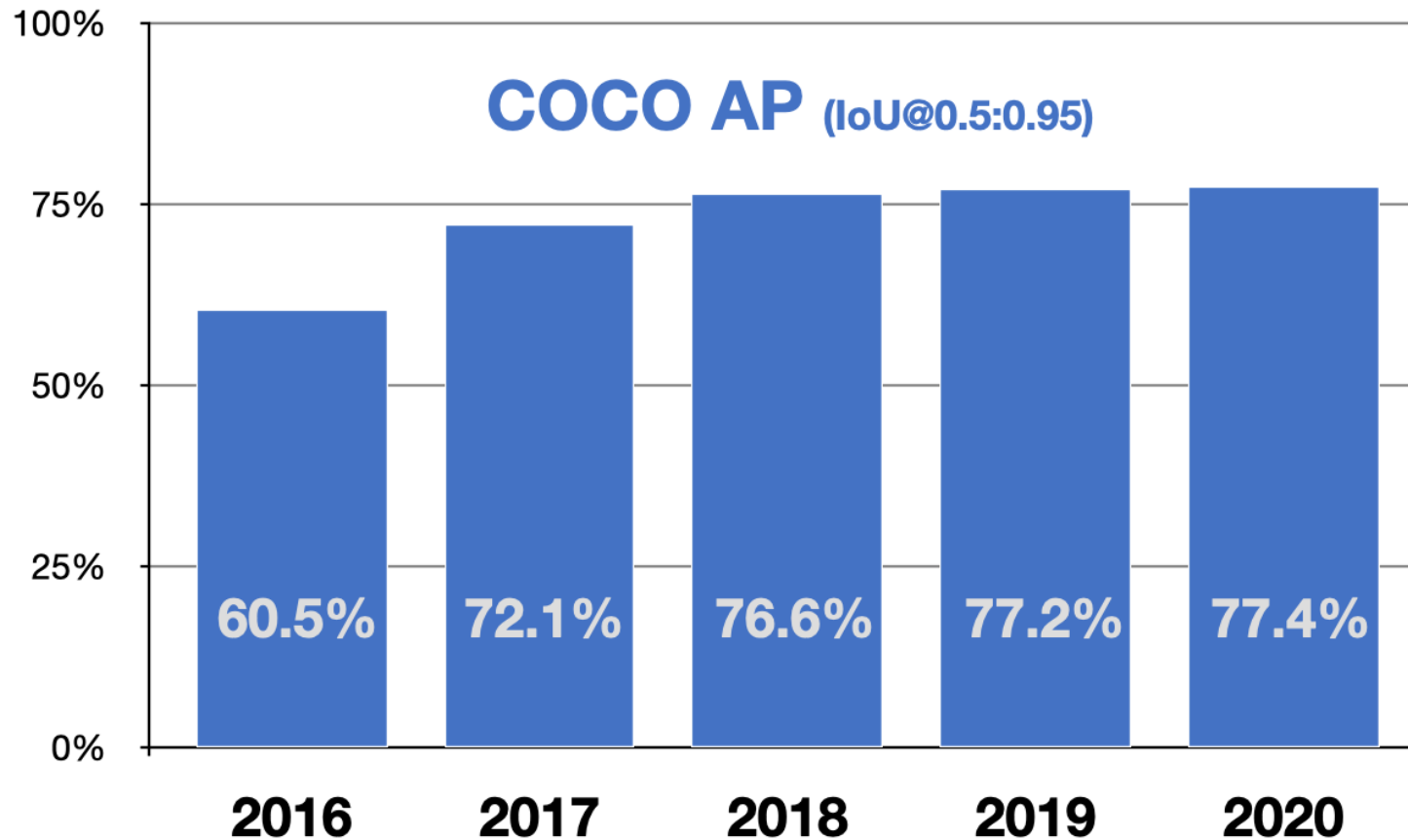
2020 COCO keypoints detection challenge





2020 COCO keypoints detection challenge

Improvement at the top is becoming marginal



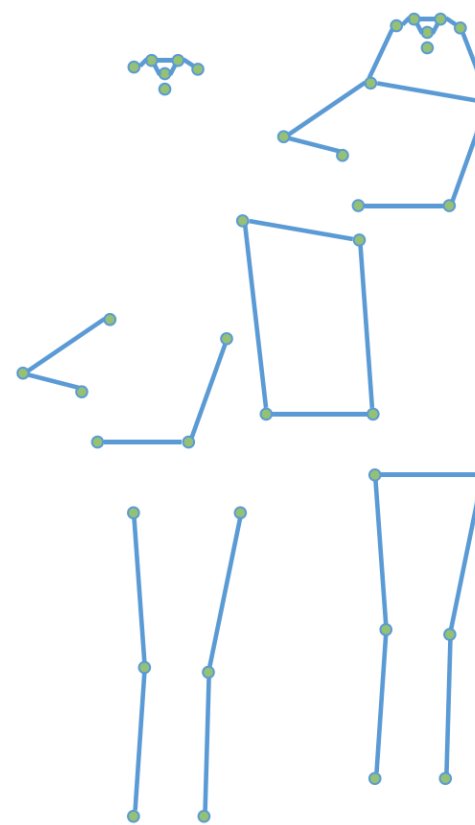
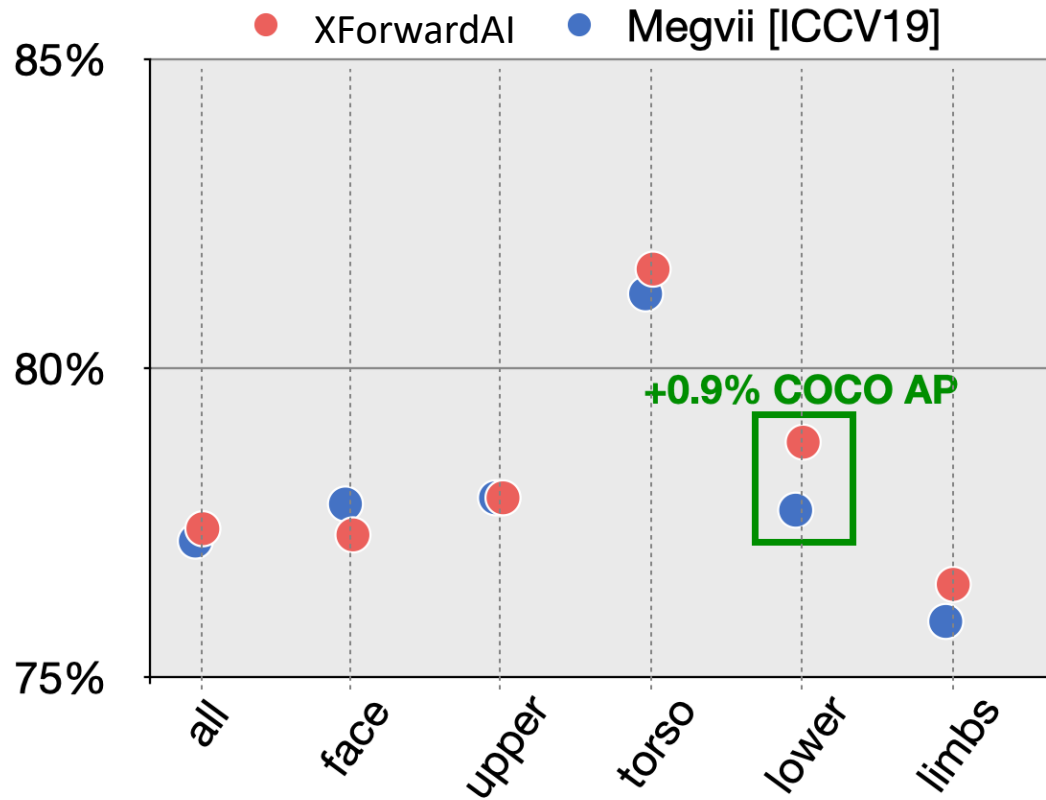
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2020 COCO keypoints detection challenge

COCO AP improvements over keypoint groups



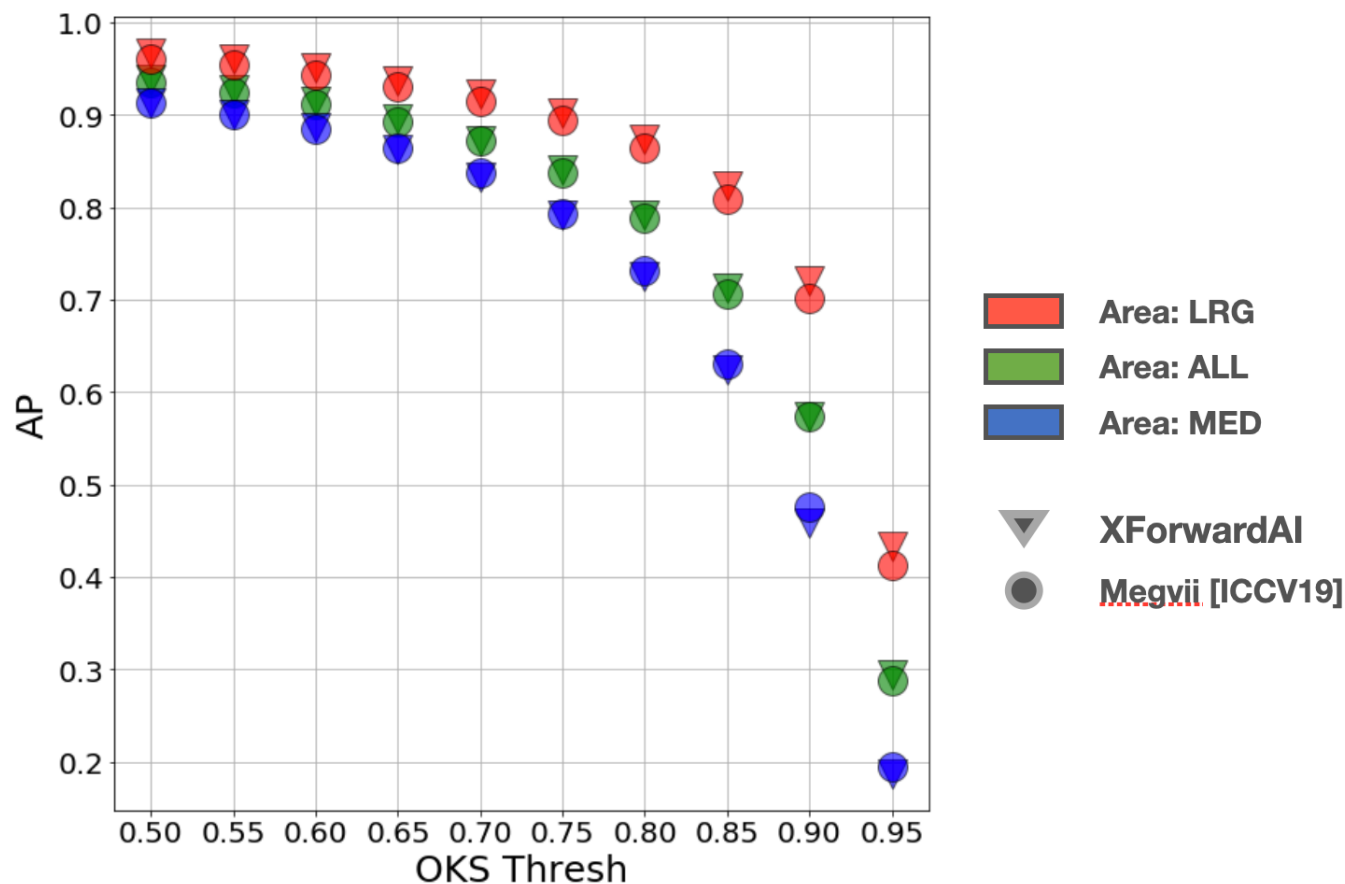
Ronchi et al, "Benchmarking and Error Diagnosis in Multi-Instance Pose Estimation", ICCV17
www.github.com/matteorr/coco-analyze





2020 COCO keypoints detection challenge

XForwardAI consistently better at large instances



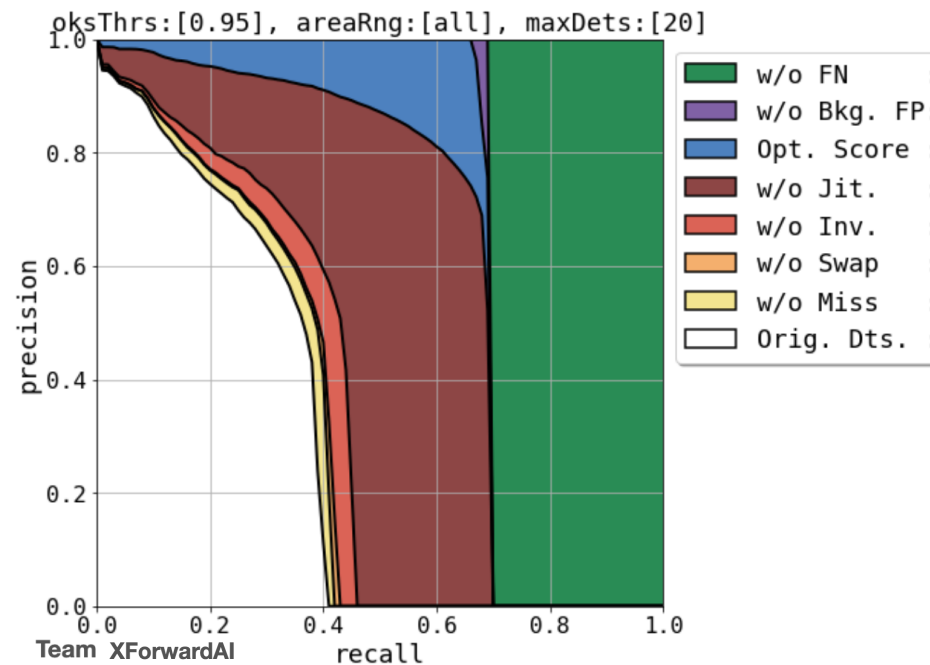
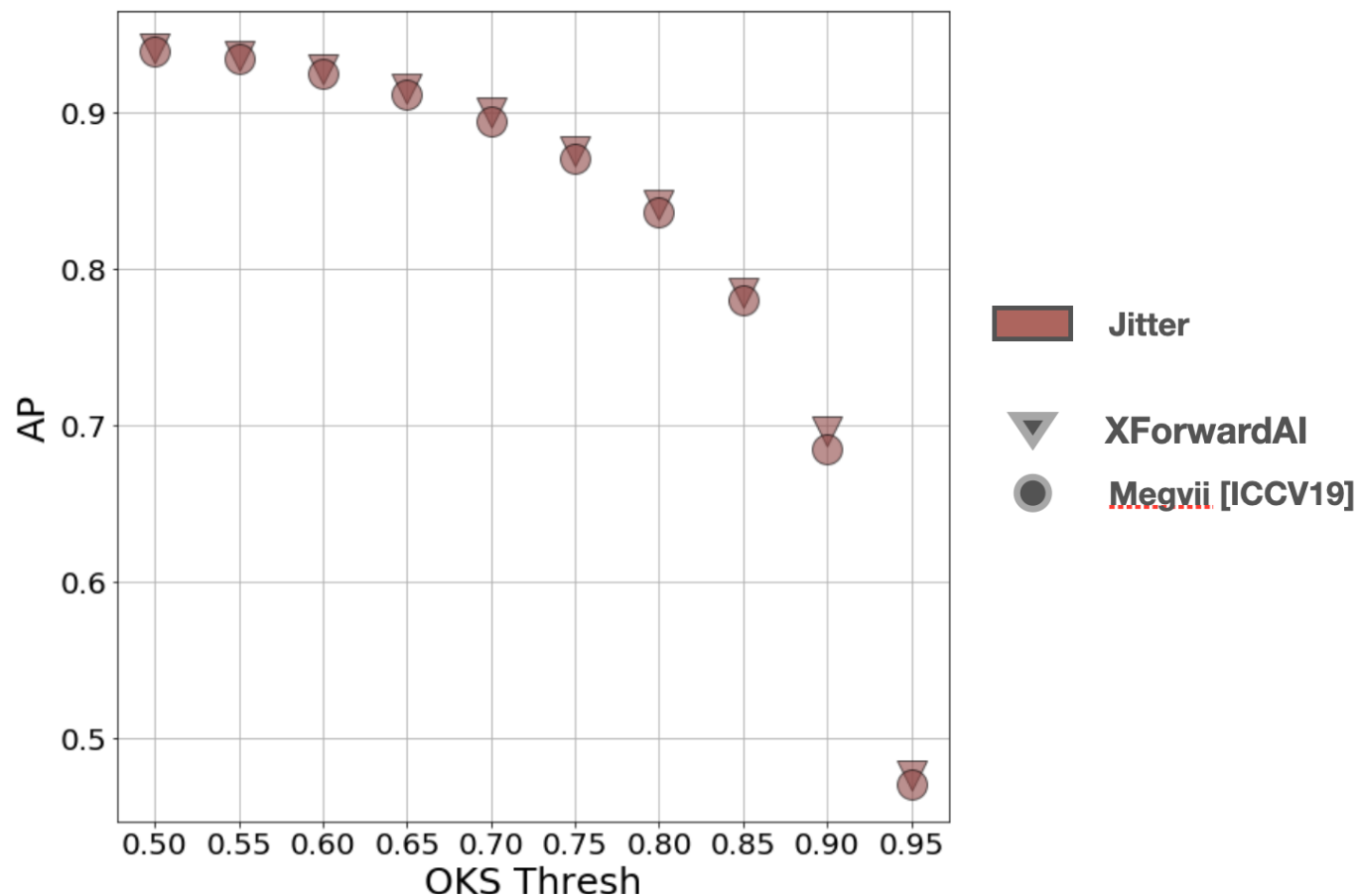
Ronchi et al, "Benchmarking and Error Diagnosis in Multi-Instance Pose Estimation", ICCV17
www.github.com/matteorr/coco-analyze





2020 COCO keypoints detection challenge

XForwardAI improved the most on jitter errors



Ronchi et al, "Benchmarking and Error Diagnosis in Multi-Instance Pose Estimation", ICCV17

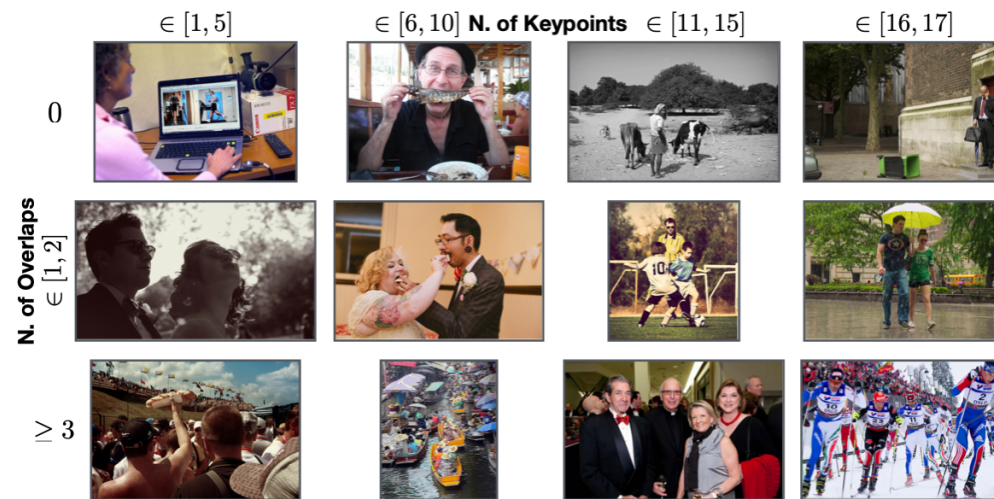
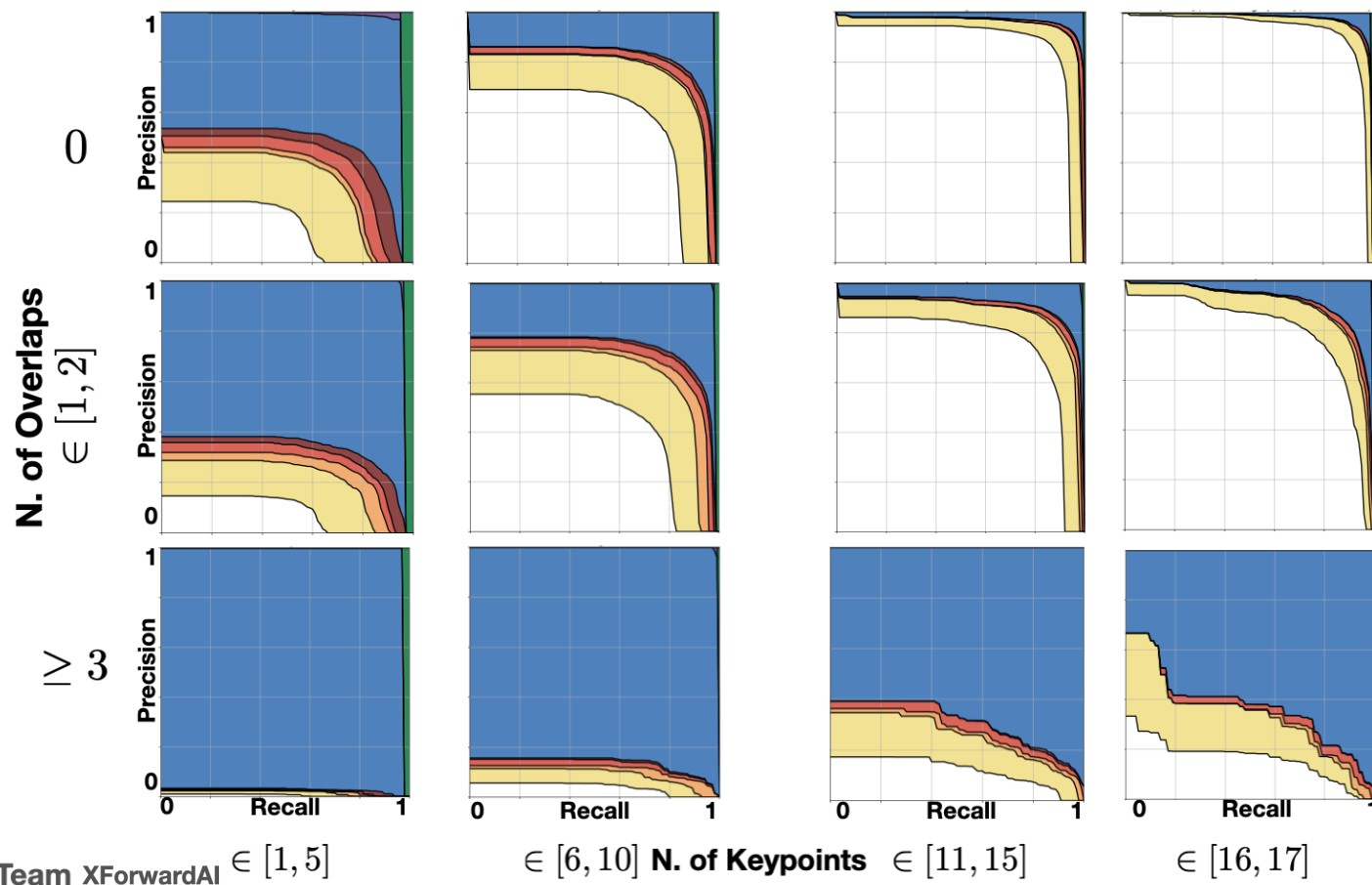
[www.github.com/matteorr/coco-analyze](https://github.com/matteorr/coco-analyze)





2020 COCO keypoints detection challenge

Overall performance is saturated by the easiest data:



Ronchi et al, "Benchmarking and Error Diagnosis in Multi-Instance Pose Estimation", ICCV17

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2020 COCO keypoints detection challenge

2020 Keypoint Challenge Take-aways:

- **We do not tolerate rule abuse in competitions.**
- Performance improvements are small, mostly concentrated on **large** sized **instances** and **jitter errors** for **high OKS** thresholds.
- Detection of the **lower** part of the **body** improved the most, which might be related to **improvements** in the prediction of heavily occluded keypoints.
- A detailed analysis shows that **performance is saturated by the easiest data**.
- We need to **broaden current benchmarks** with challenging images (high occlusion / low number of keypoints). There should be a call for a more challenging Dataset!

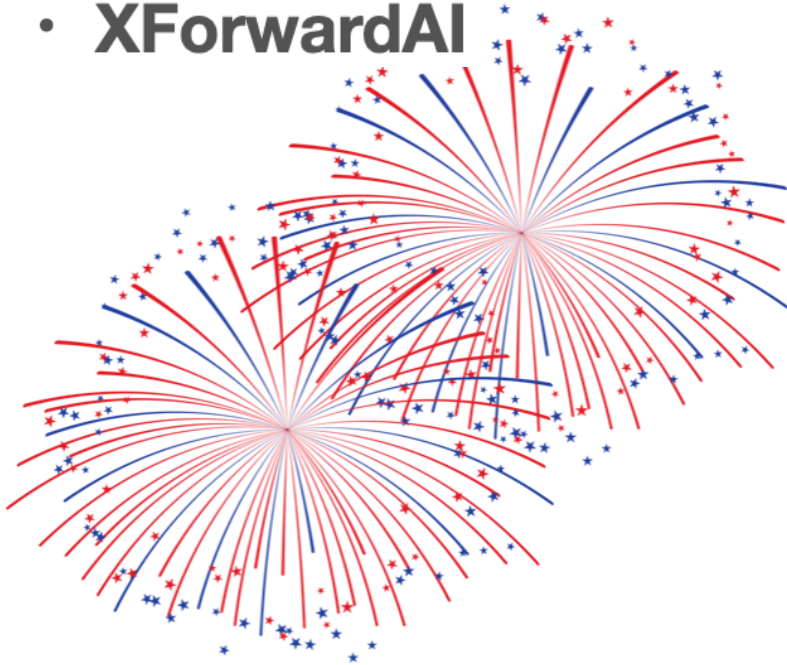
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2020 COCO keypoints detection challenge

Challenge Winner

- XForwardAI



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