Joint COCO and Mapillary Recognition Challenge

Mapillary Tasks

Mapillary Steering Committee
Samuel Rota Bulò
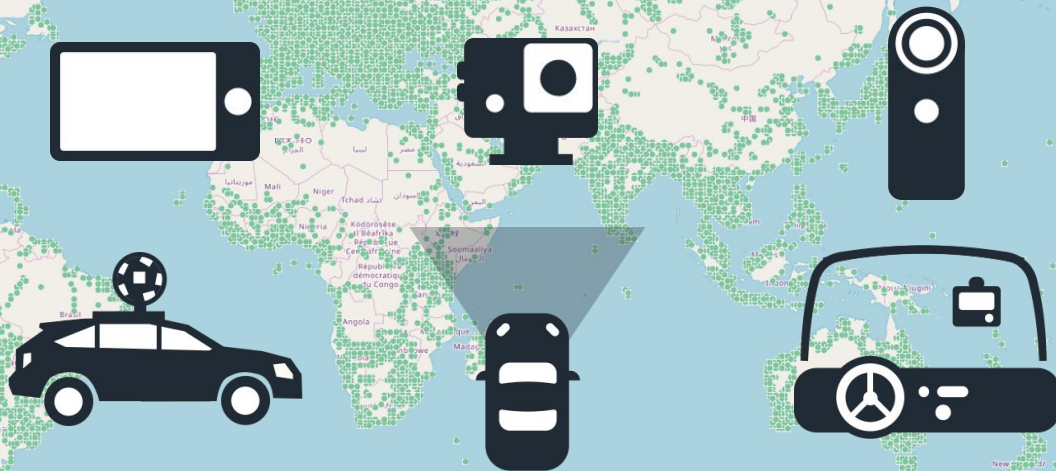Lorenzo Porzi
Peter Kontschieder

Mapillary Research

Who We Are

Mapillary is a platform for extracting map data from street-level imagery using computer vision

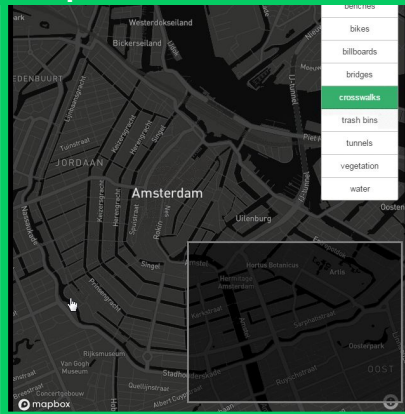Any device - scalability in image collection

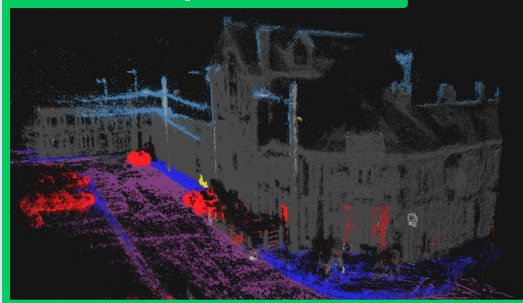350+ million images, 5.5 million km, 30+ billion objects

Why Recognition is Important for Us

Map data for 97 classes

Semantic point clouds

1500 traffic sign classes >100 countries

Extraction of line features

Privacy protection: face and licence place blurring

Mapillary Challenges

Mapillary Vistas Dataset (ICCV 2017)

- Most diverse publicly available semantic segmentation dataset with street-level imagery

- 25k high-res images with pixel-wise annotations (18k train / 2k val / 5k test)

- 65 object classes, 37 instance-specific (research edition free for non-commercial purposes)

- Global geographic reach, covering 6 continents

- Diverse viewpoints: Roads, sidewalks, off-road

- Wide variety of camera sensors, focal lengths, image aspect ratios, and types of camera noise

- Various weather conditions and capture times

Register for download at `https://vistas.mapillary.com`

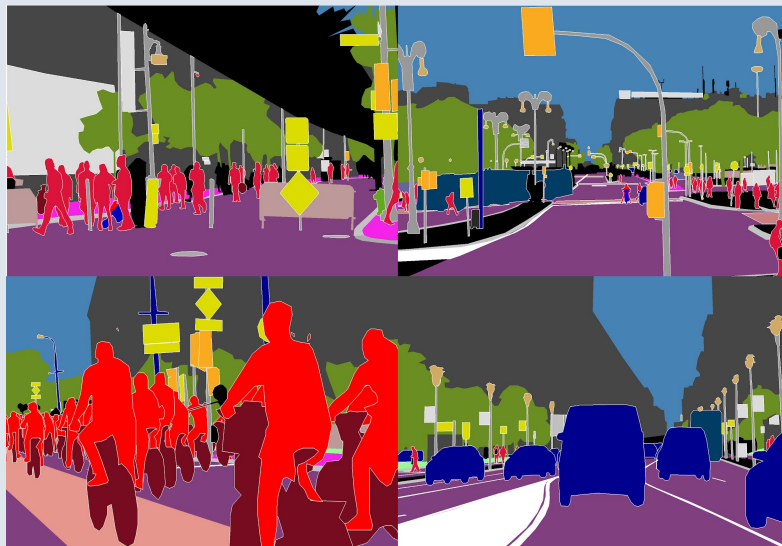# Mapillary Vistas Class Label Distribution
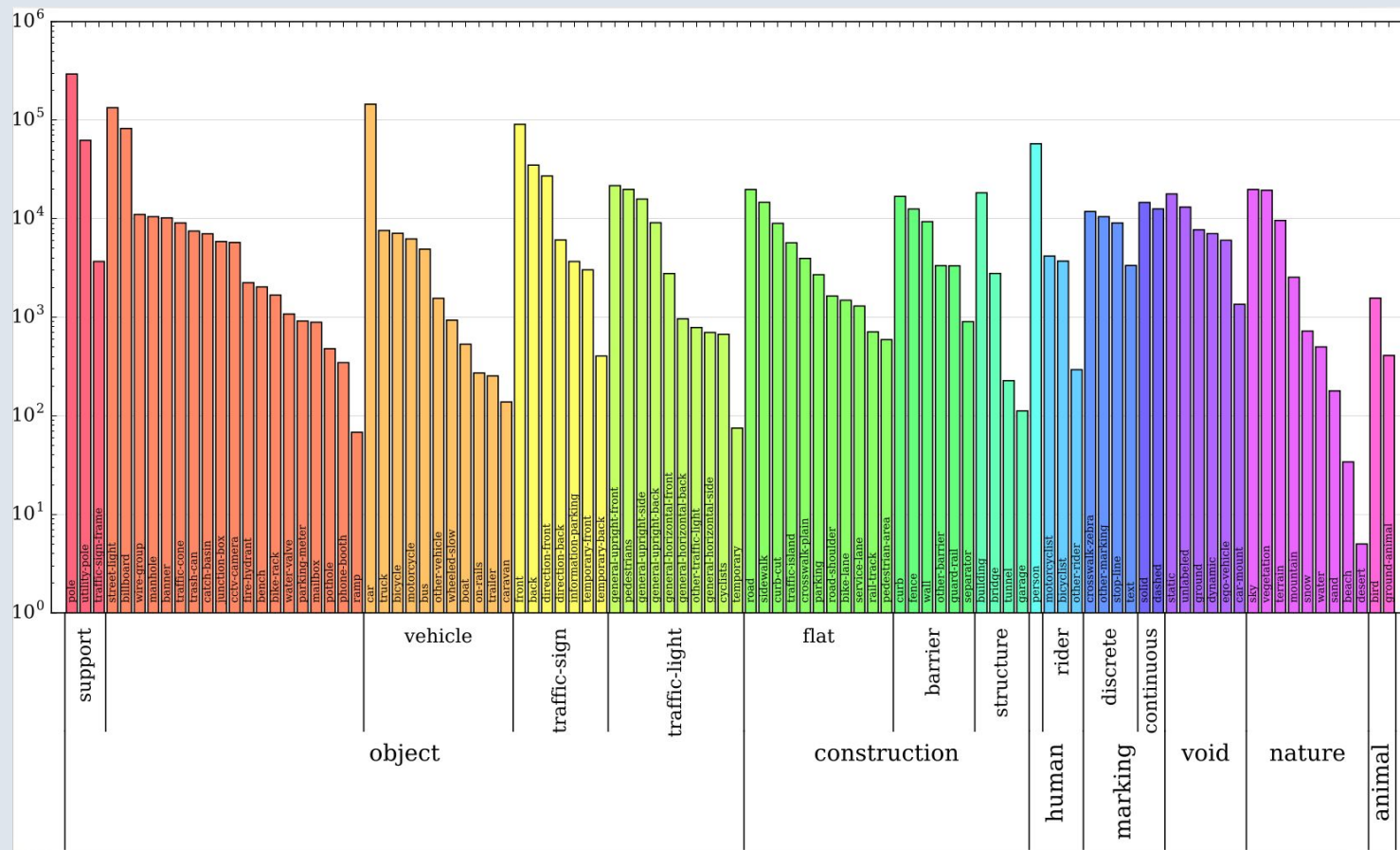
Challenges at ECCV 2018

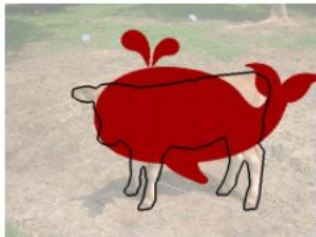**Detection Task**

Panoptic Task
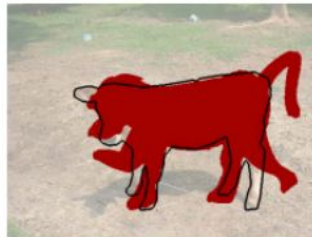
Evaluation Metrics: Detection

Unified metrics, submission format & server handling for COCO and Mapillary tasks
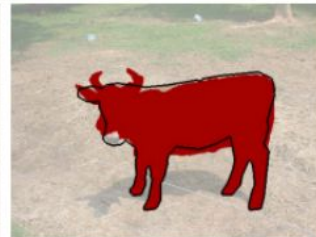

(a) Ground truth   (b) $\mathcal{J} = 0.554$ (c) $\mathcal{J} = 0.703$ (d) $\mathcal{J} = 0.910$

Figure from Krähenbühl & Koltun, 2014

```
Average Precision (AP):
    AP                        % AP at IoU=.50:.05:.95 (determines challenge winner)
    AP^IoU=.50                % AP at IoU=.50 (PASCAL VOC metric)
    AP^IoU=.75                % AP at IoU=.75 (strict metric)
```
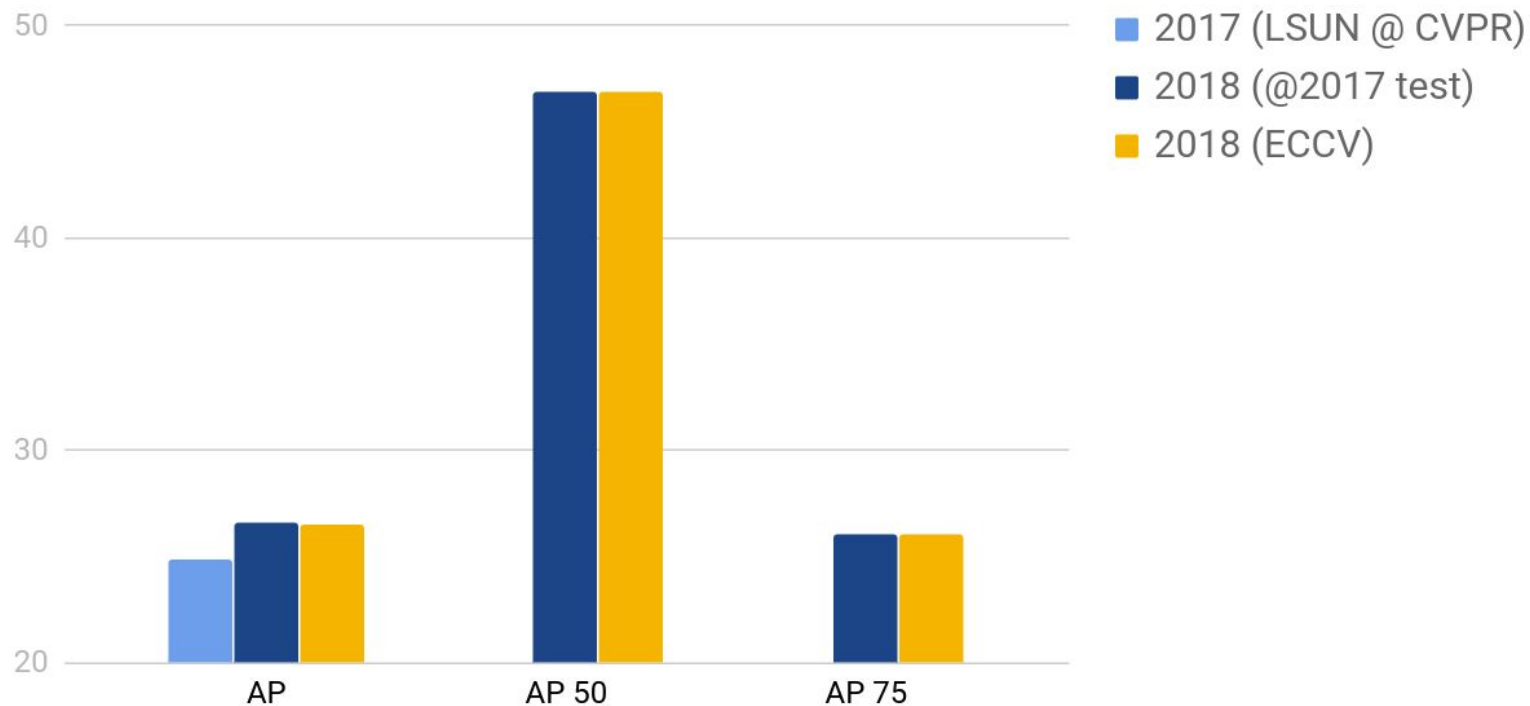
Detection Results

2017 vs. 2018 Results

Detection Results

2018   **26.6%**   **46.9%**   **26.1%**

Legend:
- 2017 (LSUN @ CVPR)
- 2018 (@2017 test)
- 2018 (ECCV)

+1.7%

Categories: AP, AP 50, AP 75

Y-axis: 20, 30, 40
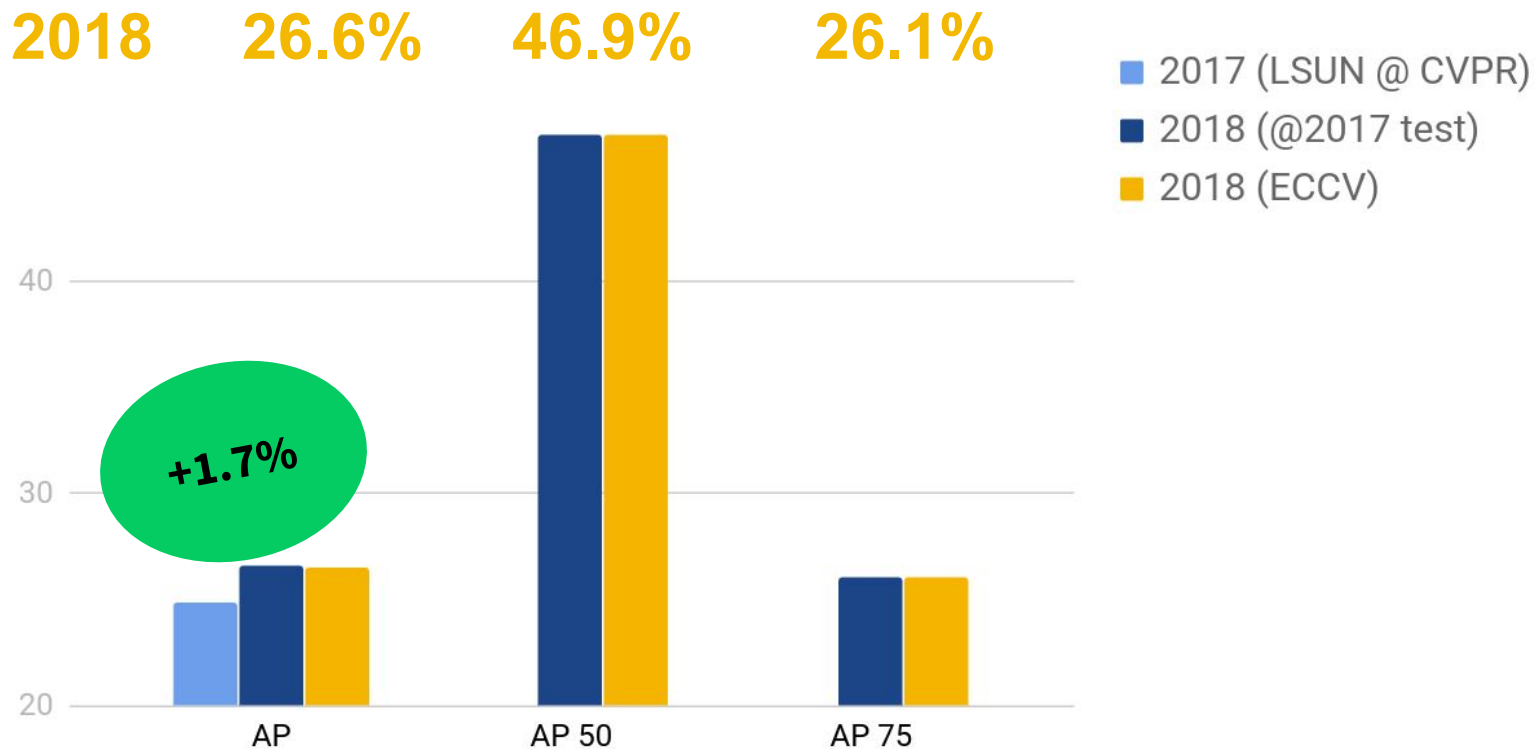
Evaluation Metrics: Panoptic Segmentation

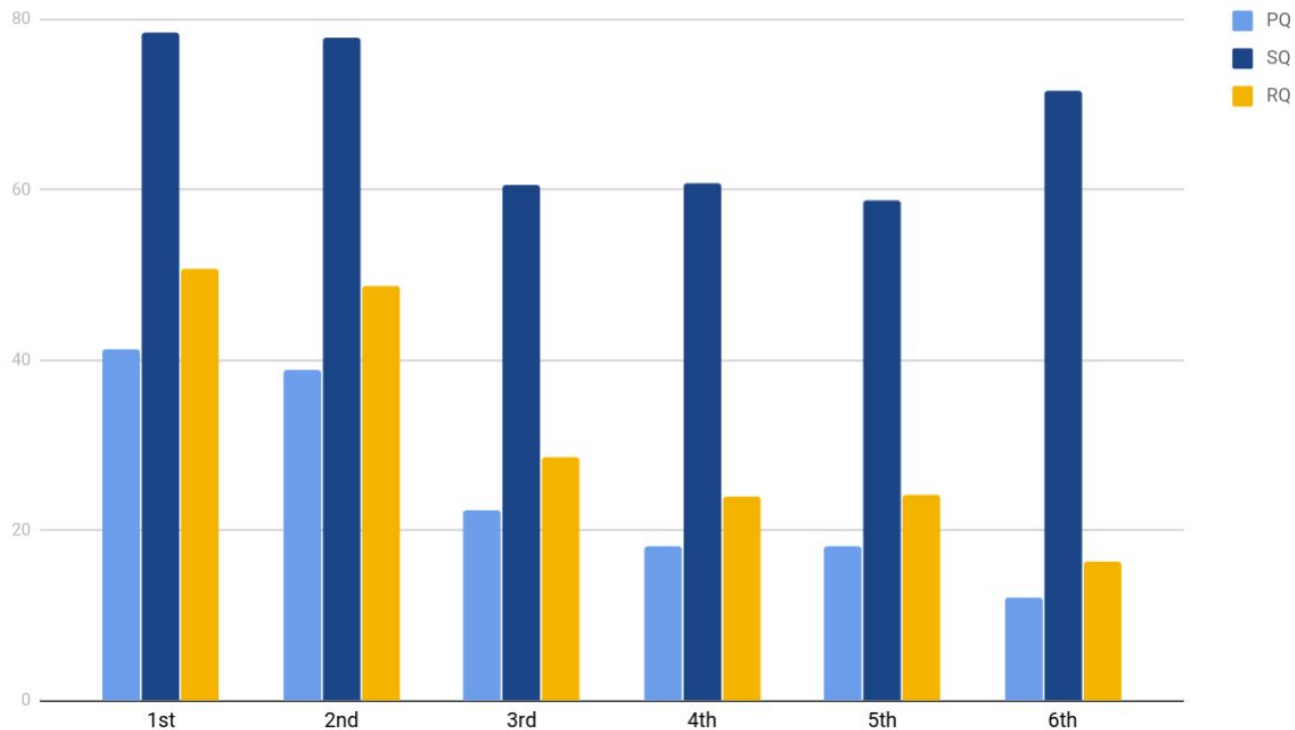**Unified metrics, submission format & server handling for COCO and Mapillary tasks**

$$\text{PQ} = \underbrace{\frac{\sum_{(p,g)\in TP} \text{IoU}(p,g)}{|TP|}}_{\text{segmentation quality (SQ)}} \times \underbrace{\frac{|TP|}{|TP| + \frac{1}{2}|FP| + \frac{1}{2}|FN|}}_{\text{recognition quality (RQ)}}$$

PSQ ... Main, joint metric used for ranking

Panoptic Results

Submission Details

Panoptic Results

Submission Details
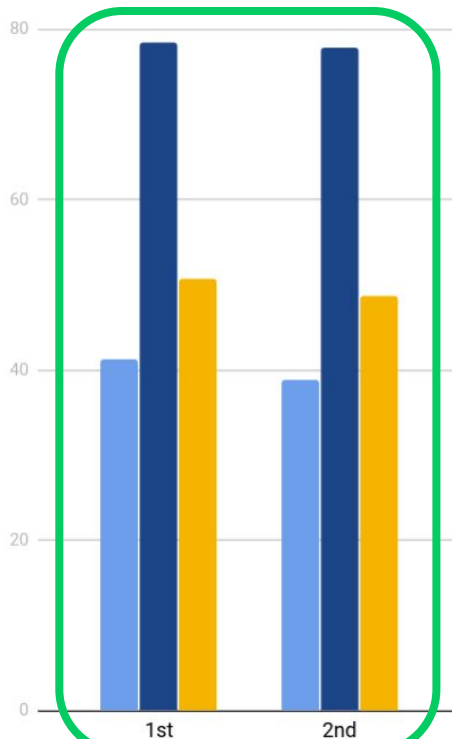
1st	PQ	SQ	RQ
All	41.2	78.4	50.8
Things	37.9	79.7	47.1
Stuff	45.6	76.7	55.7

2nd	PQ	SQ	RQ
All	38.8	77.8	48.7
Things	39.2	79.2	49.4
Stuff	38.2	76.0	47.9

Mapillary Challenge Winners

Prizes

2 Titan Xp's from NVIDIA
$20.000 as AWS credits from Amazon AWS

… and the Winners are

Mapillary Vistas Object Detection Winner

Certificate of Award

This is to certify that

Team DiDi MapVision

Xingjia Pan, Bo Li, Yang Gu, Zhichao Song, Fan Tang, Maozong Zheng,
Wei Shao, Yiping Meng, Weiming Dong, Pengfei Xu

is the **WINNER** *of*

Mapillary Vistas
Object Detection Challenge

ECCV 2018   September 9, Munich

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Mapillary Vistas Panoptic Winner

Certificate of Award

This is to certify that

Team R4D

Xu Liu, Chao Peng, Jingbo Wang, Changqian Yu, Huanyu Liu
Yueqing Zhuang, Zeming Li, Shunsuke Kamijo, Gang Yu, Jian Sun

*is the **WINNER** of*

**Mapillary Vistas
Panoptic Segmentation Challenge**

ECCV 2018   September 9, Munich

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Mapillary Vistas Panoptic Runner-Up

Certificate of Award

This is to certify that

TRI-ML

Jie Li, Allan Raventos, Arjun Bhargava, Adrien Gaidon

is the **RUNNER-UP** of

Mapillary Vistas
Panoptic Segmentation Challenge

ECCV 2018

September 9, Munich

Mapillary
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Thank you!

Visit us at booth #32

We're hiring !
(interns & full positions)