The RoboDepth Competition

The 1st Challenge for Robust Out-of-Distribution Depth Estimation under Common Corruptions

Agenda

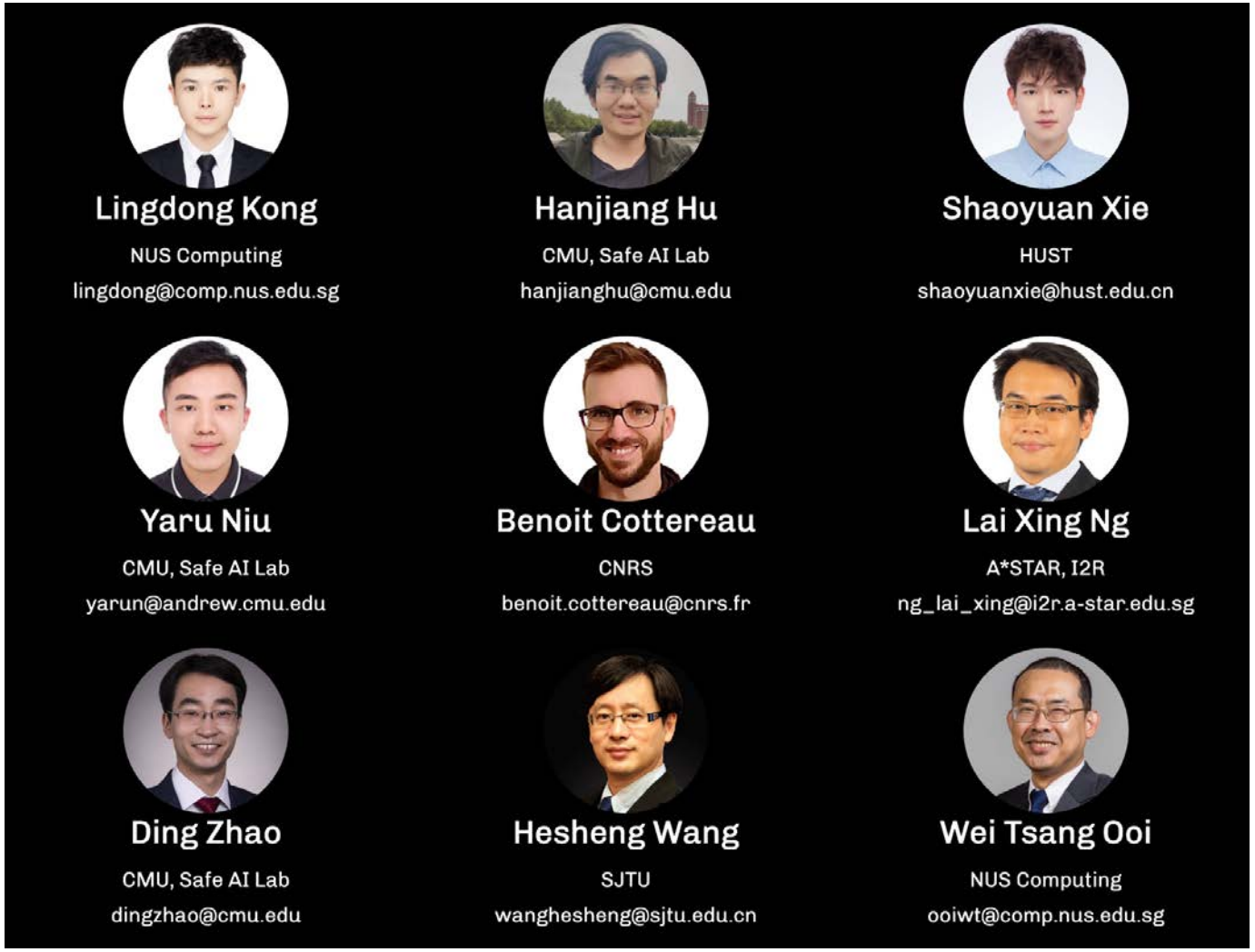
- Competition Overview
- RoboDepth Benchmark
- Award Ceremony
  - Spotlight Talks (Track 1)
  - Spotlight Talks (Track 2)
- Q & A for Organizers

Competition Overview

ICRA
LONDON · 2023

RoboDepth @ ICRA 2023

RoboDepth Organizing Team



ICRA LONDON 2023

NUS National University of Singapore

cnrs

Carnegie Mellon University

DesCartes

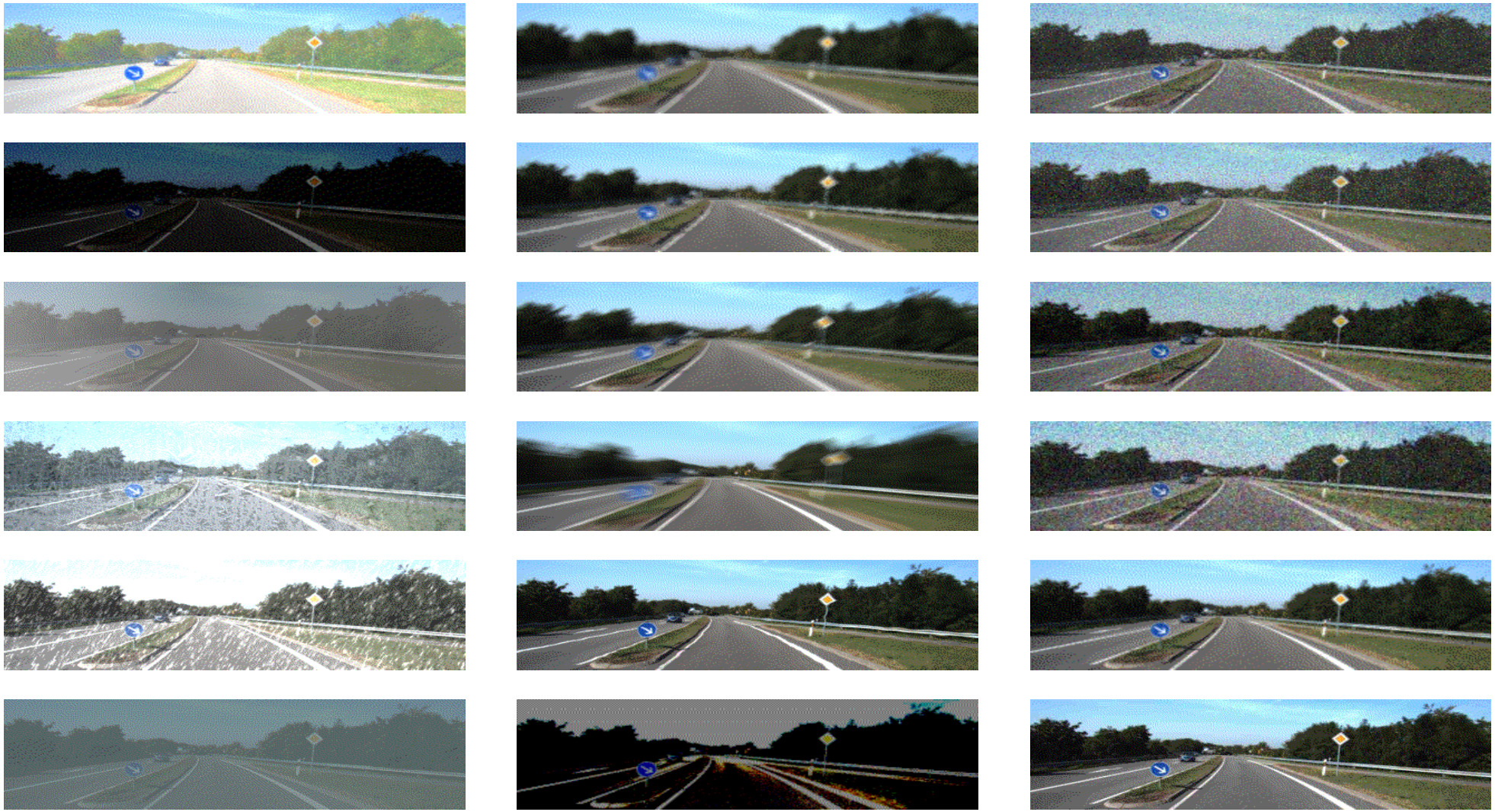
Agency for Science, Technology and Research SINGAPORE

Sponsors

We thank the exceptional support from **Baidu Research**, USA

Know more about Baidu at this link: http://research.baidu.com

RoboDepth @ ICRA 2023



RoboDepth @ ICRA 2023

Track 1

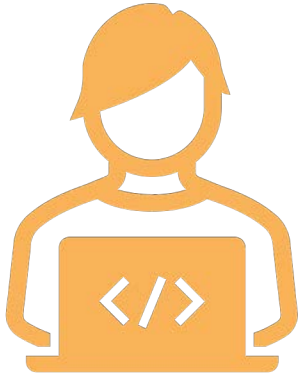
Robust Self-Supervised Depth Estimation for Outdoor Scenes

Track 2

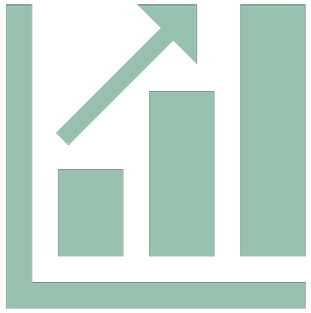
Robust Supervised Depth Estimation for Indoor Scenes

RoboDepth @ ICRA 2023

226
Registered Teams

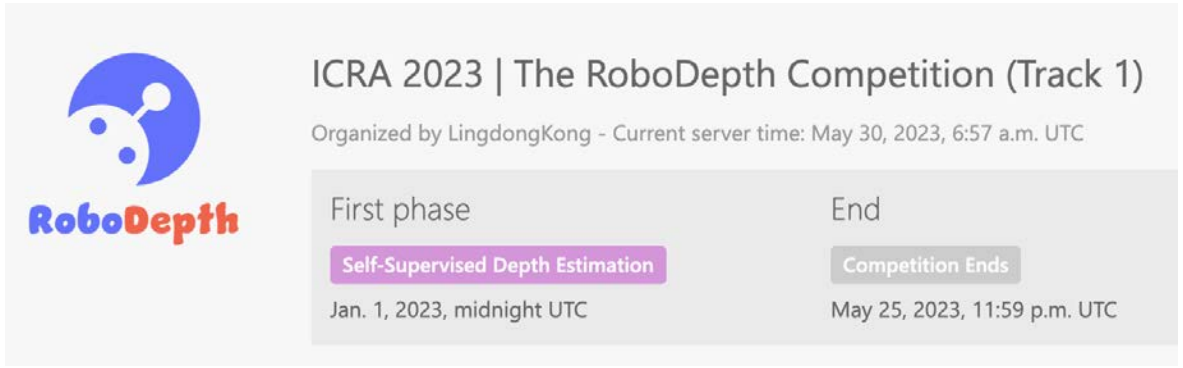


66
Teams Submitted



1137
Valid Submissions

RoboDepth @ ICRA 2023



Server:

https://codalab.lisn.upsaclay.fr/competitions/9418

Statistics:

- 137 registered teams
- 684 valid submissions

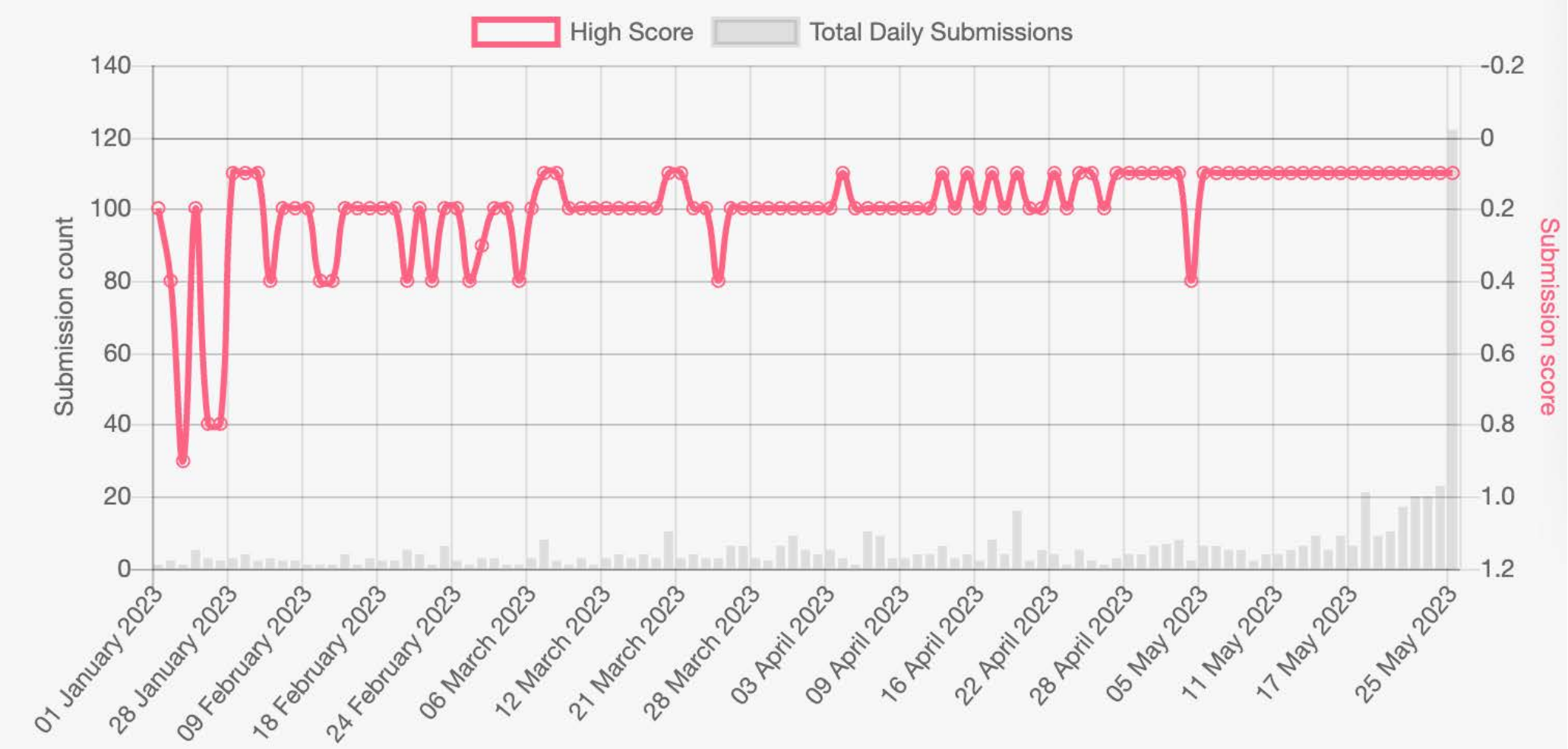
Server:

https://codalab.lisn.upsaclay.fr/competitions/9821

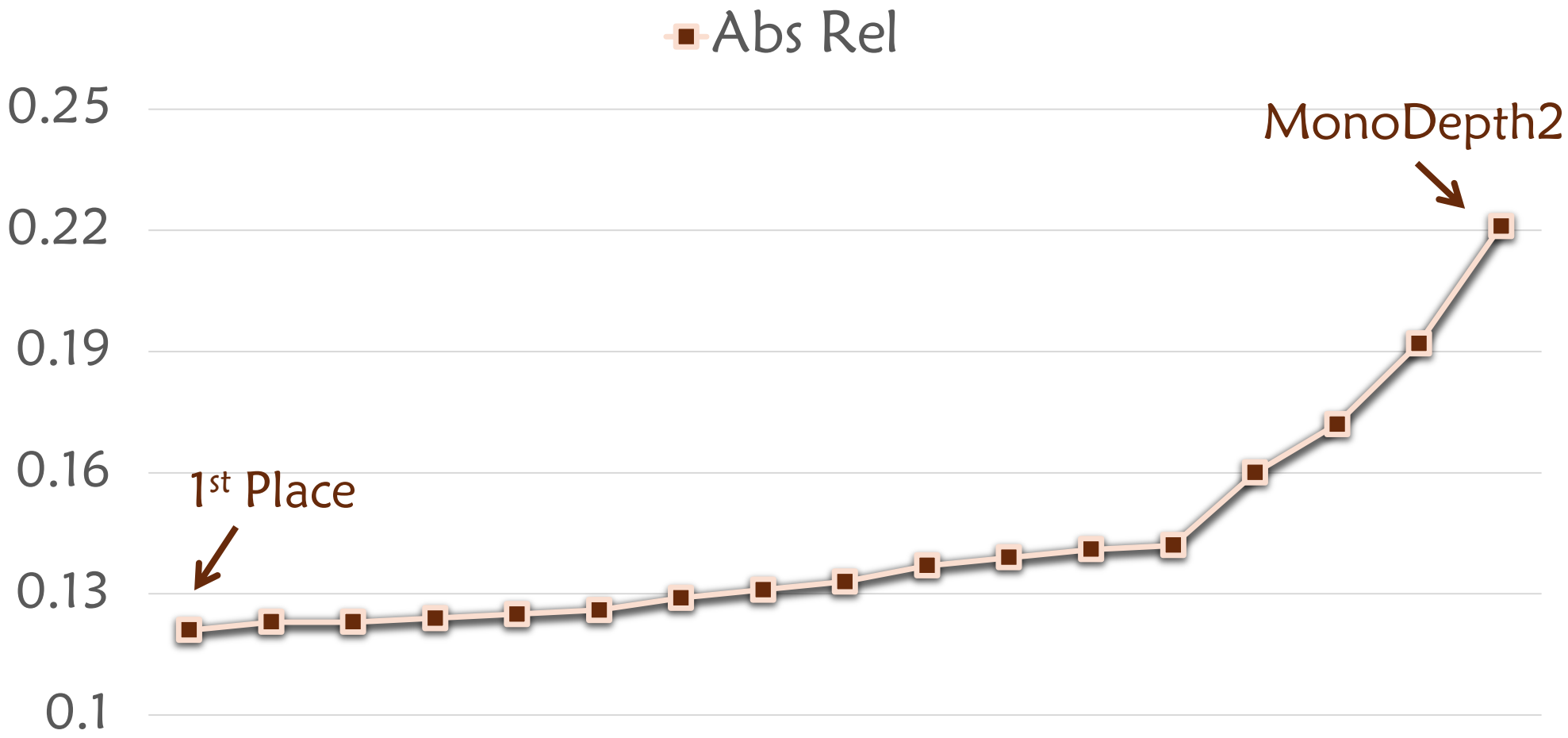
Statistics:

- 89 registered teams
- 453 valid submissions

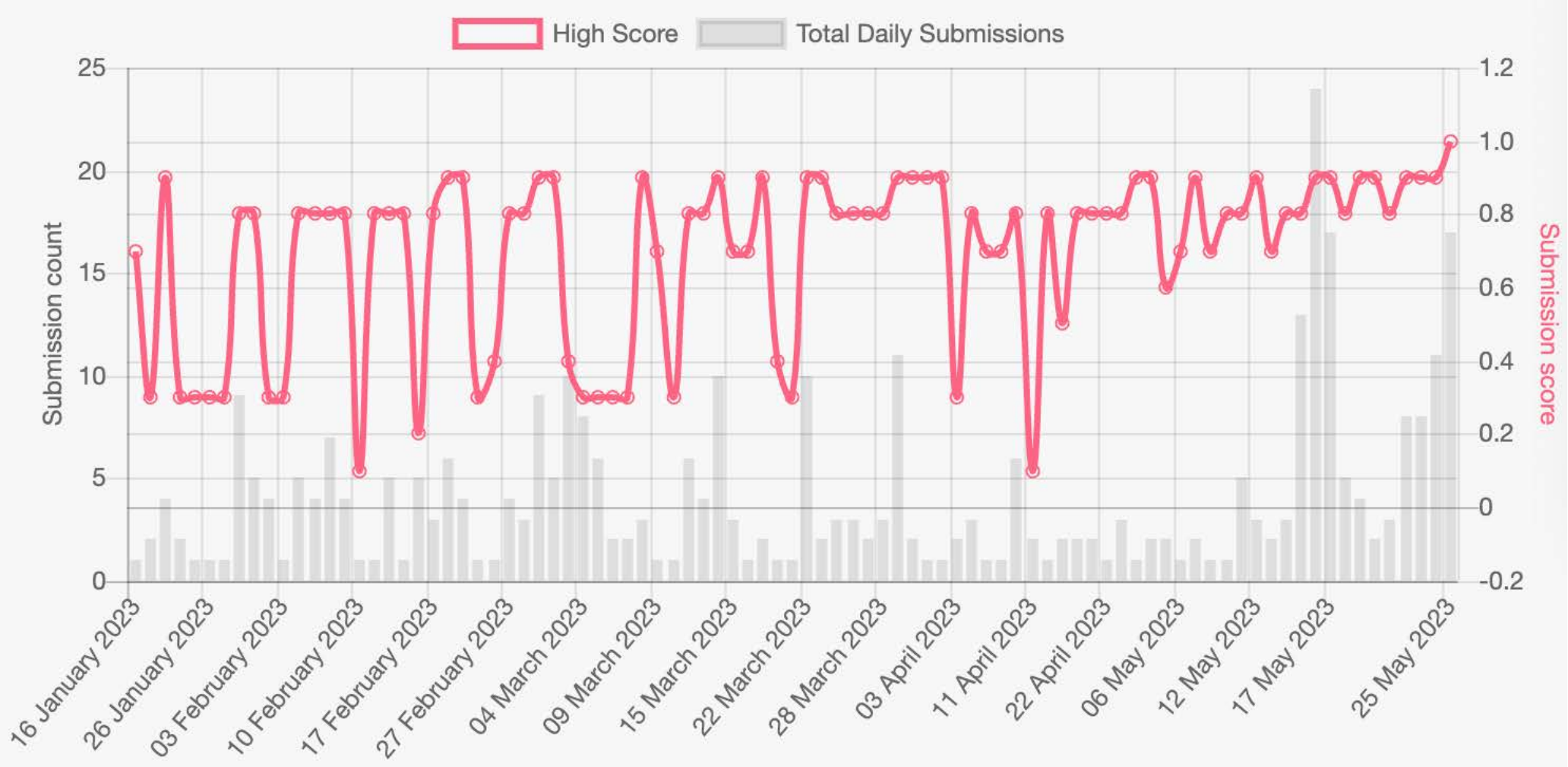
Statistics: Track 1



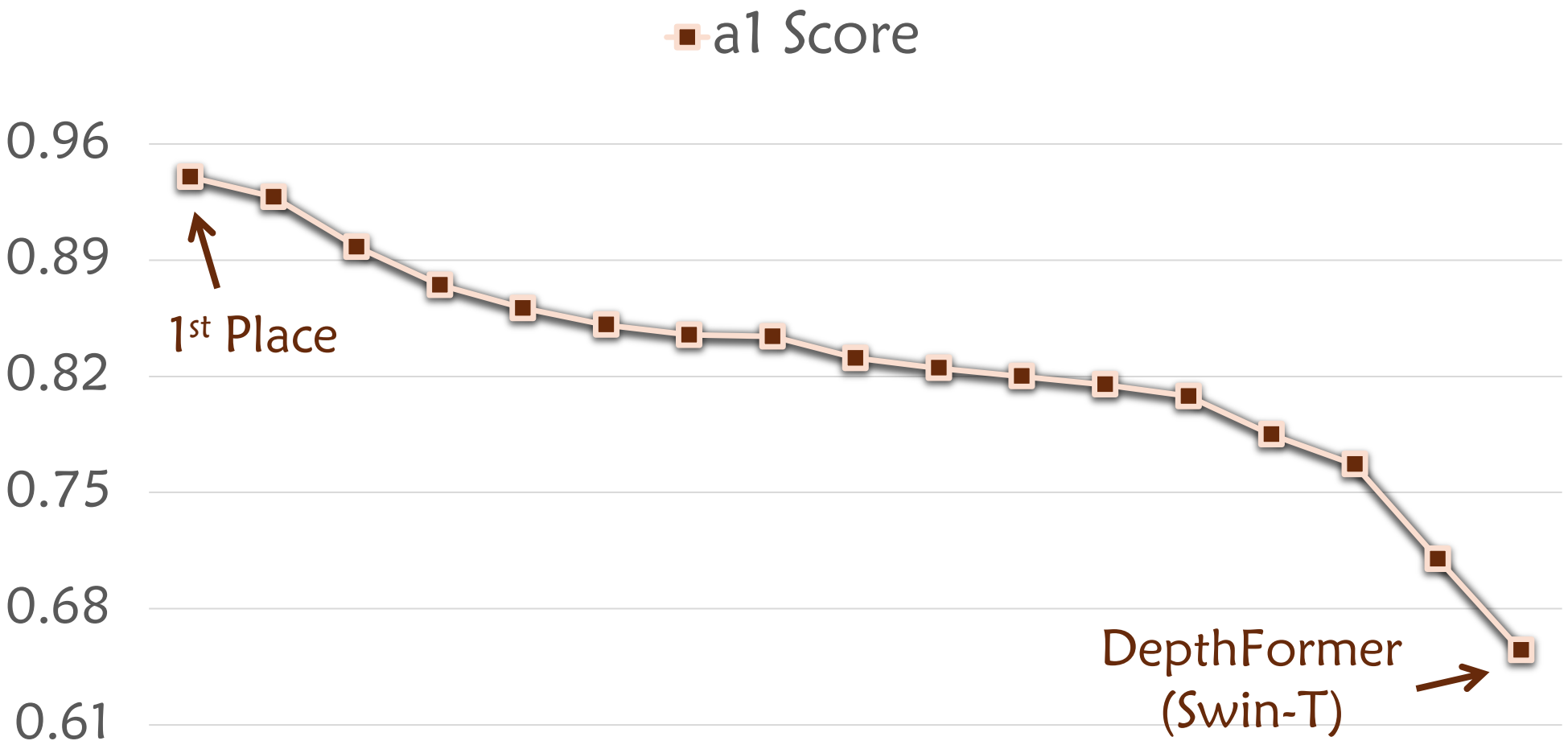
Statistics: Track 1



Statistics: Track 2



Statistics: Track 2



RoboDepth Benchmark

Statistics

18 corruption types from three main categories

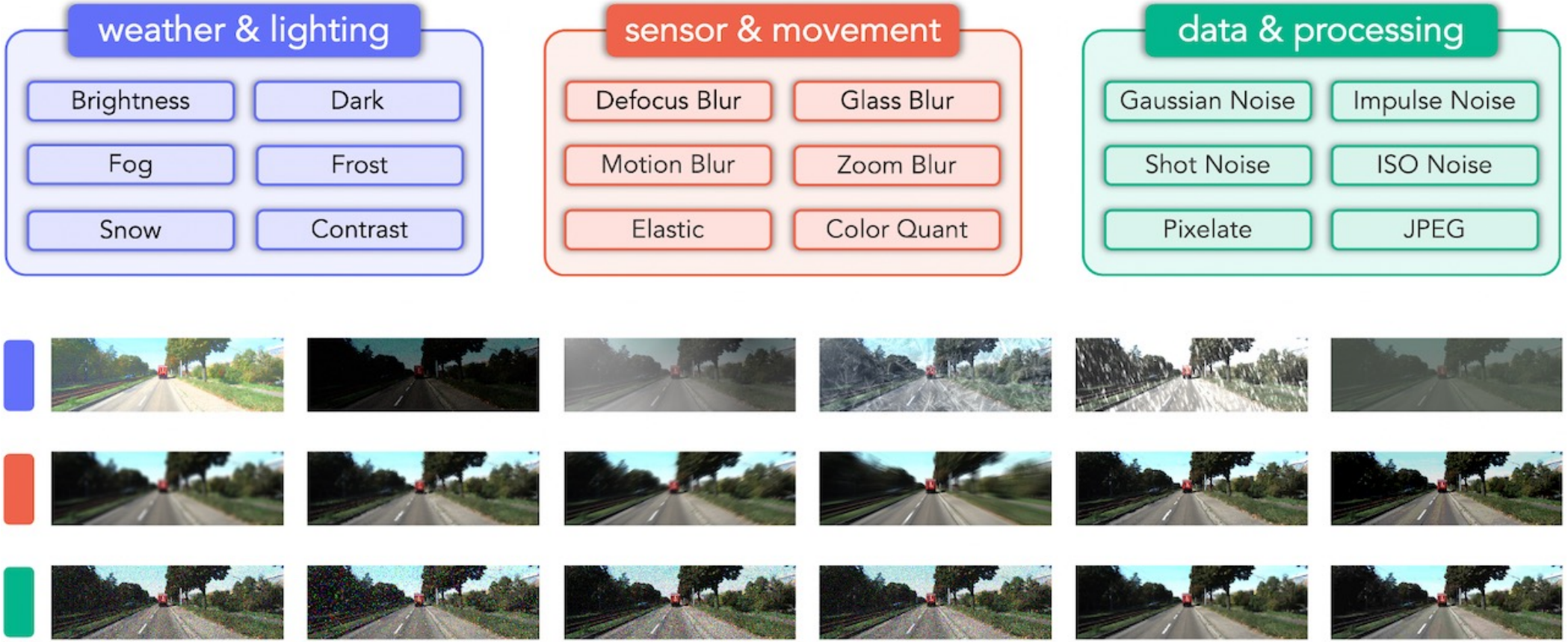
Corruption Set:

- KITTI-C, 62730 images from 18 corruption types, simulated using the KITTI dataset
- NYUDepth2-C, 39240 image from 15 corruption types, simulated using the NYU Depth V2 dataset

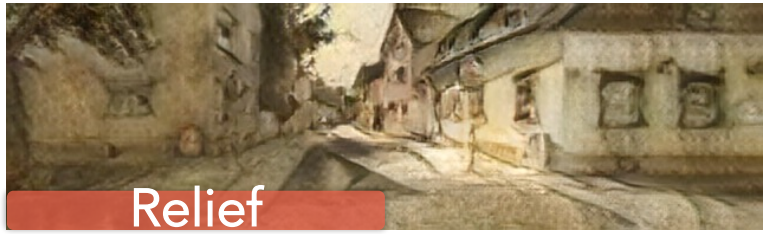
Stylized Set:

- KITTI-S, 8364 images from 12 styles, simulated using the KITTI dataset

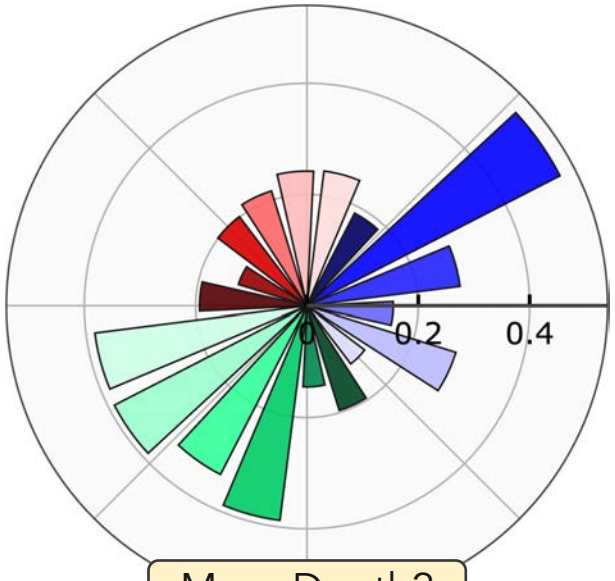
Taxonomy (Corruption)



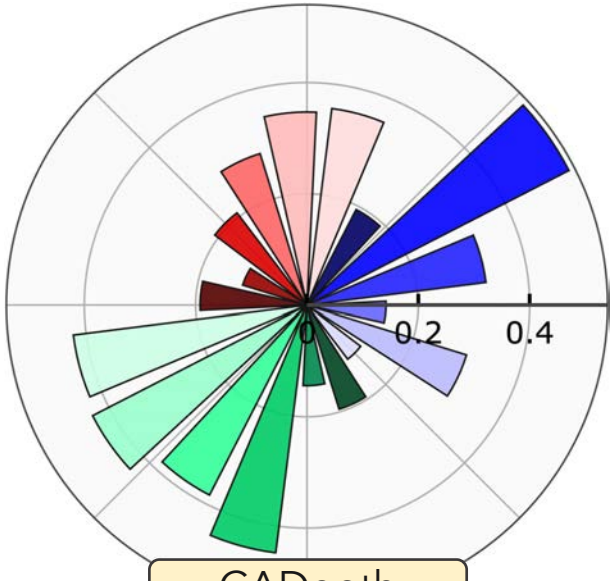
Taxonomy (Stylization)



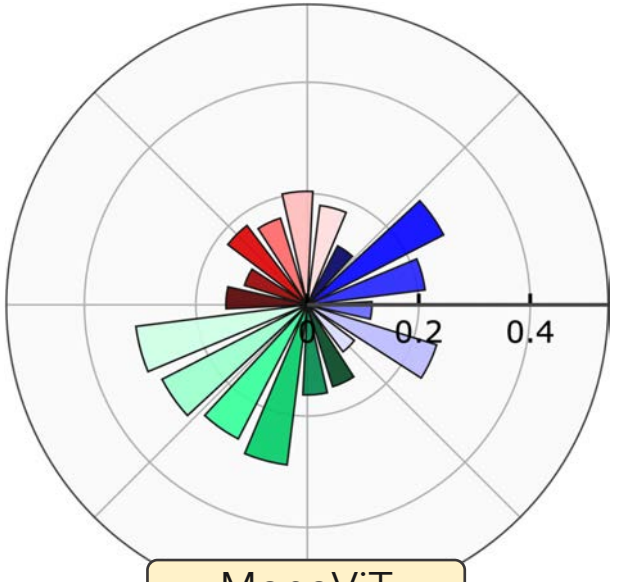
Benchmark



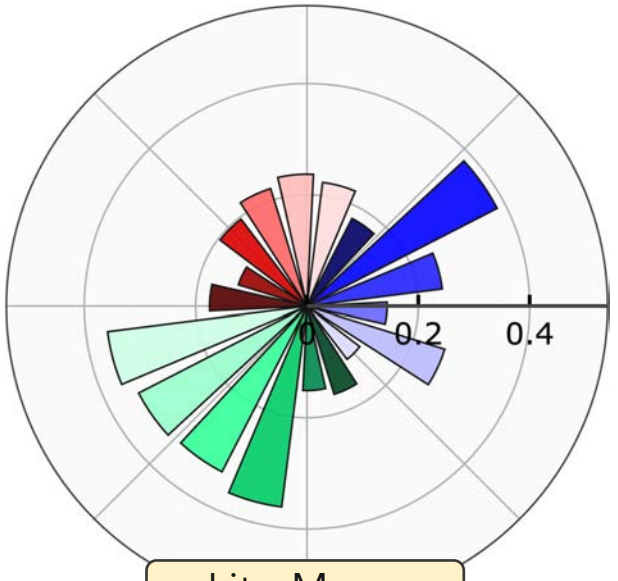
MonoDepth2



CADepth



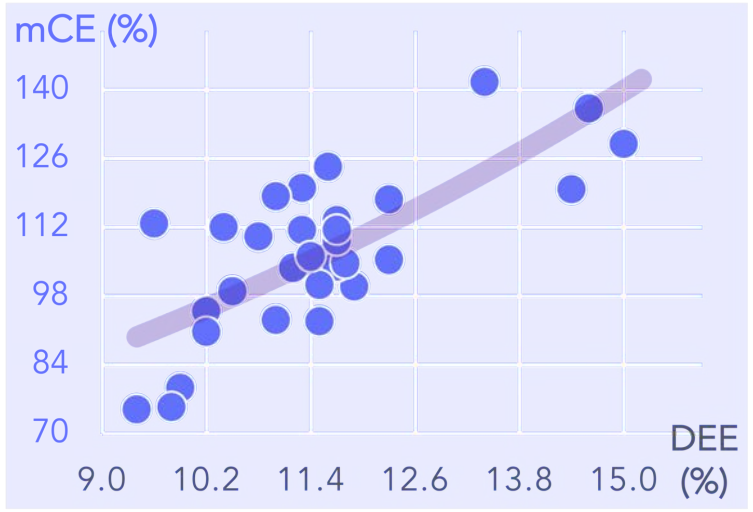
MonoViT

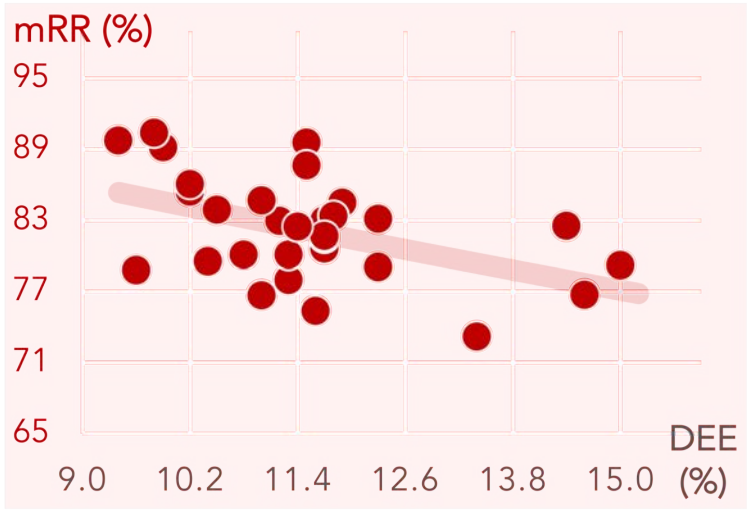


Lite-Mono

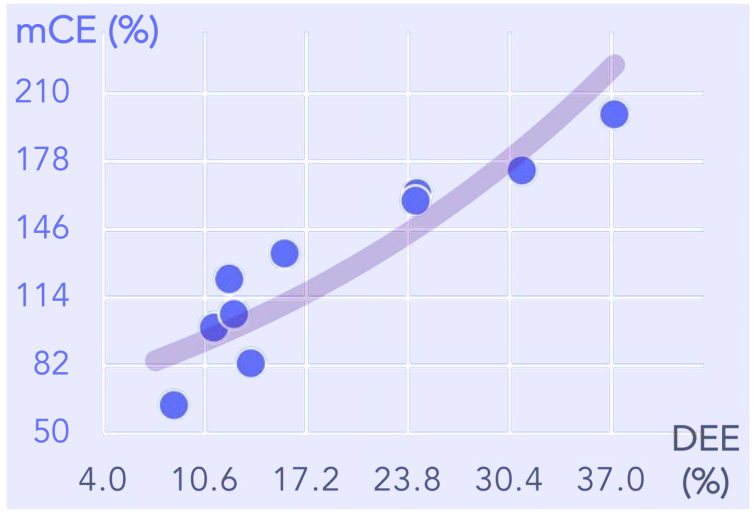
Bright
Dark
Fog
Frost
Snow
Contrast
Defocus
Glass
Motion
Zoom
Elastic
Quant
Gaussian
Impulse
Shot
ISO
Pixelate
JPEG

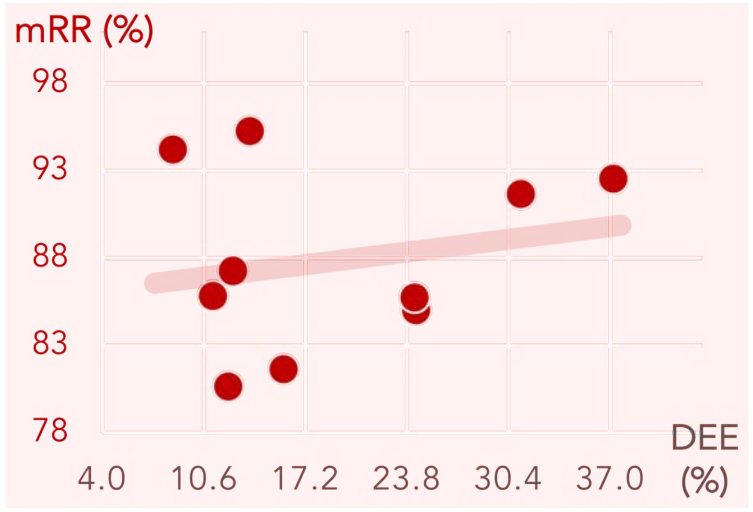
Benchmark

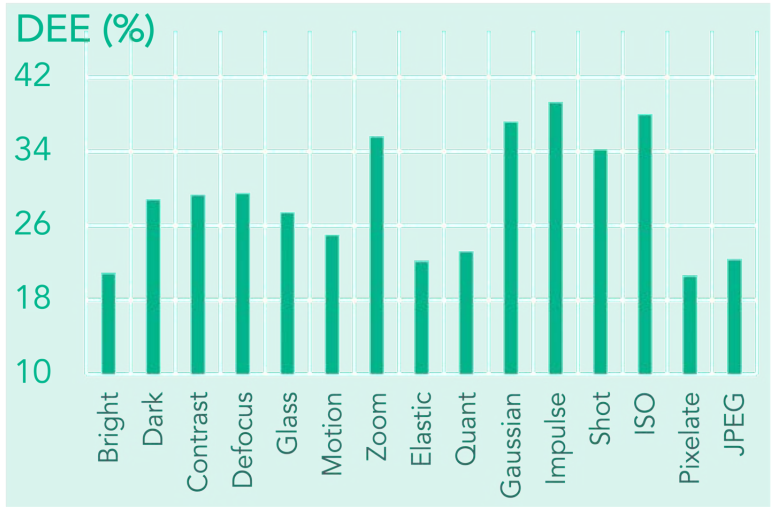

mCE (%)
140
126
112
98
84
70
9.0
10.2
11.4
12.6
13.8
15.0
DEE (%)


mRR (%)
95
89
83
77
71
65
9.0
10.2
11.4
12.6
13.8
15.0
DEE (%)

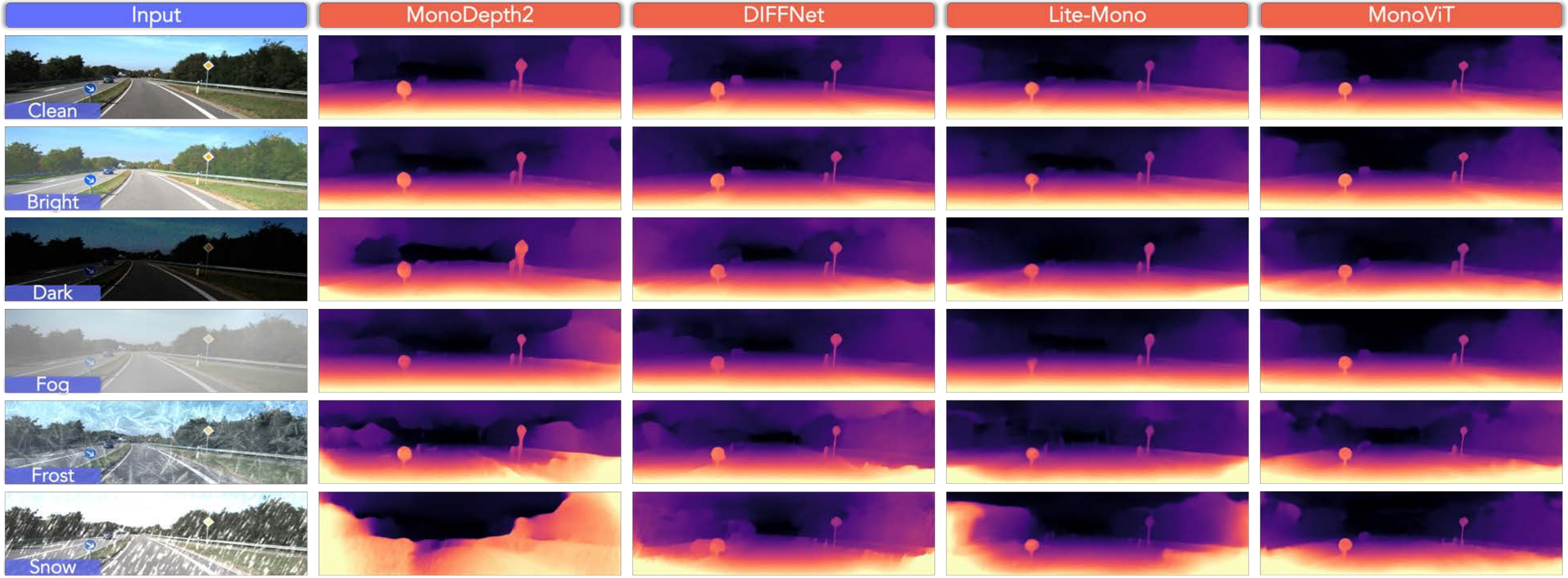

DEE (%)
50
40
30
20
10
Bright
Dark
Fog
Frost
Snow
Contrast
Defocus
Glass
Motion
Zoom
Elastic
Quant
Gaussian
Impulse
Shot
ISO
Pixelate
JPEG


mCE (%)
210
178
146
114
82
50
4.0
10.6
17.2
23.8
30.4
37.0
DEE (%)

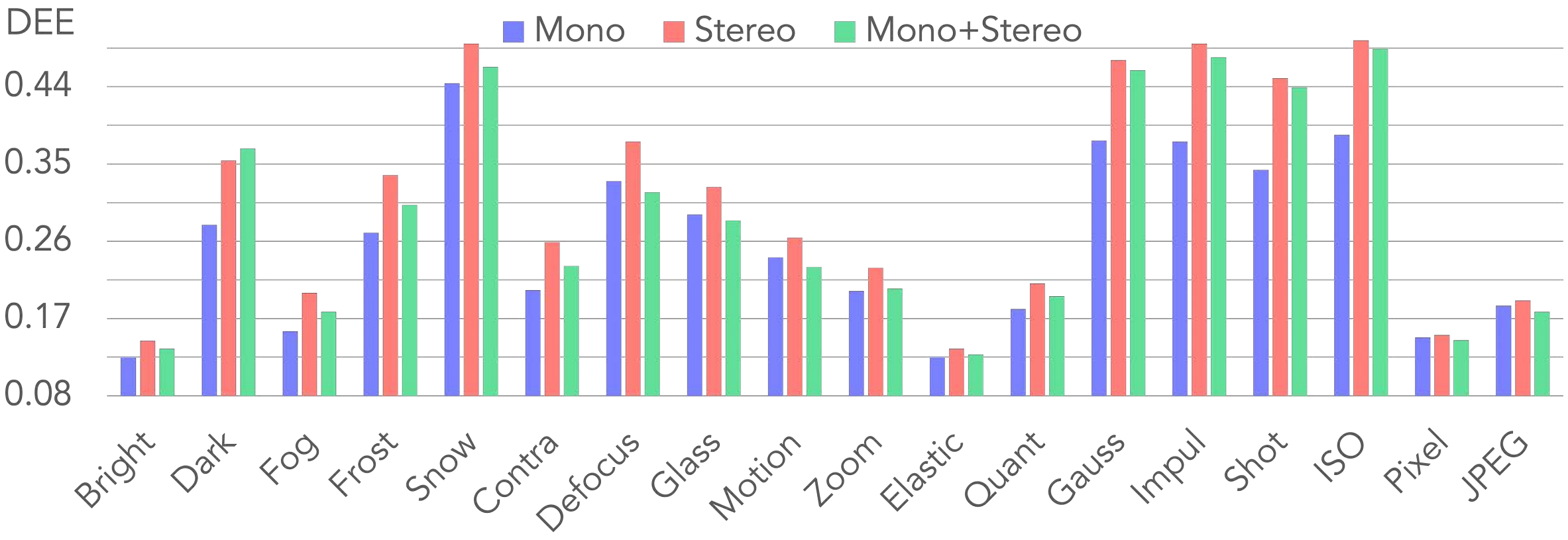

mRR (%)
98
93
88
83
78
4.0
10.6
17.2
23.8
30.4
37.0
DEE (%)


DEE (%)
42
34
26
18
10
Bright
Dark
Contrast
Defocus
Glass
Motion
Zoom
Elastic
Quant
Gaussian
Impulse
Shot
ISO
Pixelate
JPEG

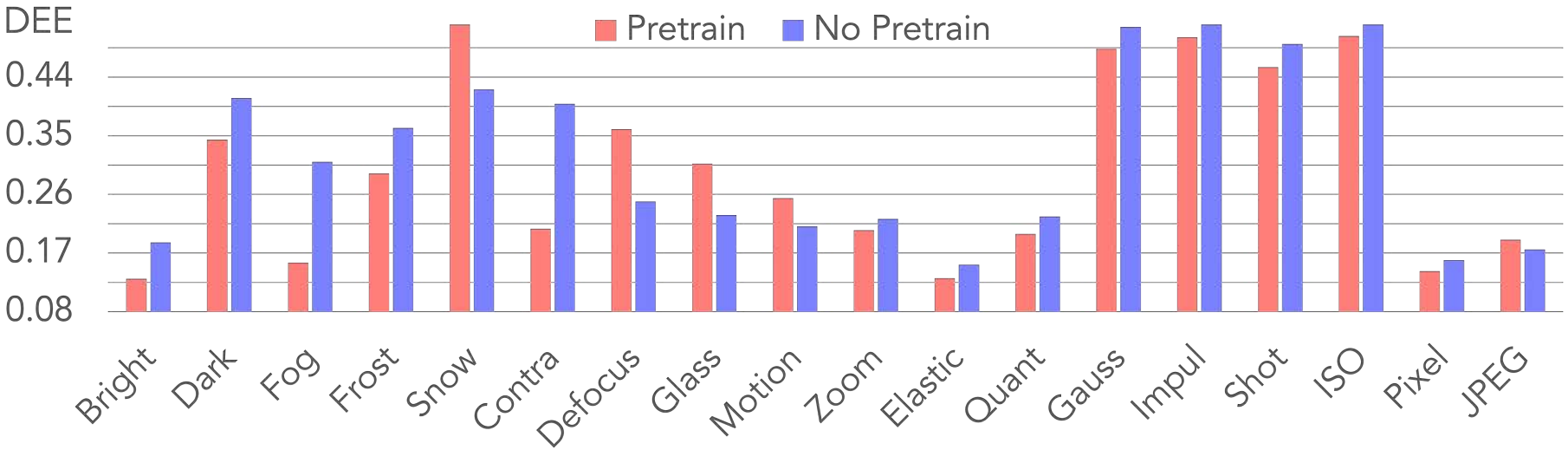
Qualitative Assessment

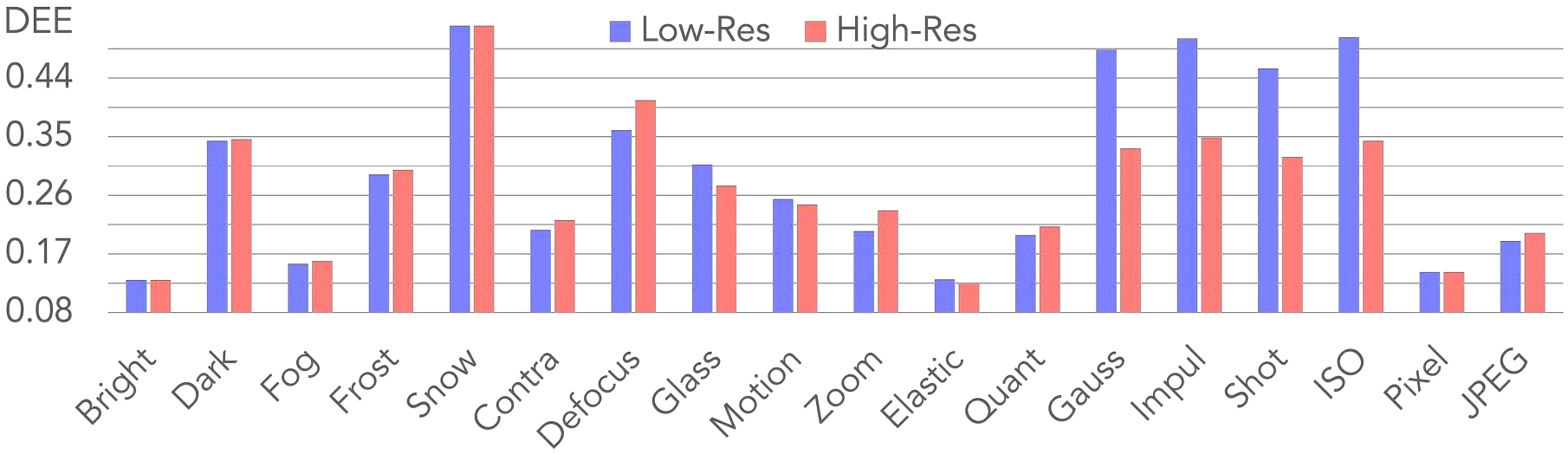


Robustness Analysis

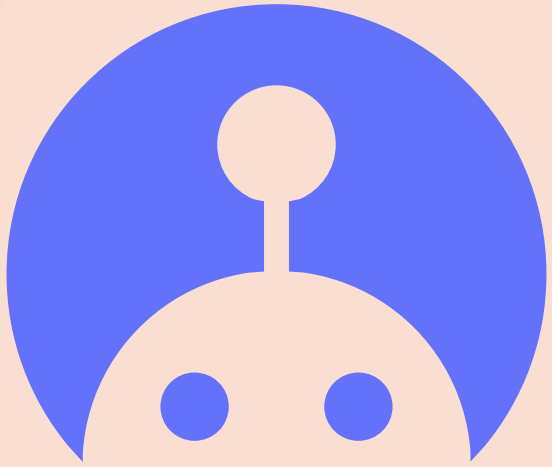


Robustness Analysis





Know more about RoboDepth



Benchmark Toolkit:

https://github.com/ldkong1205/RoboDepth

The RoboDepth Competition

Winning Teams

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	Track 1	Track 2
	OpenSpaceAI	USTCxNetEaseFuxi
	USTC-IAT-United	OpenSpaceAI
	YYQ	GANCV
	Scent-Depth Ensemble	AIIA-RDepth

Spotlight Talks (Track 1)

Innovative Prize in Track 1

Team Name:

Scent-Depth

Affiliation:

BUPT & ICT, CAS

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Team:

Scent-Depth

Final Result:

Abs Rel: 0.137

RMSE: 5.276

$\delta < 1.25$: 0.813

Structure-Centric Robust Monocular Depth Estimation via Knowledge Distillation for ICRA 2023 The RoboDepth Challenge

Runze Chen[1,2], Haiyong Luo[1], Fang Zhao[2], Jingze Yu[1,2]
[1]School of Computer Science, Beijing University of Posts and Telecommunications
[2]Institute of Computing Technology, Chinese Academy of Sciences

Q & A

Innovative Prize in Track 1

Team Name:

Ensemble

Affiliation:

Tsinghua University

ICRA LONDON·2023

Team:

Ensemble

Final Result:

Abs Rel: 0.124

RMSE: 4.904

$\delta < 1.25$: 0.851

Robust Self-Supervised Monocular Depth Estimation Networks for Unseen Corruptions

Jiale Chen Shuang Zhang
Tsinghua University

3rd Place in Track 1

Team Name:

YYQ

Affiliation:

Harbin Institute of Technology

ICRA LONDON·2023

Team:

YYQ

Final Result:

Abs Rel: 0.123

RMSE: 4.983

$\delta < 1.25$: 0.848

Online Presentation

Q & A

2nd Place in Track 1

Team Name:

USTC-IAT-United

Affiliation:

USTC & CSU & Huawei Cloud

ICRA LONDON · 2023

Team:

USTC-IAT-United

Final Result:

Abs Rel: 0.123

RMSE: 4.873

$\delta < 1.25$: 0.861

The RoboDepth Challenge - ICRA 2023

team name: USTC-IAT-United

Jun Yu[1], Xiaohua Qi[1] Jie Zhang[2], Mohan Jing[1], Pengwei Li[1], Zhen Kan[1],
Qiang Ling[1], Liang Peng[3], Minglei Li[3], Di Xu[3], Changpeng Yang[3]

[1] University of Science and Technology of China

[2]Central South University

[3]Huawei Cloud Computing Technology Co., Ltd.

1st Place in Track 1

Team Name:

OpenSpaceAI

Affiliation:

USTC & Deep Space Exploration Lab

ICRA LONDON·2023

Team:

OpenSpaceAI

Final Result:

Abs Rel: 0.121

RMSE: 4.981

$\delta < 1.25$: 0.861

IRUDepth: Improve Robustness and Uncertainty of Self-Supervised Monocular Depth Estimation

OpenSpaceAI Team:

Ruijie Zhu[1], Ziyang Song[1], Li Liu[1], Tianzhu Zhang[1,2]

[1]University of Science and Technology of China

[2]Deep Space Exploration Lab

中国科学技术大学
University of Science and Technology of China

Spotlight Talks (Track 2)

Innovative Prize in Track 2

Team Name:

AIIA-RDepth

Affiliation:

Harbin Institute of Technology

ICRA LONDON · 2023

Team:

AIIA-RDepth

Final Result:

$\delta < 1.25$: 0.861

Abs Rel: 0.123

RMSE: 0.450

log10: 0.052

Online Presentation

Q & A

3rd Place in Track 2

Team Name:

GANCV

Affiliation:

Individual Researcher

ICRA LONDON·2023

Team:

GANCV

Final Result:

$\delta < 1.25$: 0.898

Abs Rel: 0.104

RMSE: 0.391

log10: 0.045

A Depth Estimation Solution for Track 2 of the RoboDepth Challenge

Jiamian Huang, Baojun Li

GANCV

June 2023

2nd Place in Track 2

Team Name:

OpenSpaceAI

Affiliation:

USTC & Deep Space Exploration Lab

ICRA LONDON·2023

Team:

OpenSpaceAI

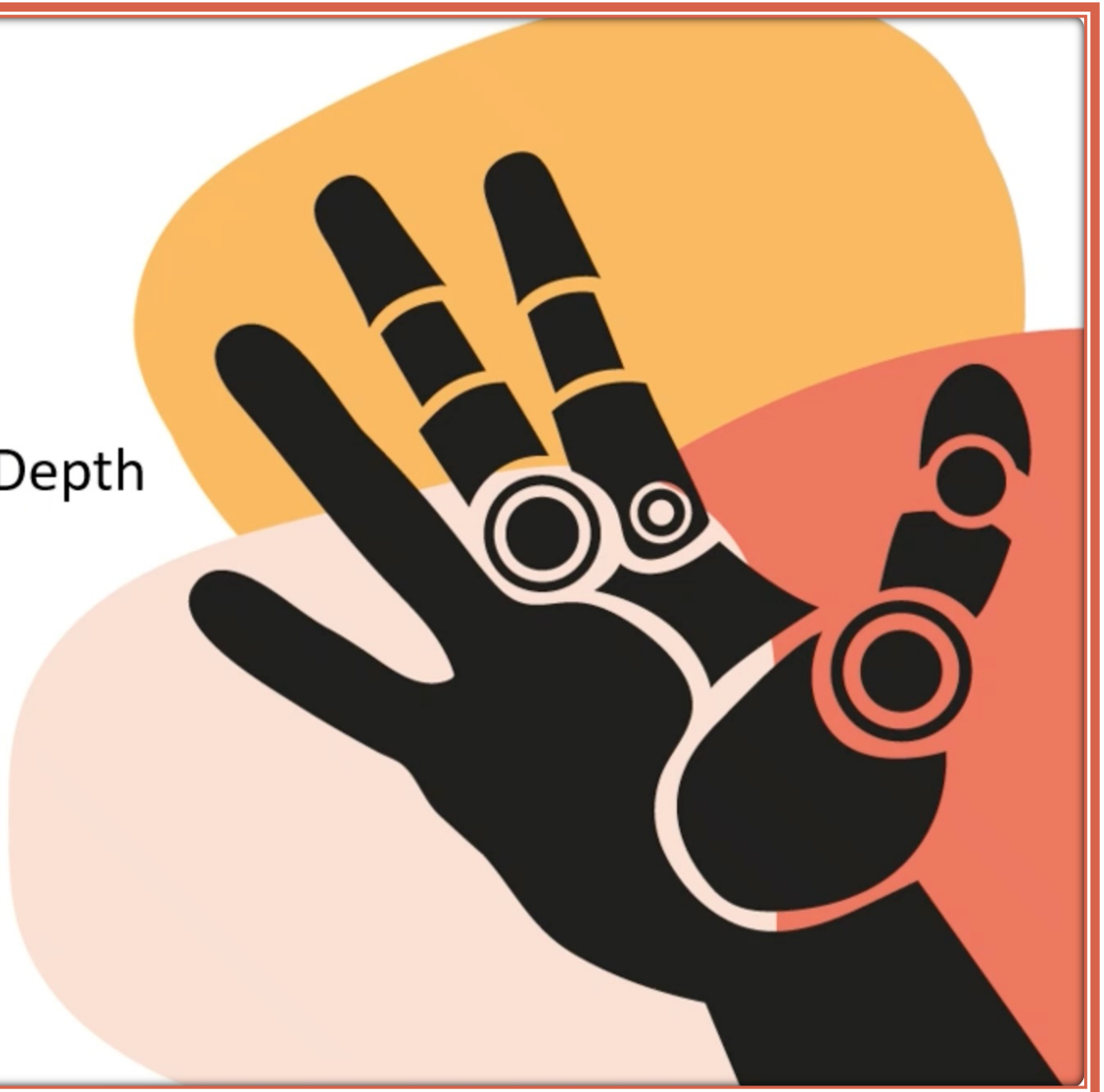
Final Result:

$\delta < 1.25$: 0.928

Abs Rel: 0.095

RMSE: 0.341

log10: 0.040



Diffusion model for Robust Depth Estimation

OpenSpaceAI Team:

Li Liu[1], Ruijie Zhu[1], Ziyang Song[1], Tianzhu Zhang[1,2]

[1]University of Science and Technology of China

[2]Deep Space Exploration Lab

中国科学技术大学
University of Science and Technology of China

Q & A

1st Place in Track 2

Team Name:

USTCxNetEaseFuxi

Affiliation:

USTC & NetEaseFuxi

ICRA LONDON · 2023

Team:

USTCxNetEaseFuxi

Final Result:

$\delta < 1.25$: 0.940

Abs Rel: 0.088

RMSE: 0.347

log10: 0.038

The RoboDepth Challenge - ICRA 2023

Jun Yu[1], Mohan Jing[1], Pengwei Li[1], Xiaohua Qi[1],

Cheng Jin[2], Yingfeng Chen[2], Jie Hou[2]

[1]University of Science and Technology of China & [2]NetEaseFuxi

Public Resources

Video Recording & Report:
https://robodepth.github.io

Benchmark Toolkit:
https://github.com/ldkong1205/RoboDepth

Ask Anything

Thank You!

See You Next Time