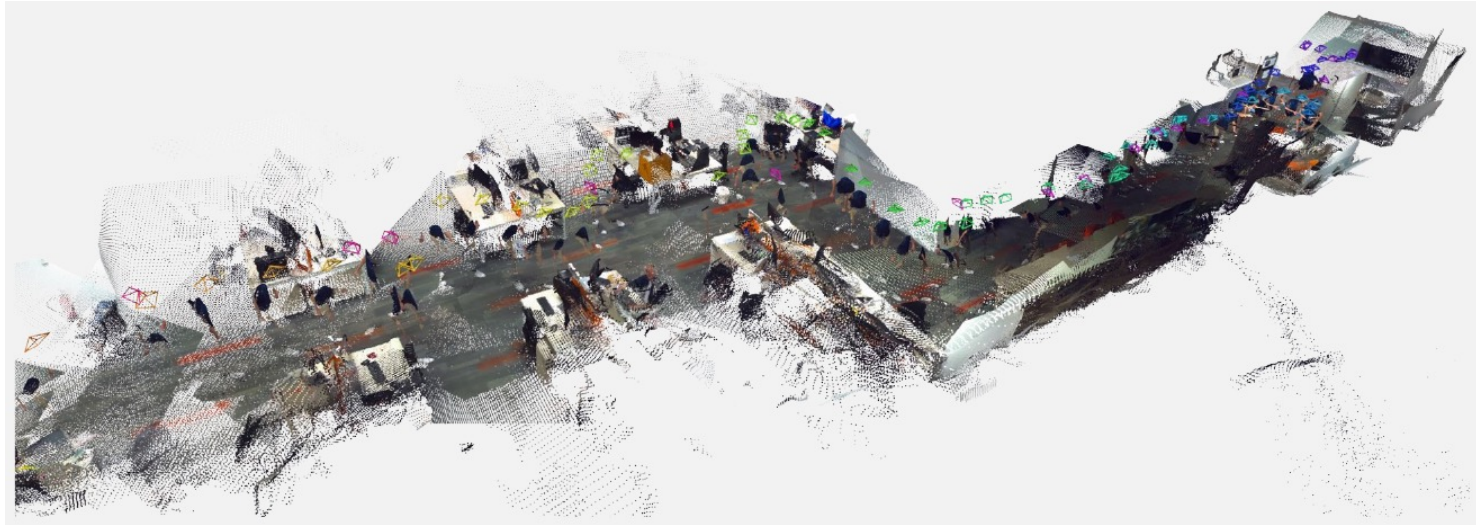


SpatialBench

Is Your Spatial Foundation Model an All-Round Player?



Why a new benchmark?

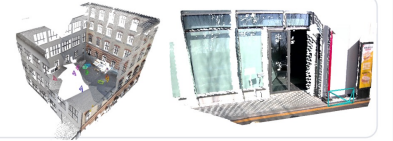
Spatial Intelligence operates from diverse inputs with various domains.



Room



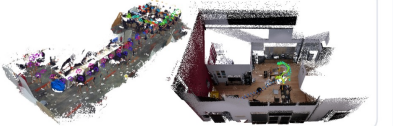
Roaming



Driving



Ego-View



Wrist-View

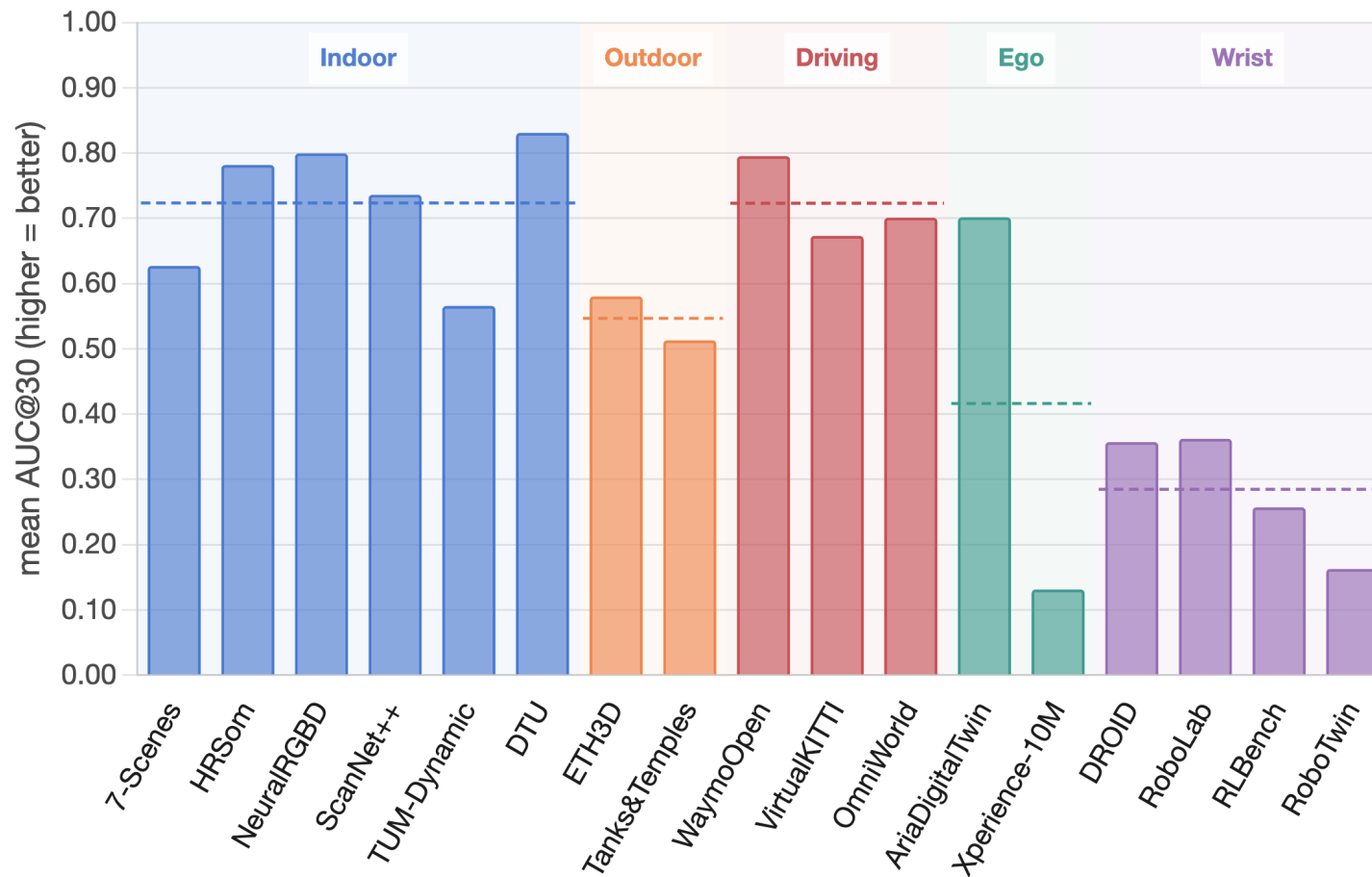


Fixed
Indexes



Various
Domains

Embodied views expose a generalization gap



Stronger on
standard scenes

Egocentric
Wrist views

Major gaps in
current models

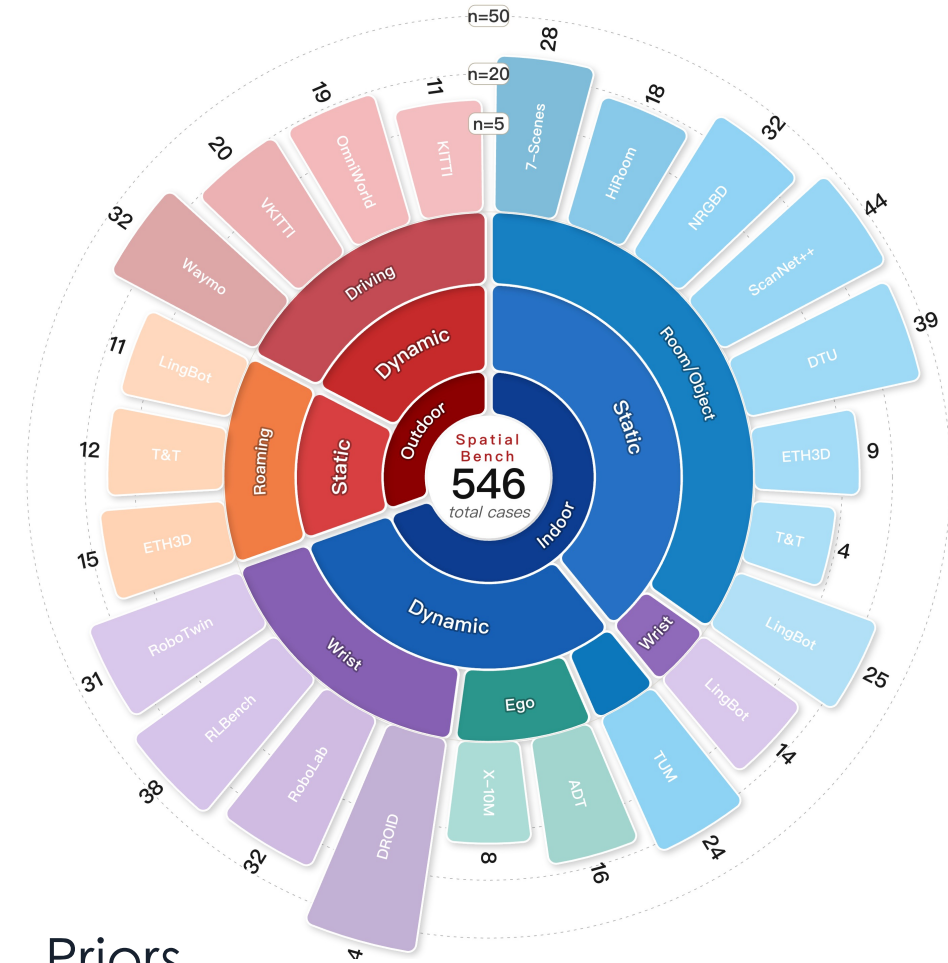
SpatialBench: A unified benchmark

19
Datasets

546
Scenes

41
Model variants

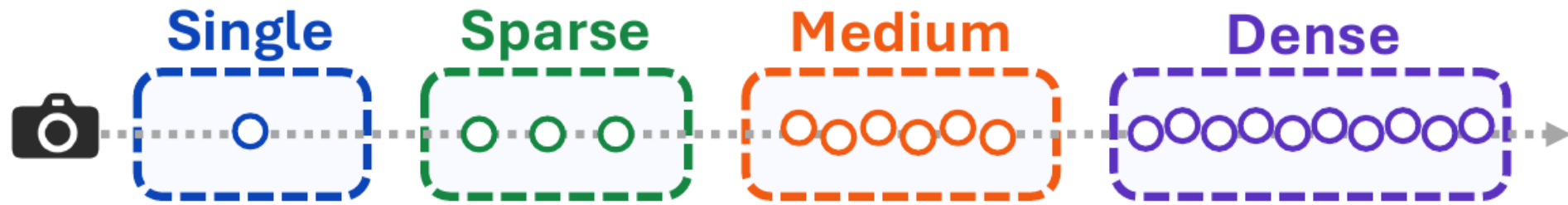
6
Paradigms



Depth Pose Trajectory 3D reconstruction Priors

Four input densities, deterministic sampling

Deterministic Multi-Density Sampling



Single

Monocular priors

Sparse

Wide baselines

Medium

Moderate overlap

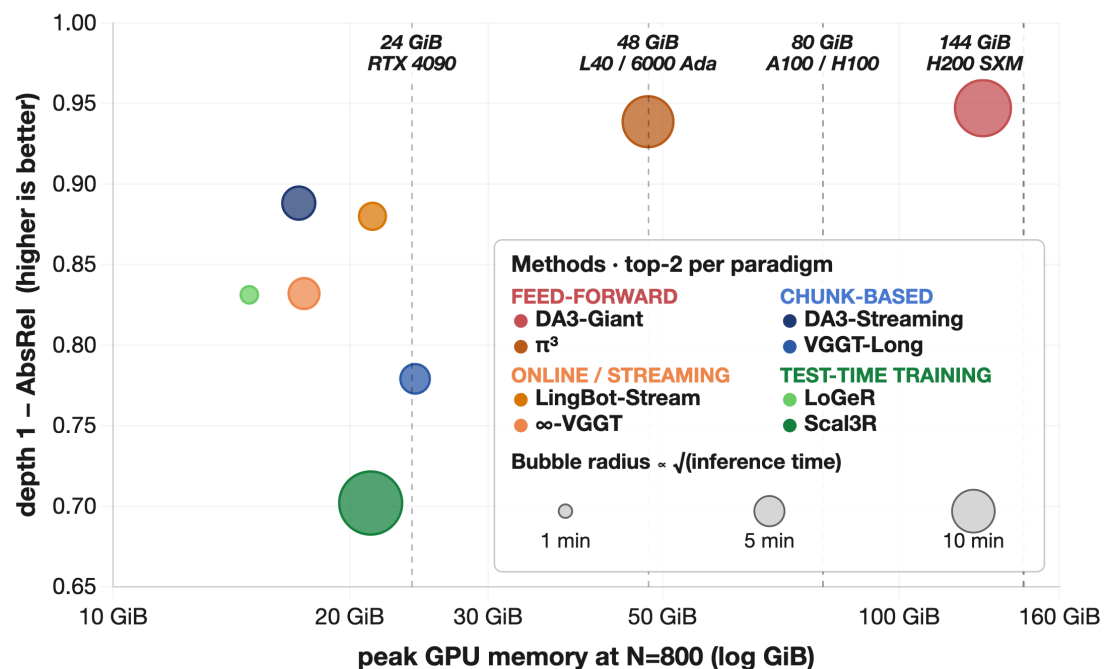
Dense

Long sequences

Identical scenes and inputs enable reproducible comparison

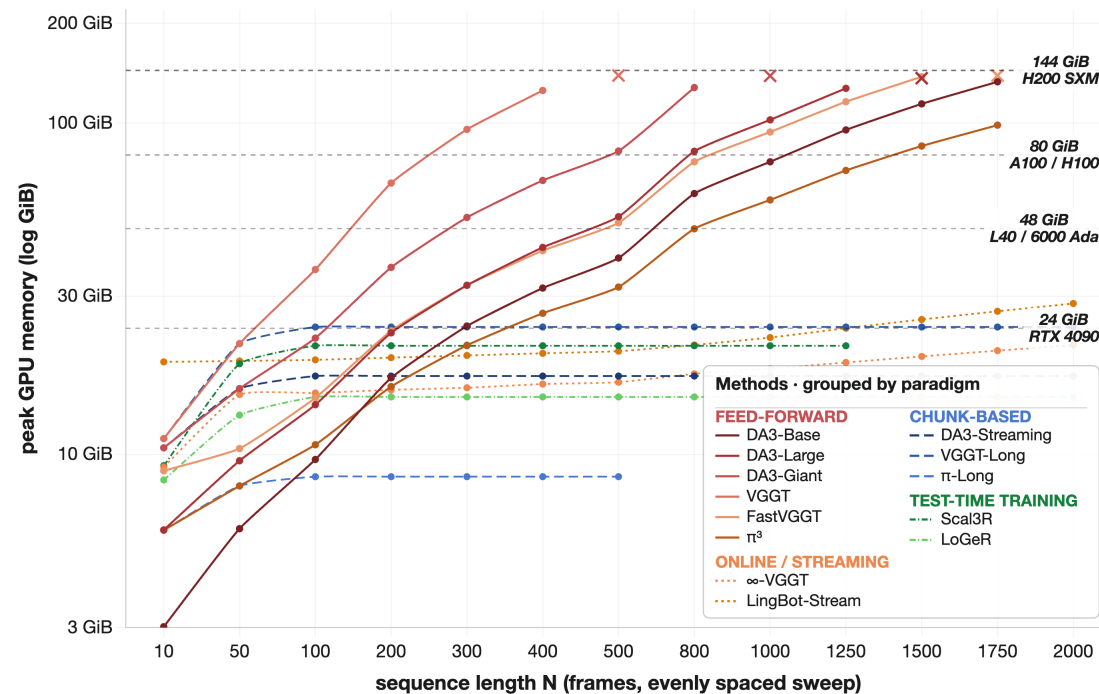
Accuracy and scalability favor different models

Accuracy at a fixed input budget



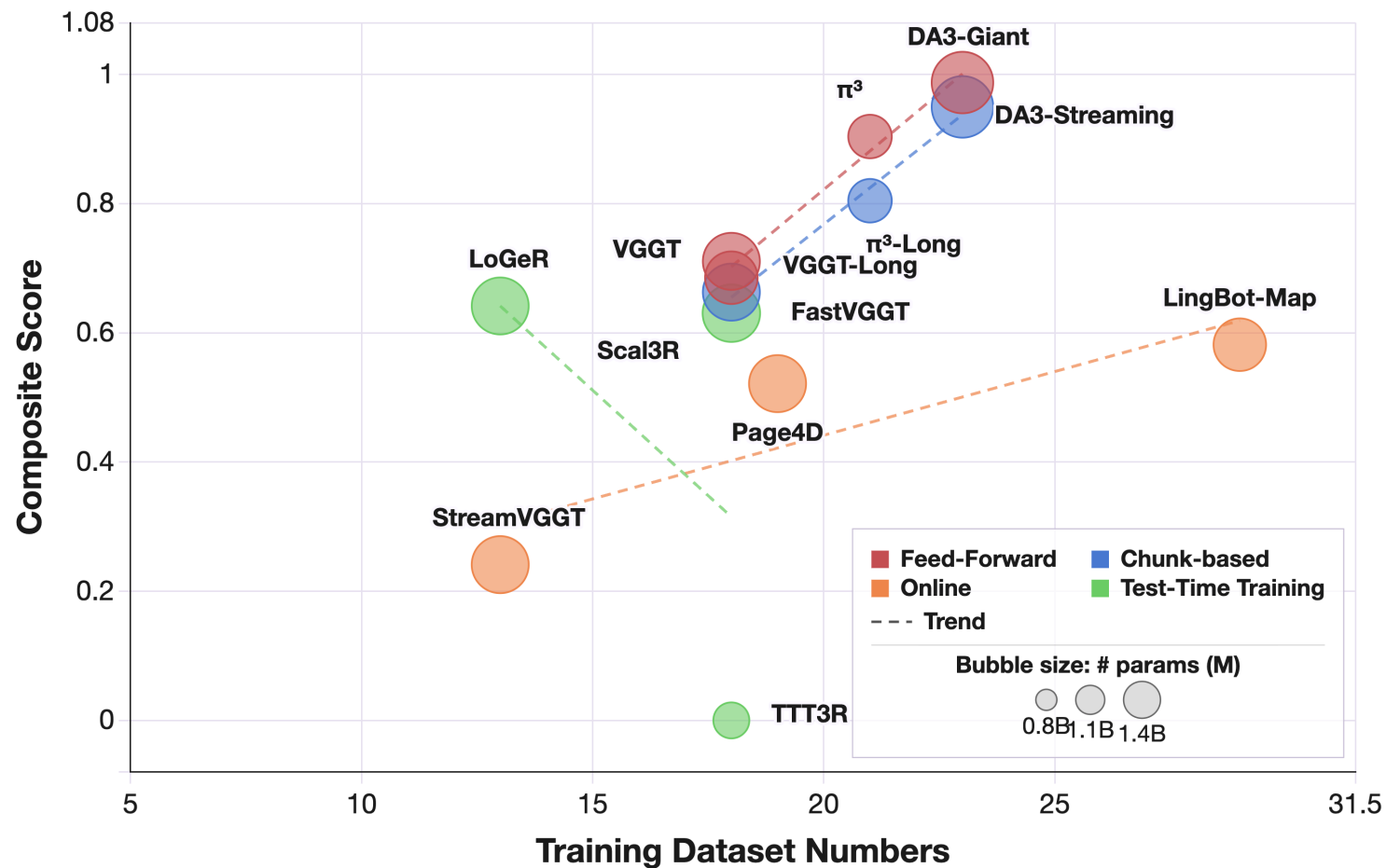
Full context favors accuracy

Memory growth with sequence length



Bounded memory supports longer inputs

Training coverage and supervision quality



More data sources

Correlate with
higher performance

Better supervision

Explains gaps at
comparable scale

DA-Next-5M: Data for embodied views

5.5M

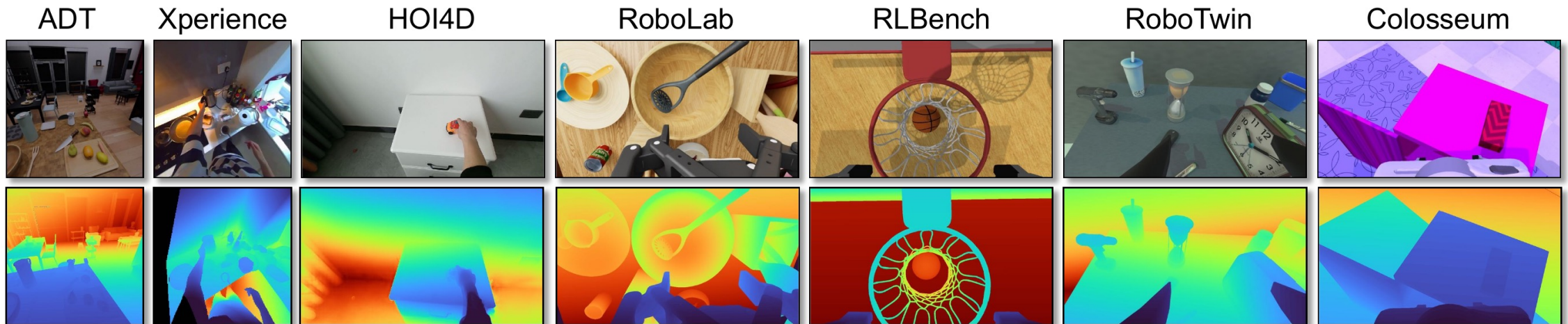
High-quality frames

22K

Scenes / sequences

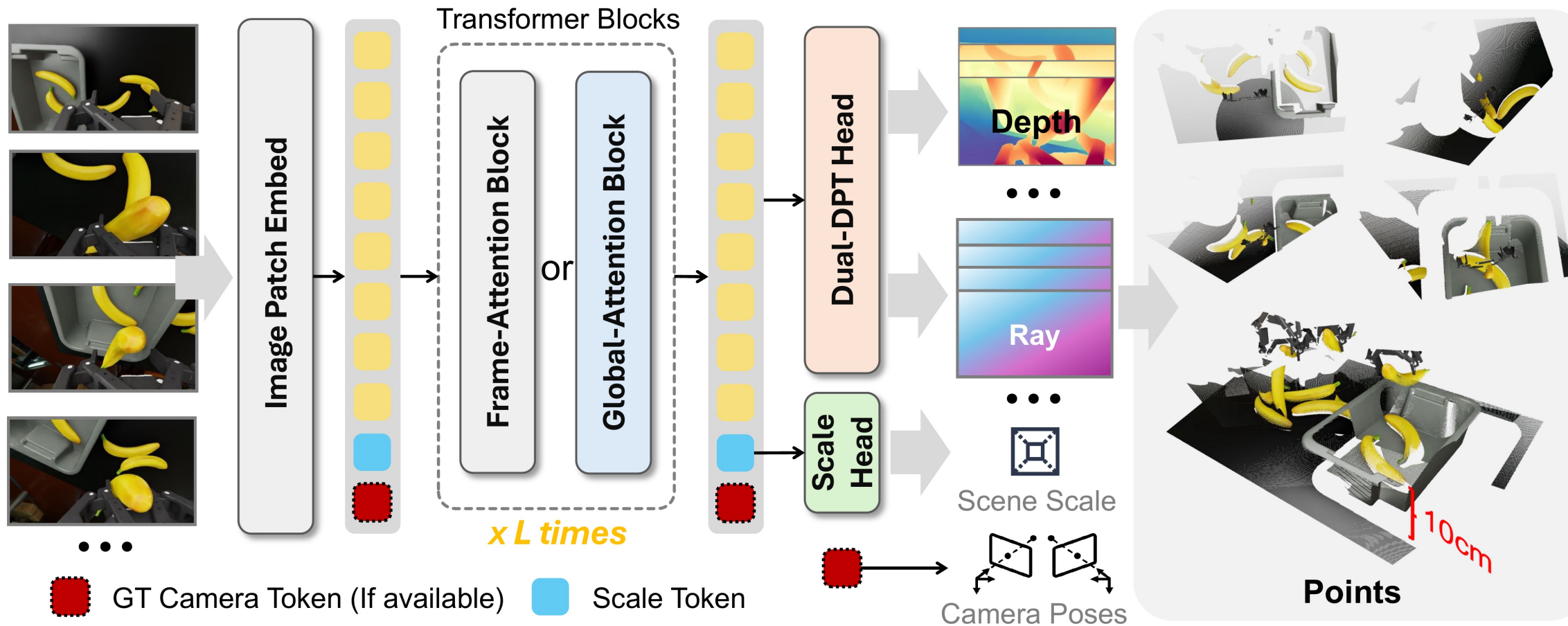
7

Data sources



Real and synthetic data for egocentric and wrist views

DA-Next: Geometry with metric scale

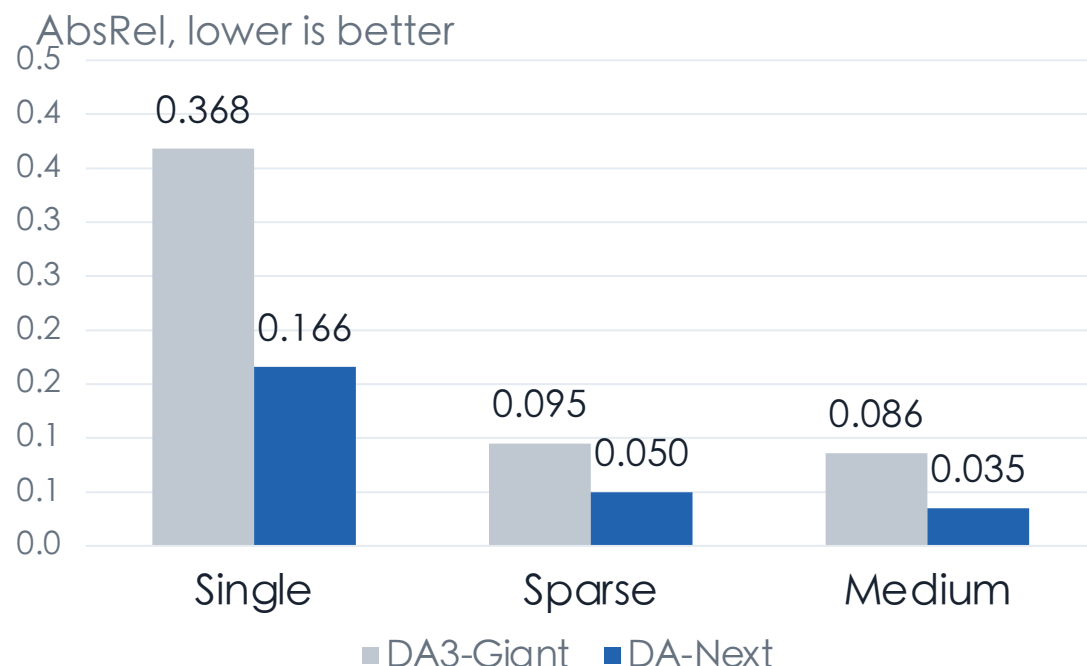


Scale tokens recover metric scale

Camera tokens encode optional pose priors

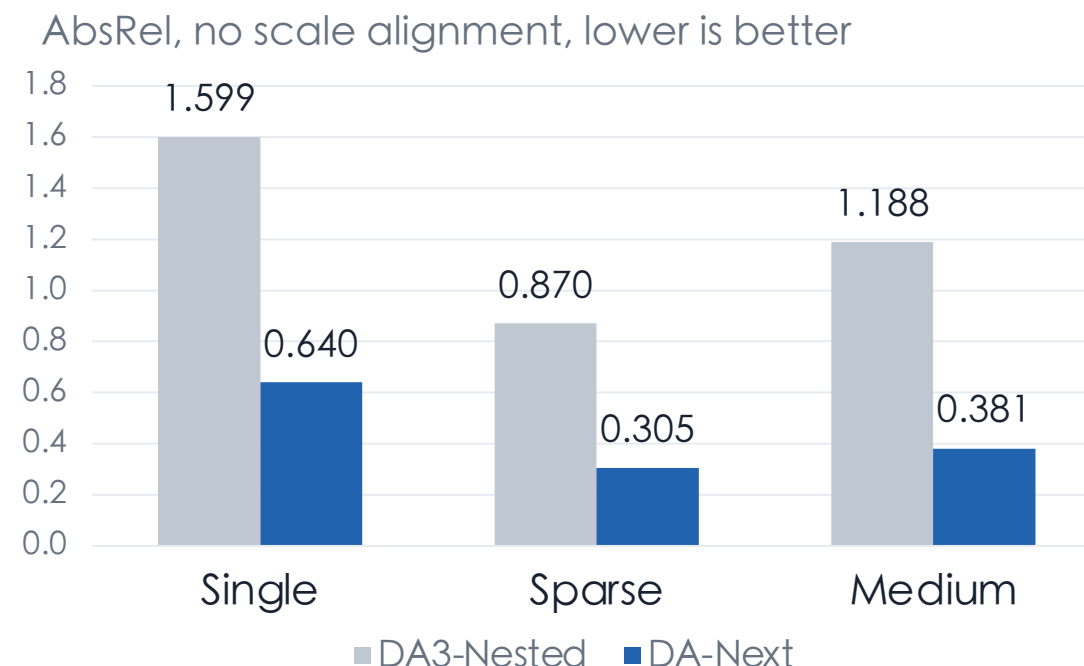
DA-Next reduces depth error

Aligned depth error



Sparse: -47.4% Medium: -59.3%

Metric depth error

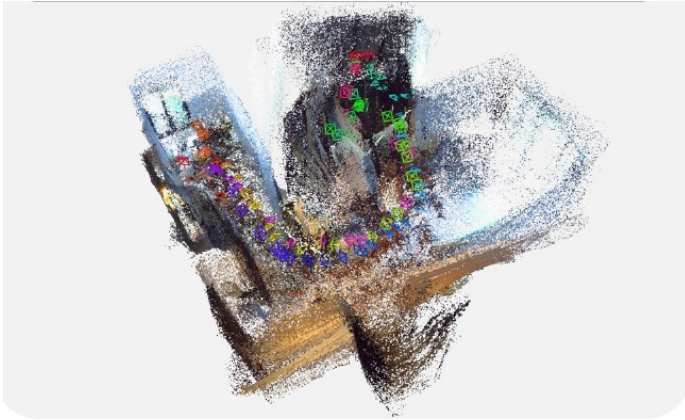


Mean AbsRel: 1.219 to 0.442

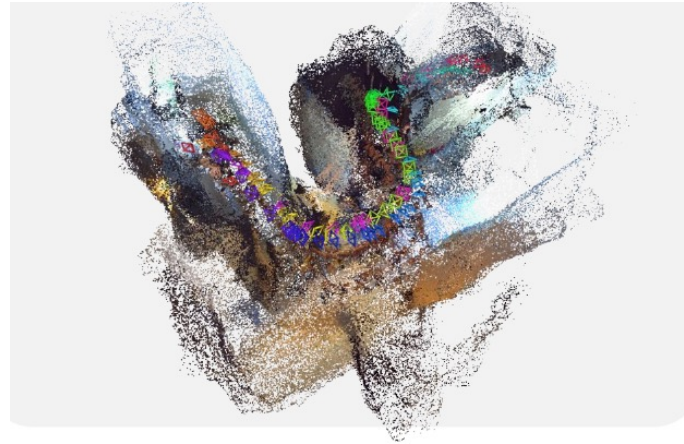
Limits: Dense inputs exceed memory. Trajectory error does not improve.

Targeted data improves embodied reconstruction

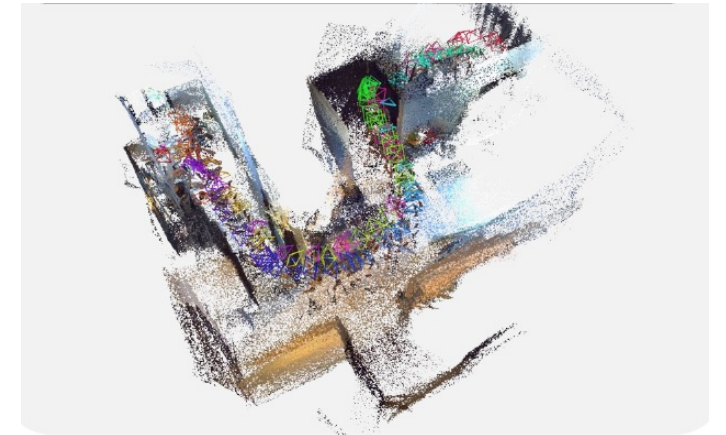
DA3-Giant



DA-Next



Ground Truth



SpatialBench unifies evaluation

DA-Next-5M and DA-Next expand embodied data coverage