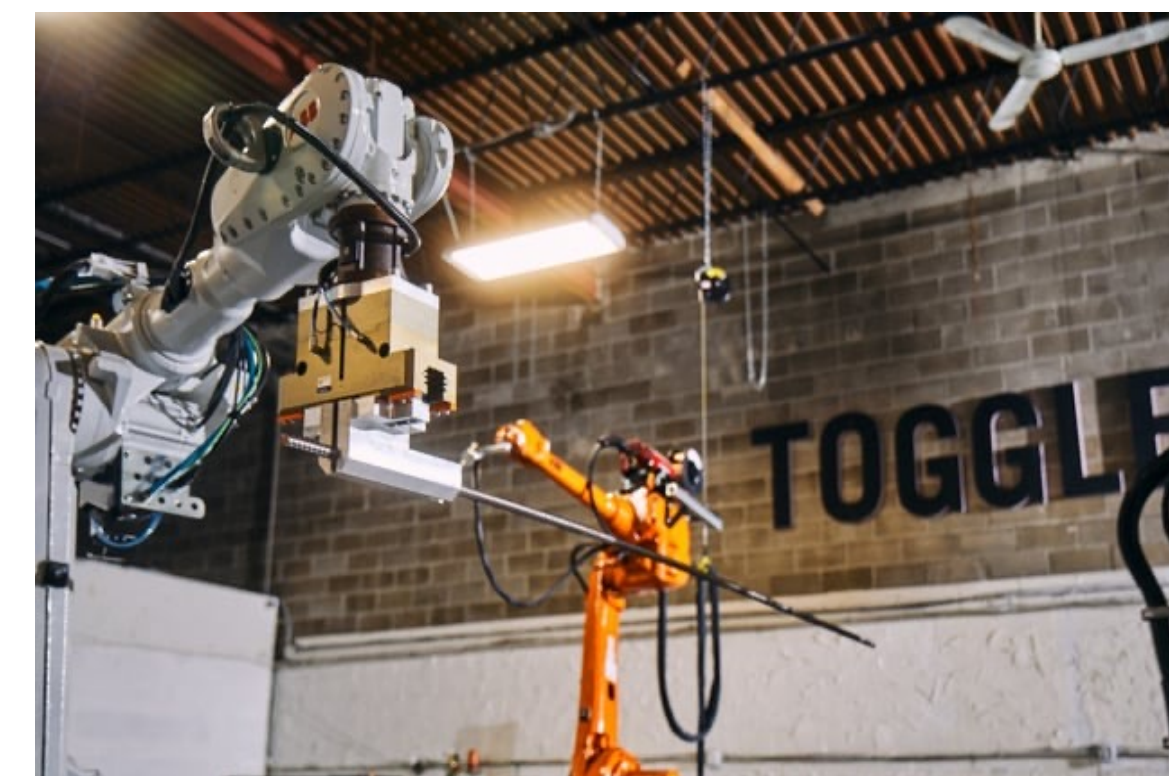


Motivation

Rebar recognition drives automation in reinforcement work

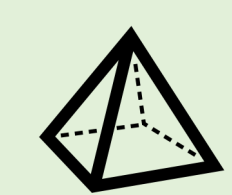


Quality Control



Robotic Manipulation

Segmenting rebars from **3D point clouds** vs. 2D images:



Better leverages 3D priors (more robust to occlusions and perspective variations)



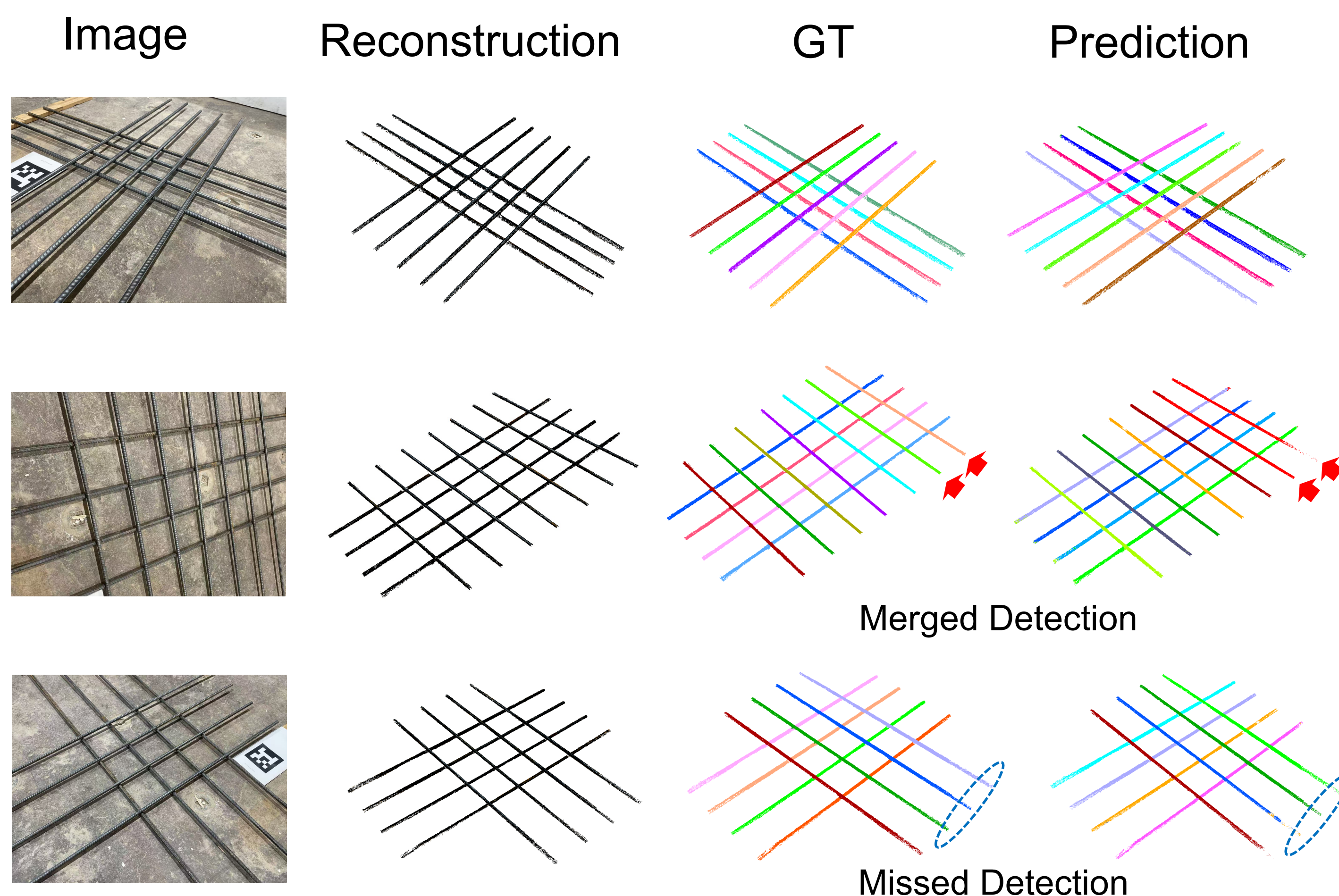
Scales to large scenes (more efficient detection)

Deployment bottleneck: Scarce high-quality 3D dataset



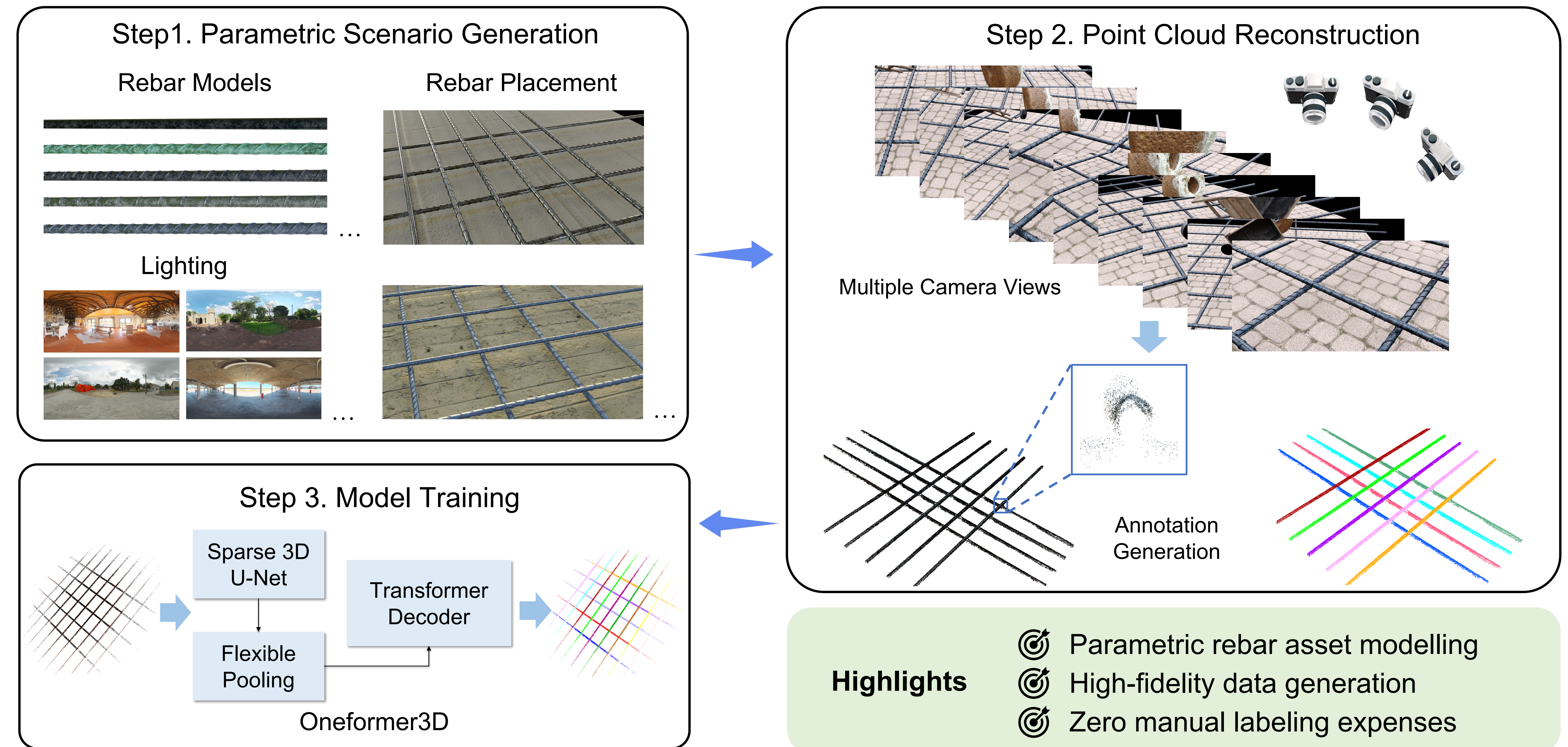
Can we learn rebar segmentation from point cloud using synthetic data?

Experiment & Results



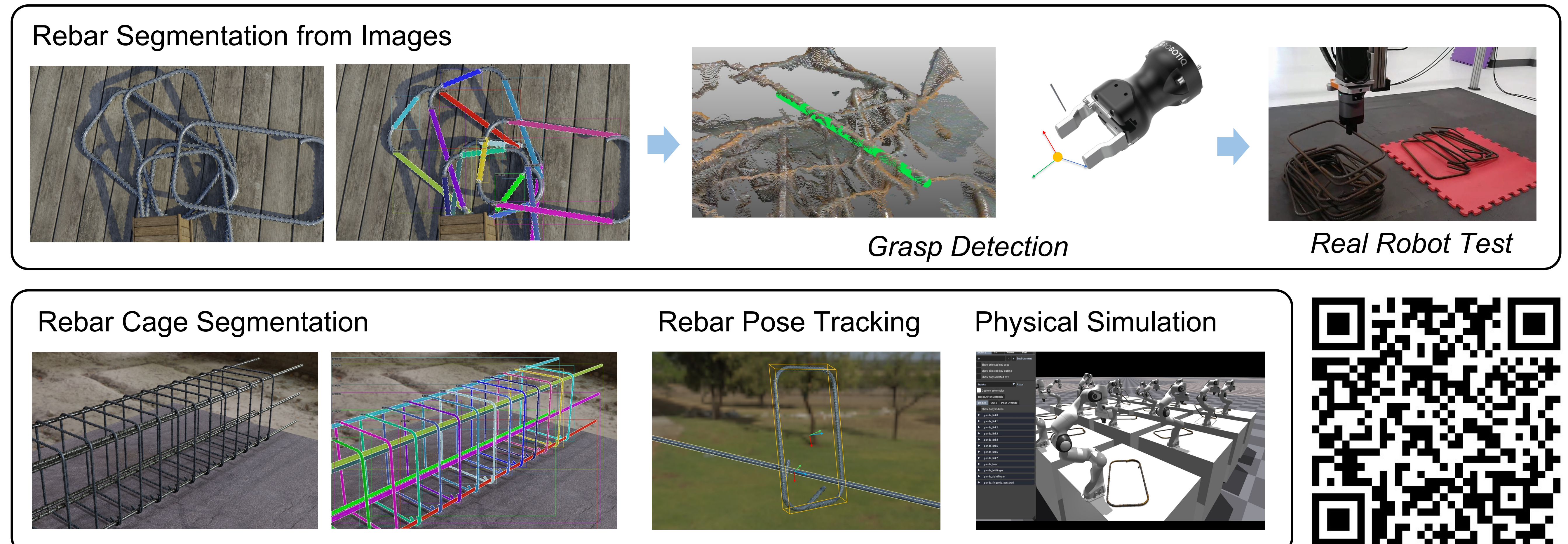
Domain	Segmentation mAP
Synthetic	99.4
Real	95.4

Method



Extension

Our pipeline can be easily generalized to other rebar recognition tasks ^[1]



[1] Sun, Tao, et al. "Rebar grasp detection using a synthetic model generator and domain randomization." *Automation in Construction* 176 (2025): 106252.



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