



# ParticleSfM: Exploiting Dense Point Trajectories for Localizing Moving Cameras in the Wild

ECCV 2022

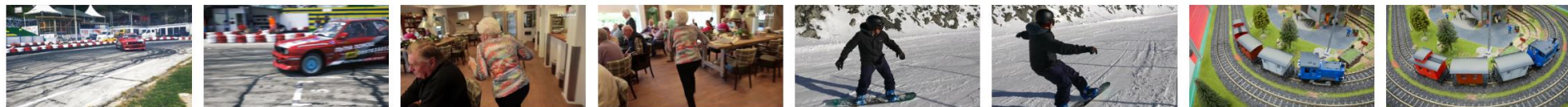
Wang Zhao, Shaohui Liu, Hengkai Guo, Wenping Wang, Yong-Jin Liu



# RGB video → Dense 3d geometry and camera poses



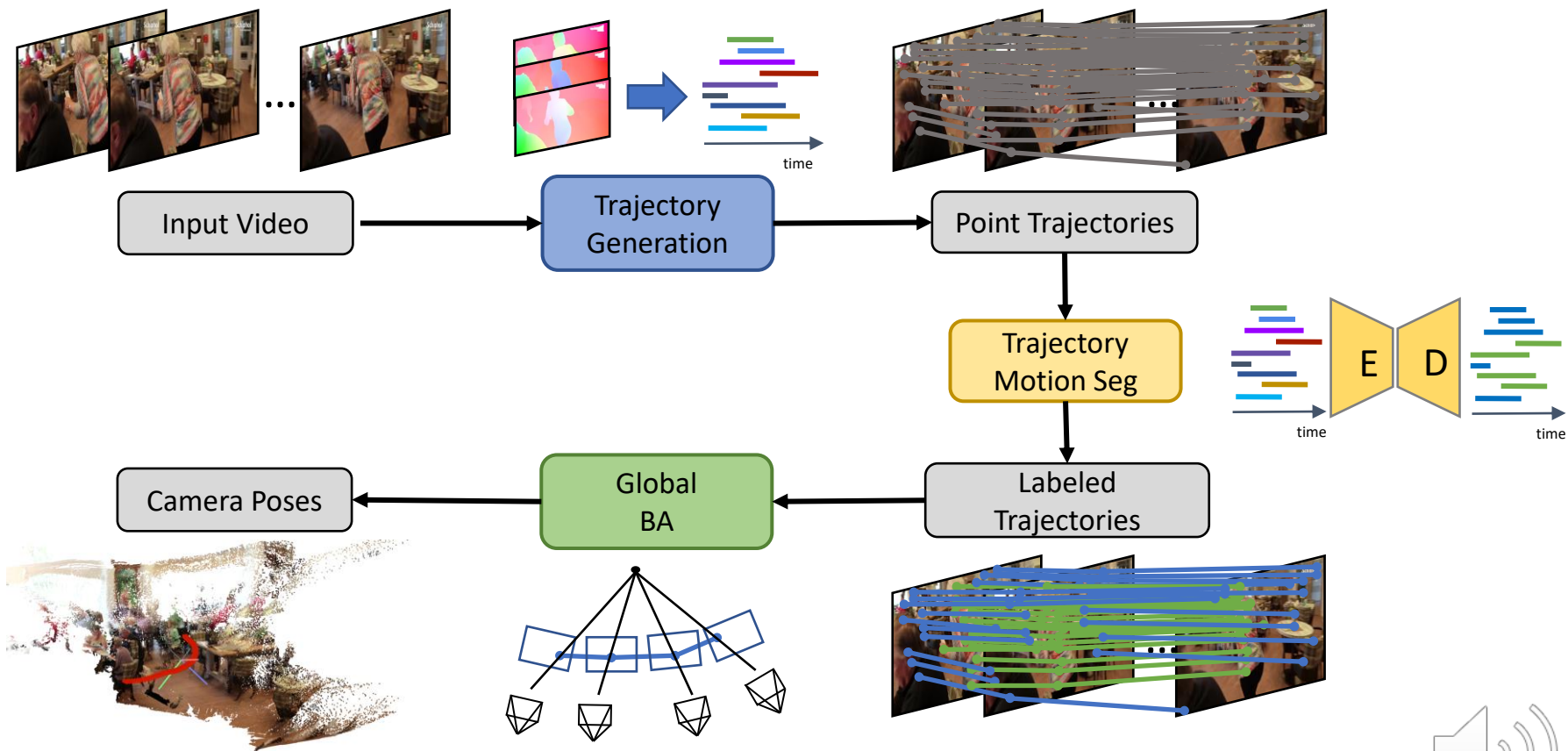
# RGB video → Dense 3d geometry and camera poses



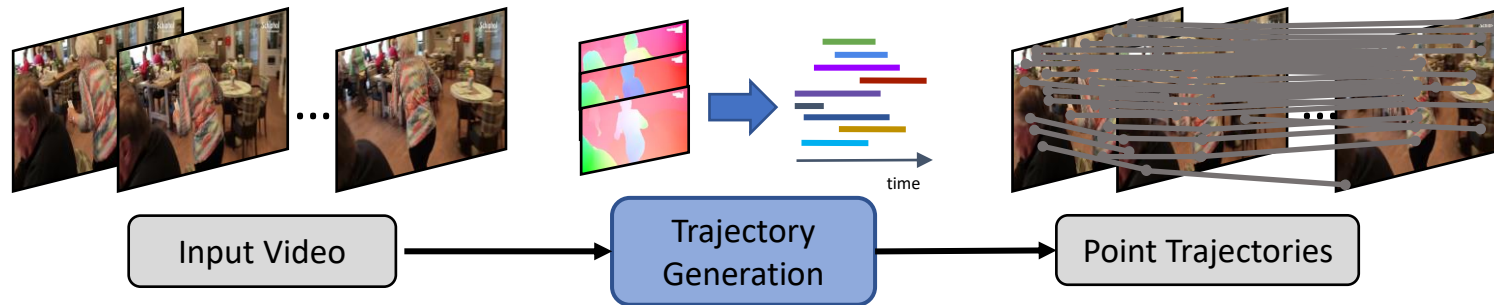
Top: COLMAP

Bottom: Ours



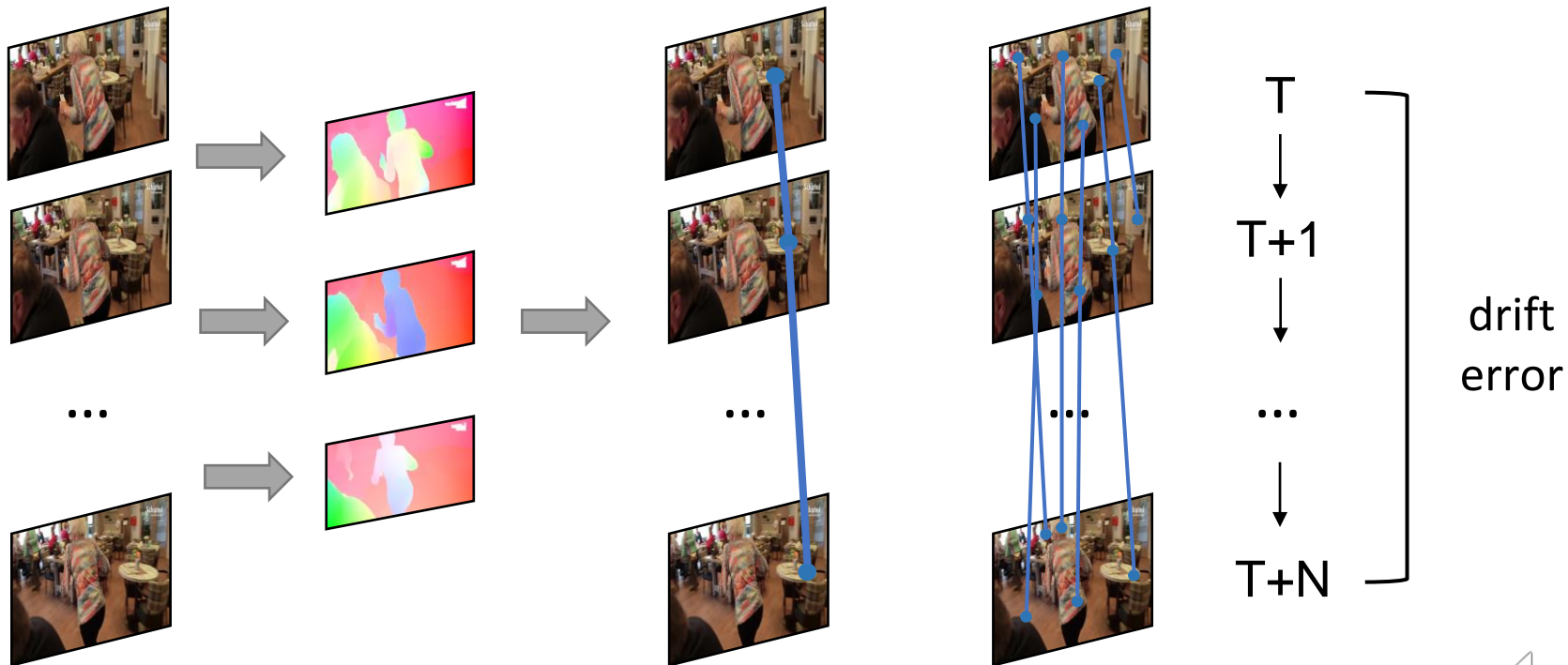


# Trajectory Generation

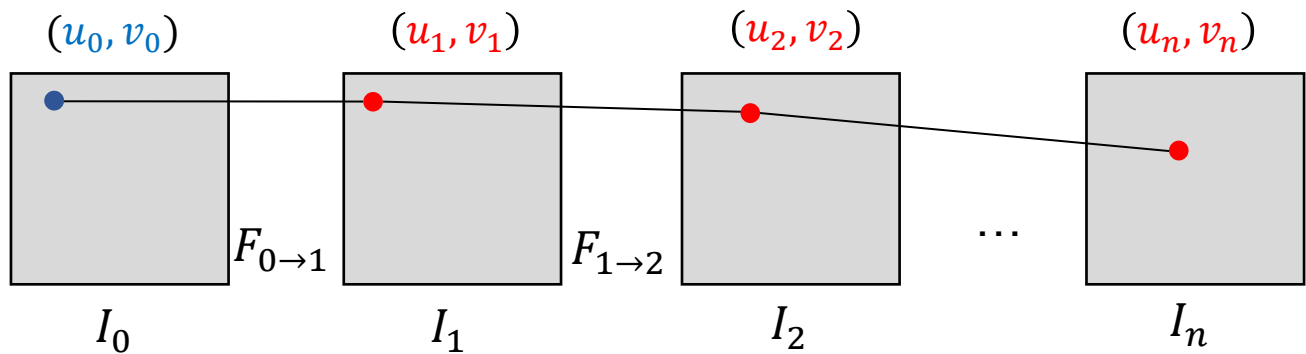




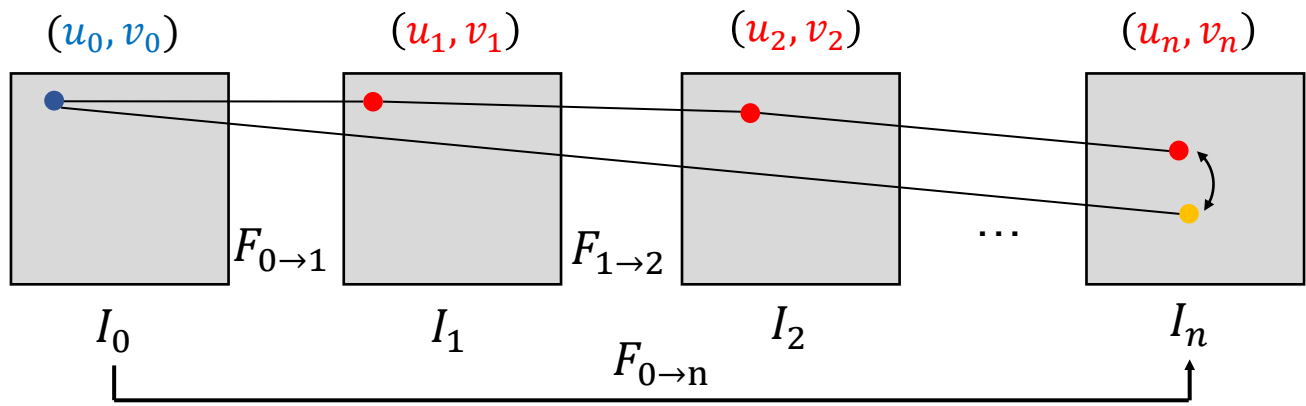
# Trajectory Generation



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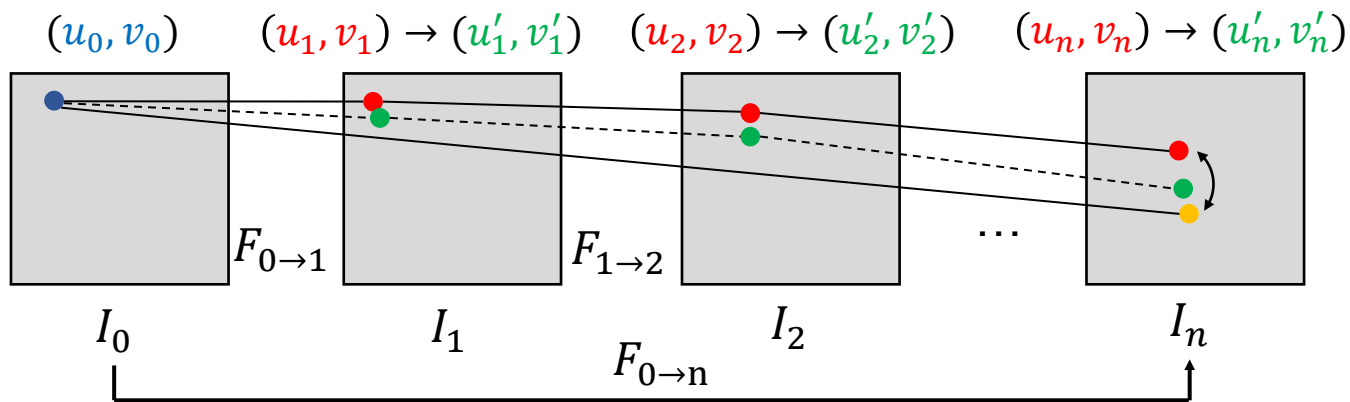


# Trajectory Generation

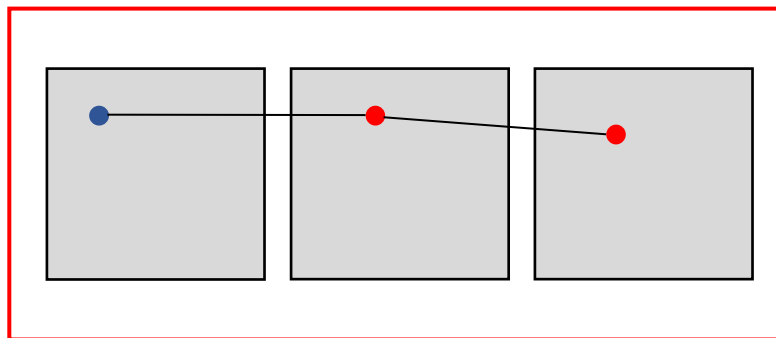
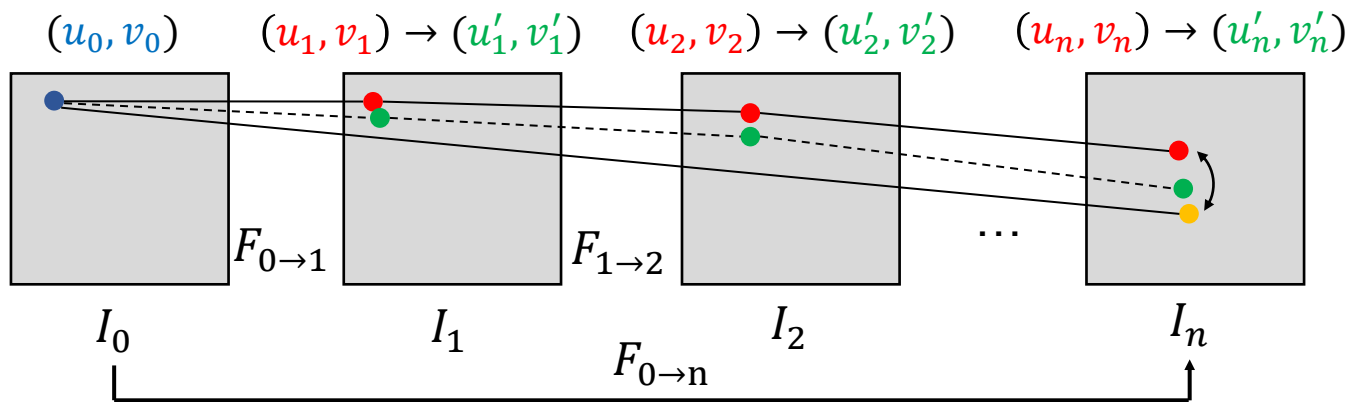




# Trajectory Generation



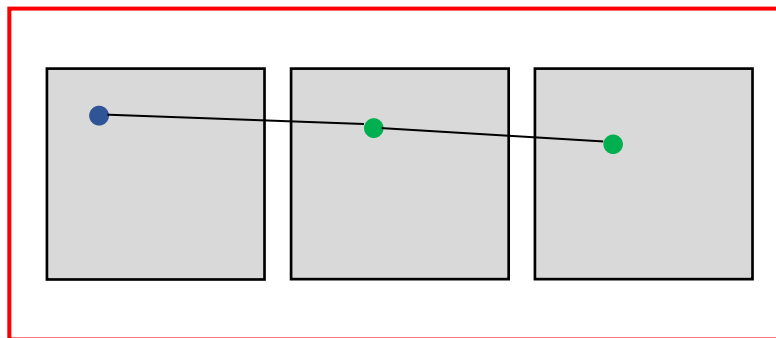
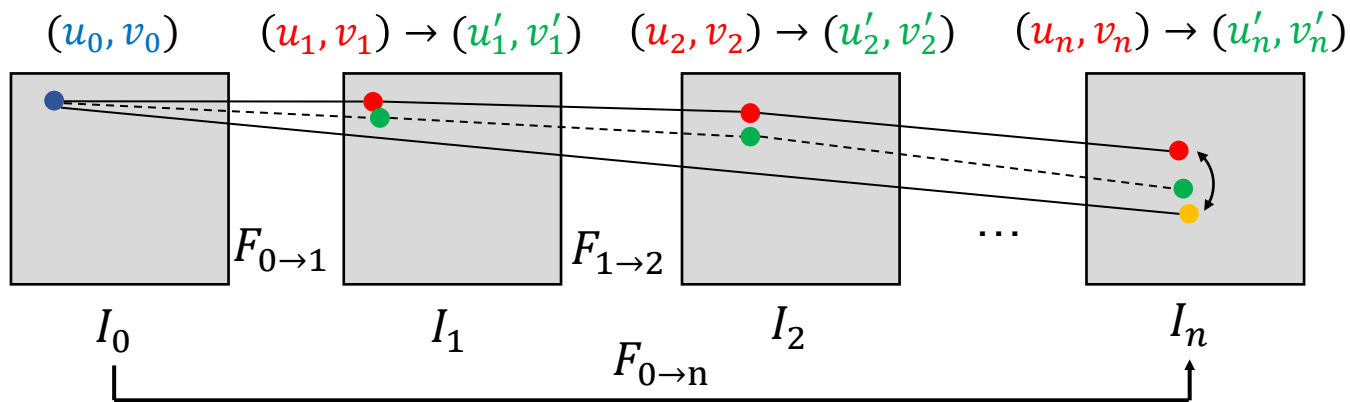
# Trajectory Generation



$n = 2$



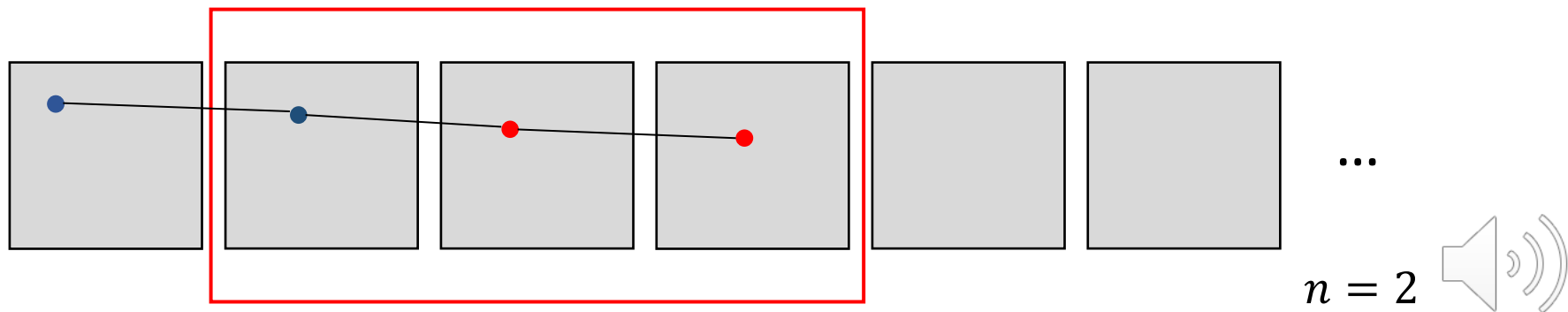
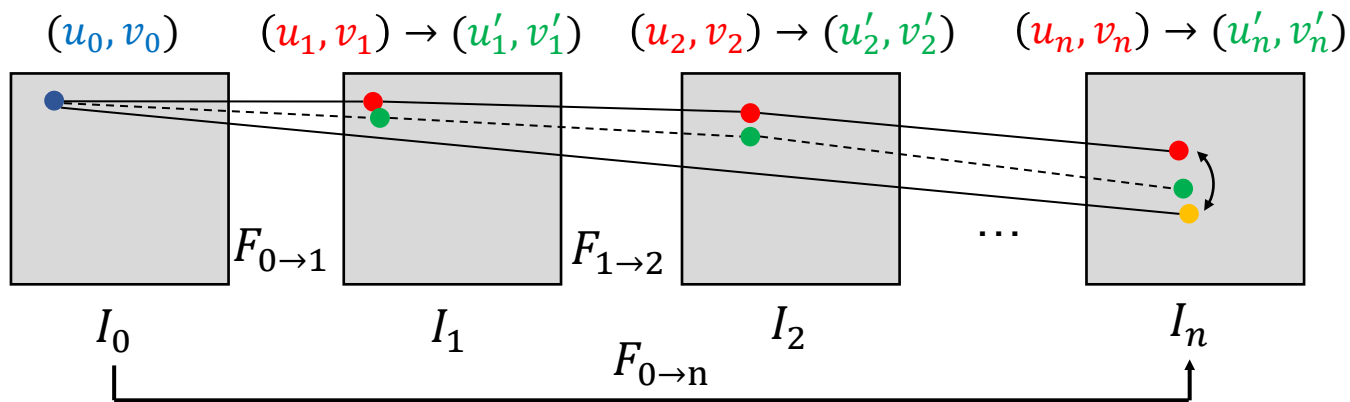
# Trajectory Generation



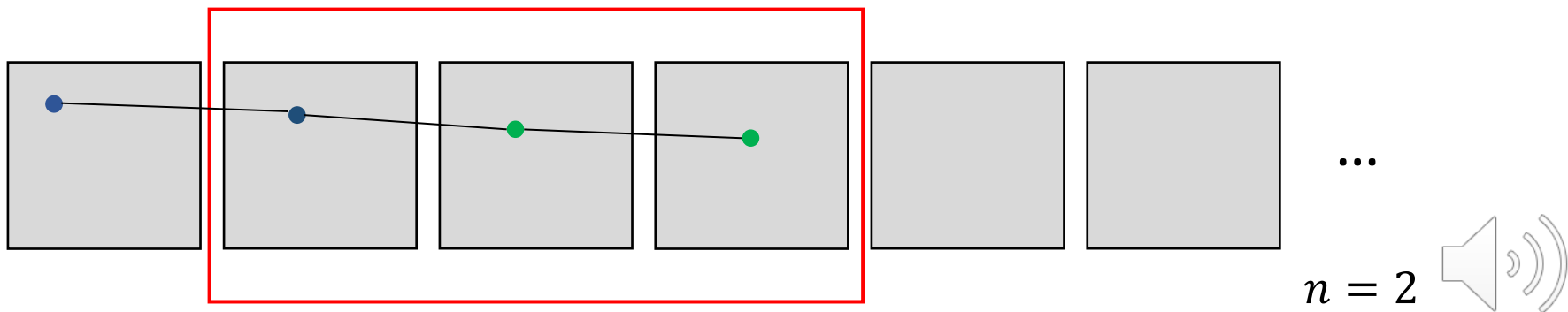
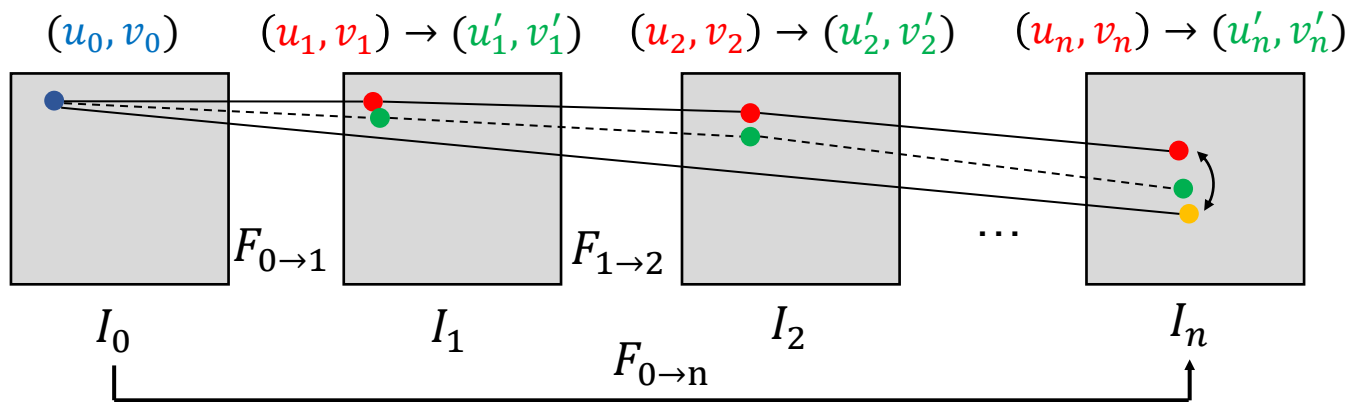
$n = 2$



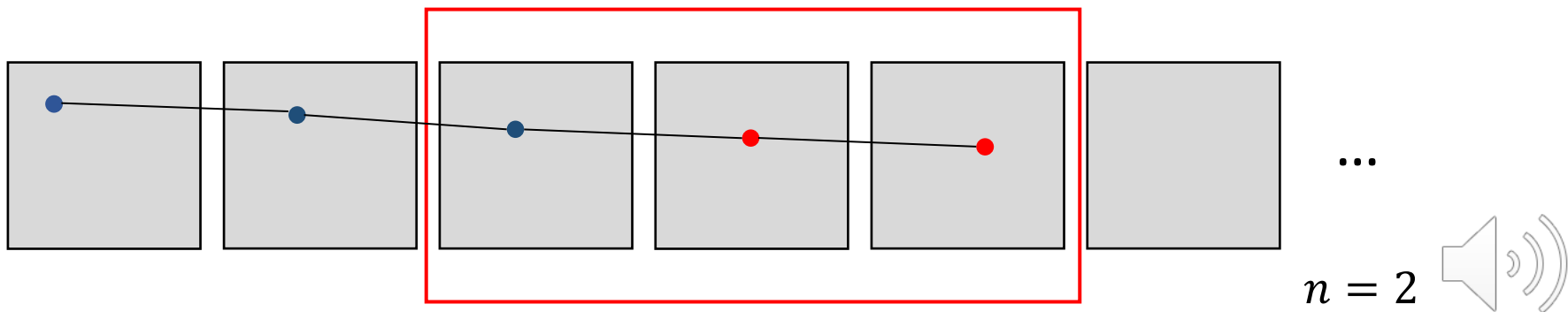
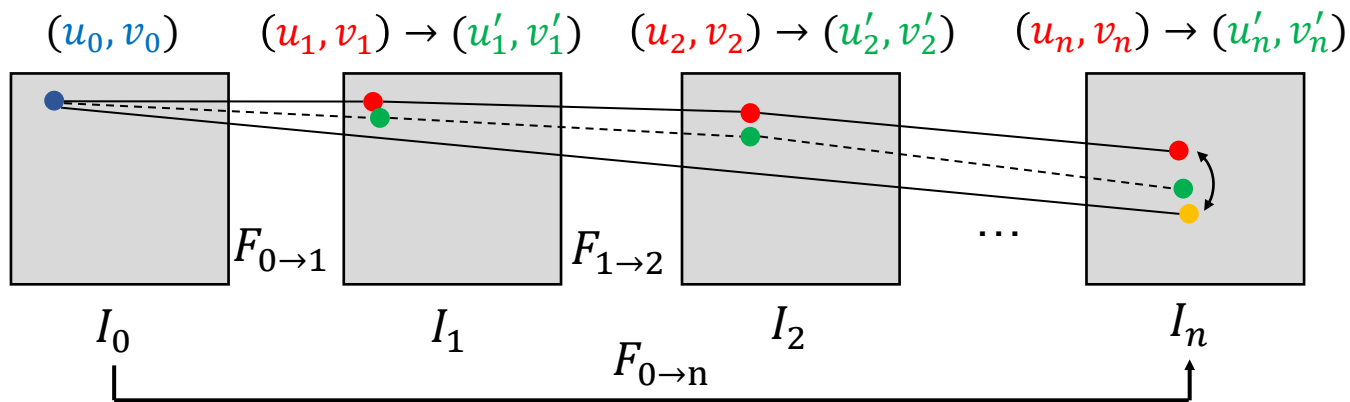
# Trajectory Generation

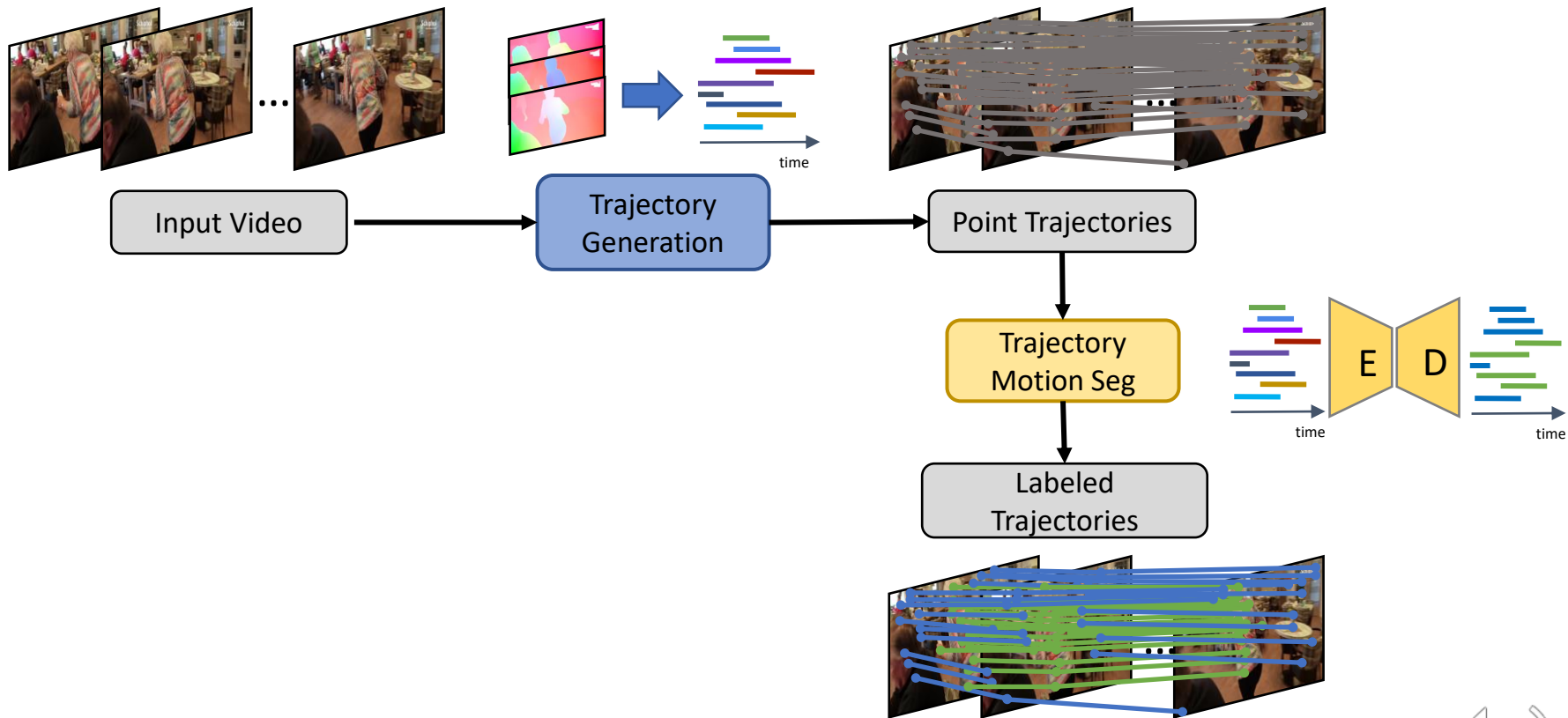


# Trajectory Generation



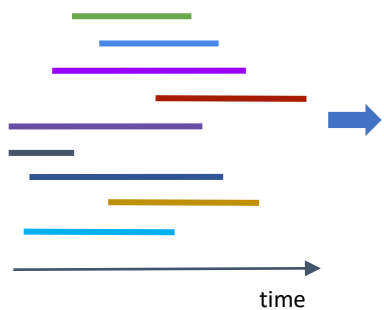
# Trajectory Generation



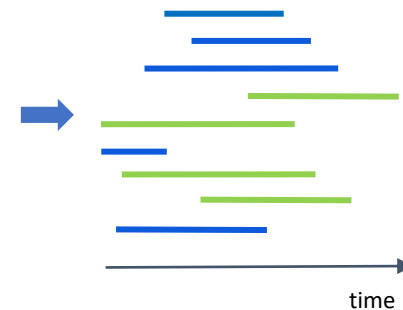




# Trajectory-based Motion Segmentation



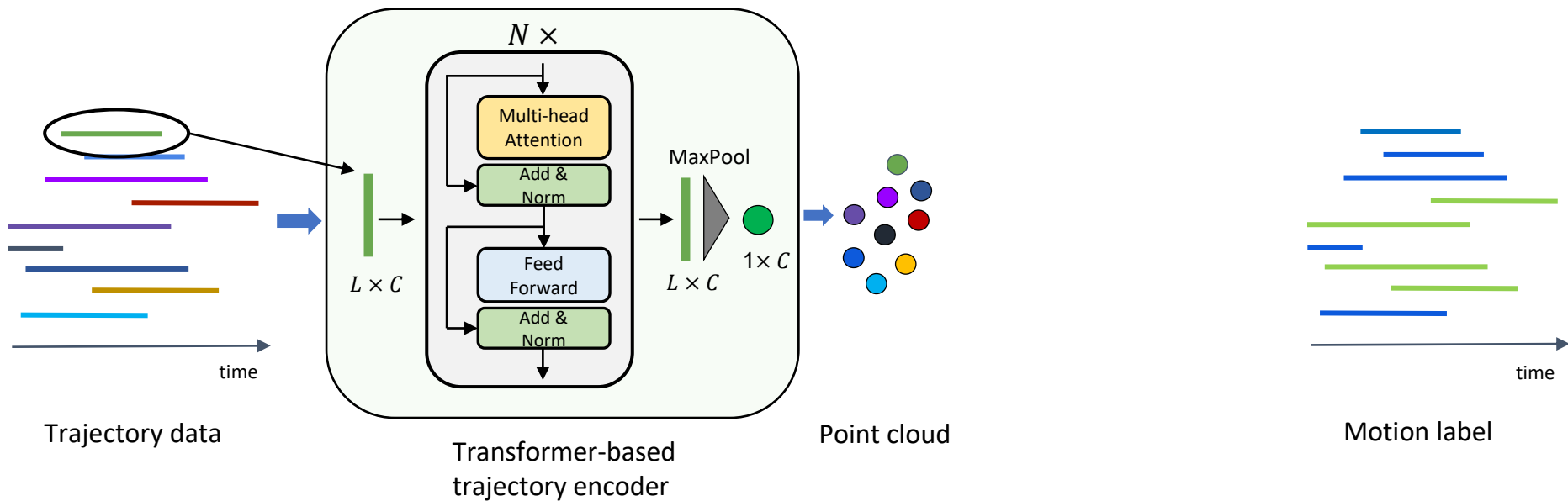
Trajectory data



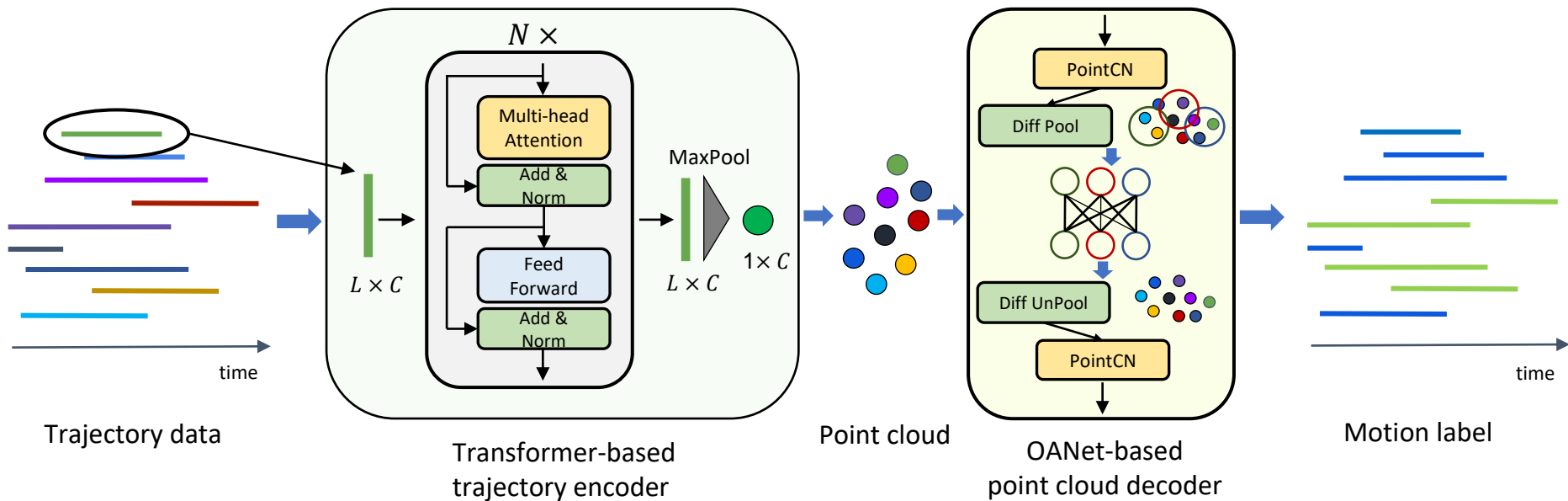
Motion label



# Trajectory-based Motion Segmentation



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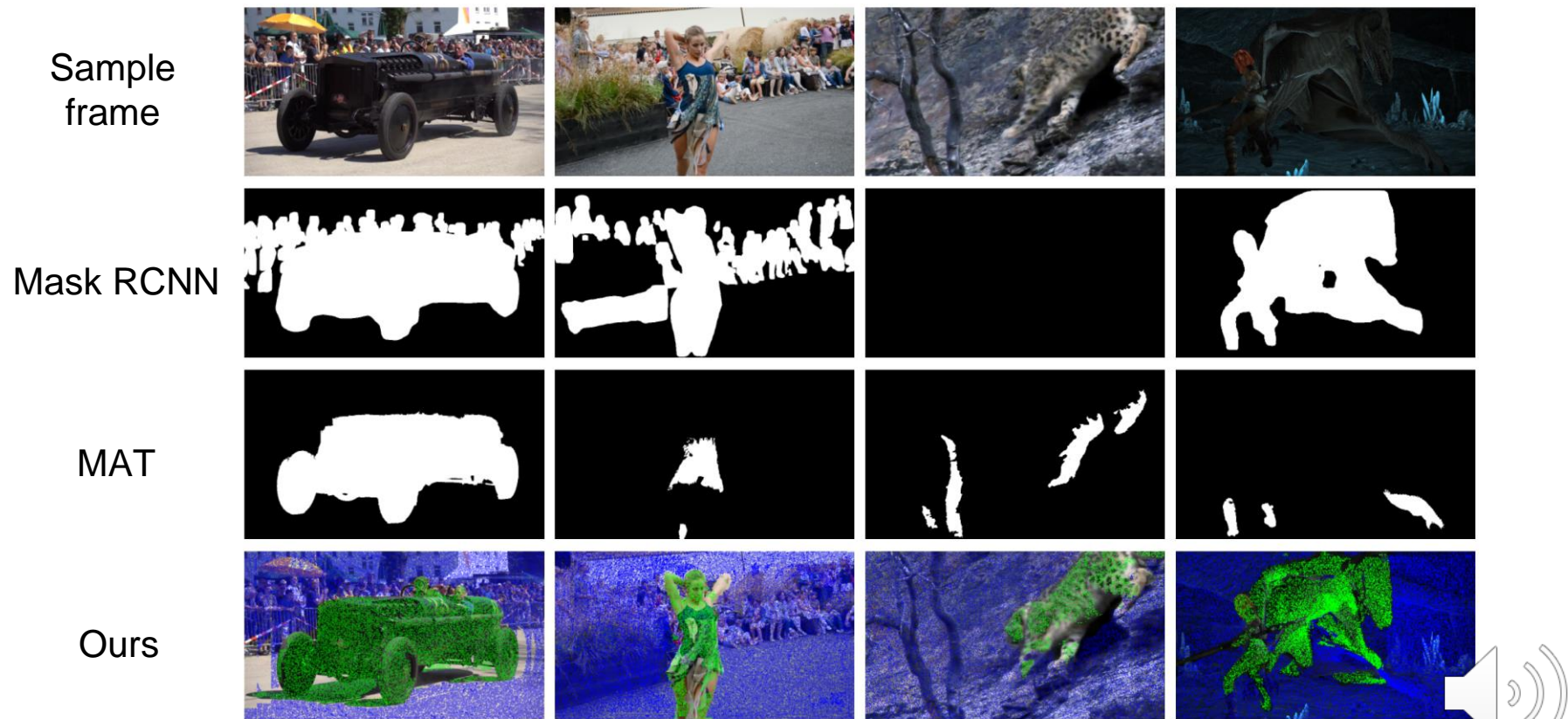


# Trajectory-based Motion Segmentation

Trained only on synthetic Flyingthings3D dataset and generalize to the open world



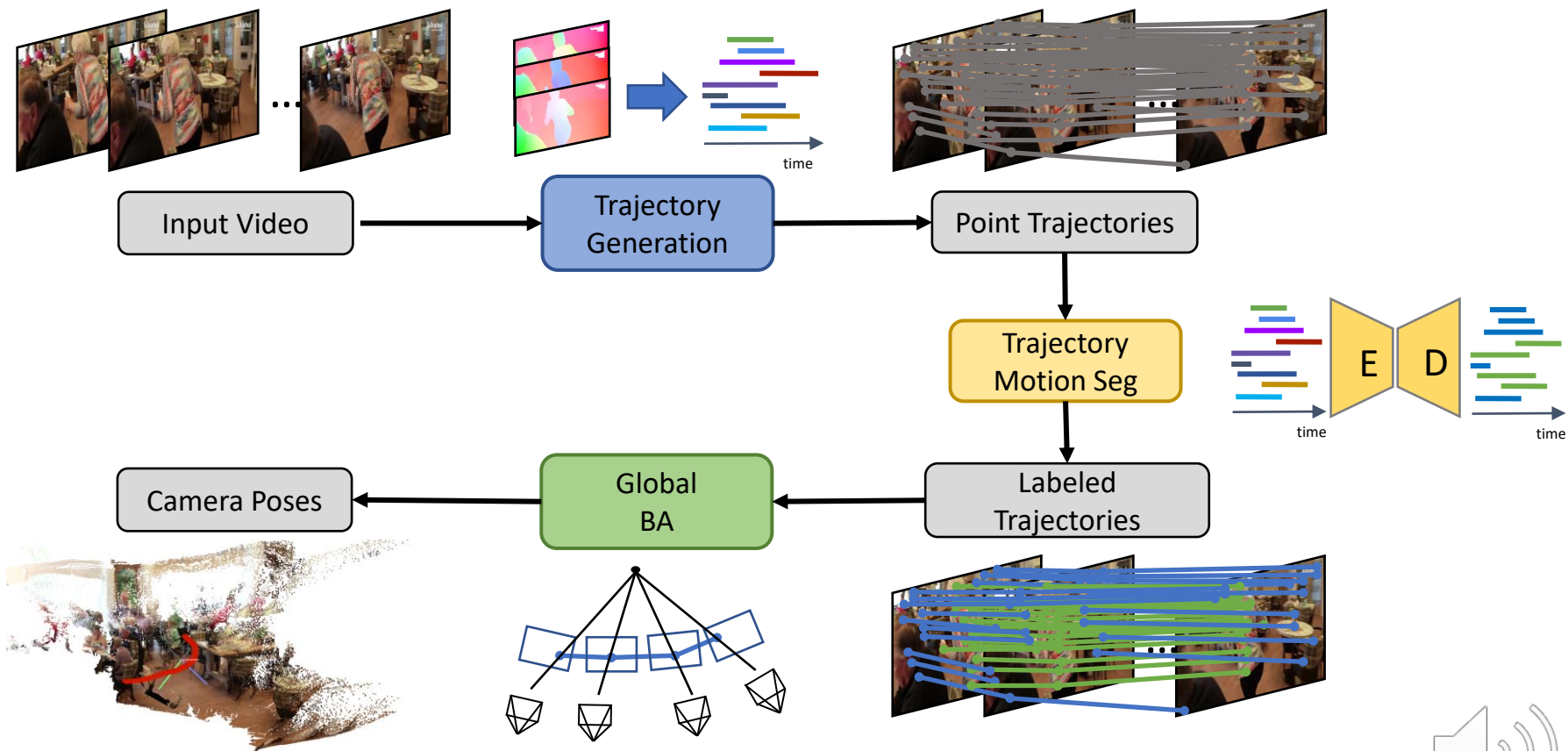
# Trajectory-based Motion Segmentation



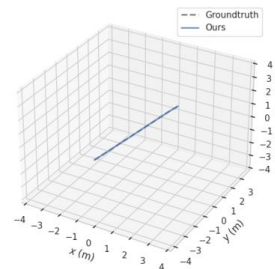
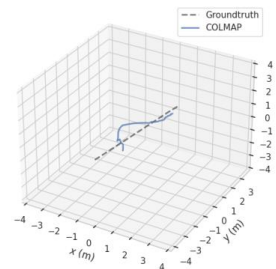
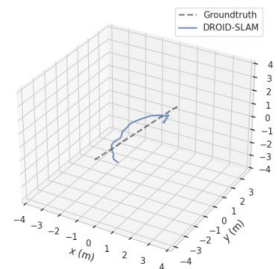
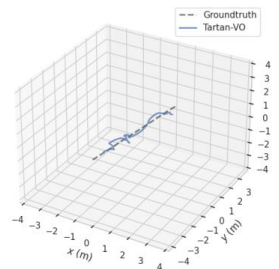
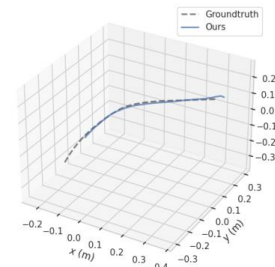
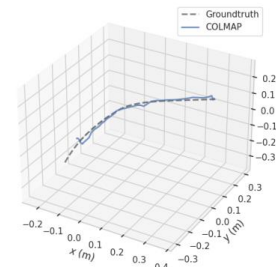
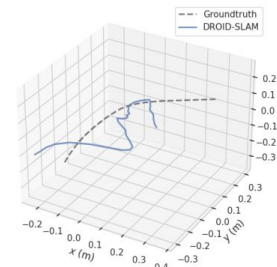
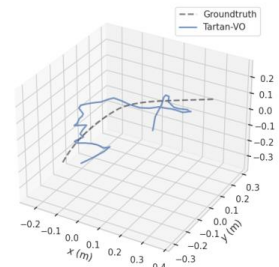
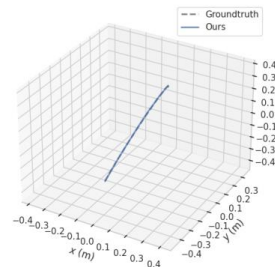
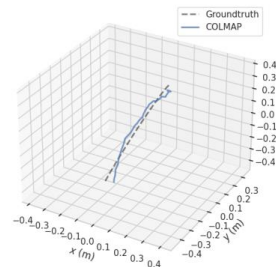
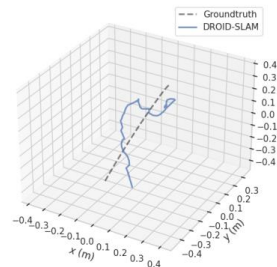
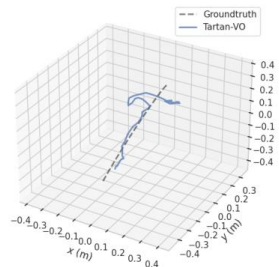
He et al., Mask R-CNN, ICCV 2017

Zhou et al., Motion-attentive Transition for Zero-shot Video Object Segmentation, AAAI 2020





# Evaluation – Sintel dataset



Sample frames

Tartan-VO

DROID-SLAM

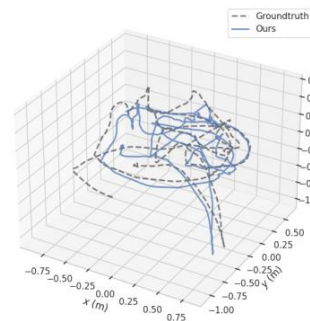
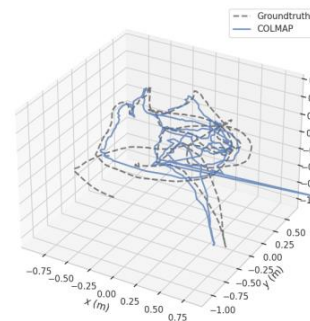
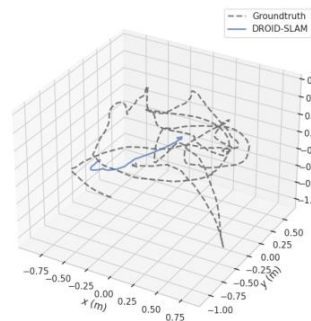
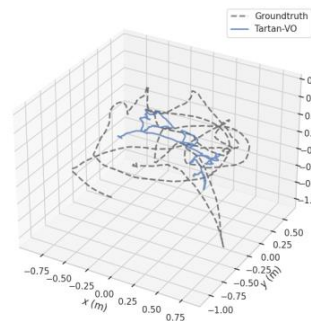
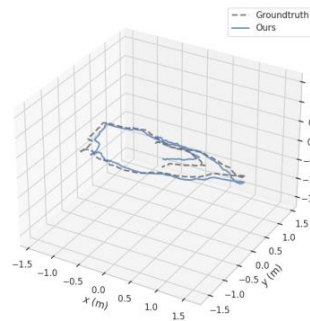
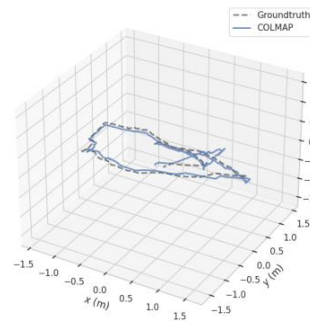
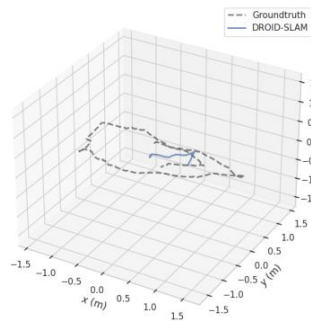
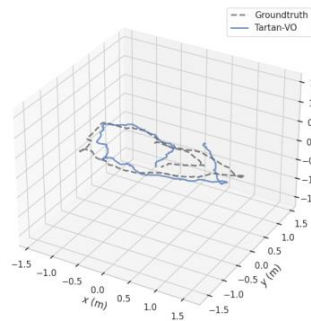
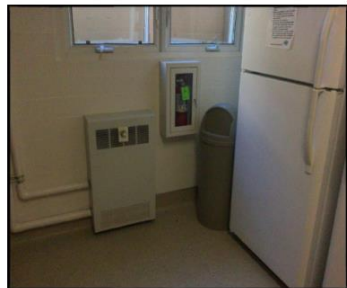
COLMAP

Ours





# Evaluation – ScanNet dataset

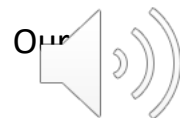


Sample frames

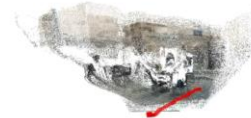
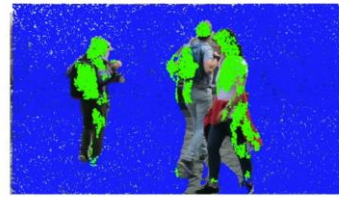
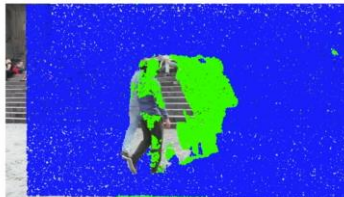
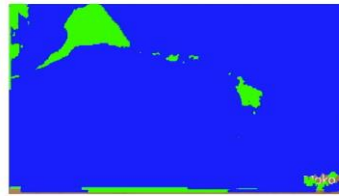
Tartan-VO

DROID-SLAM

COLMAP



# Evaluation – In-the-wild sequences





# ParticleSfM: Exploiting Dense Point Trajectories for Localizing Moving Cameras in the Wild

Code and more results at

<http://b1ueber2y.me/projects/ParticleSfM>

