1. Problem and Contributions

Problem
- Most mapping systems assume the environment is static or treat dynamic entities as noise.
- Dense mapping typically requires large amounts of GPU memory.

Contributions
- Online dense mapping system that reconstructs:
  - Environment map
  - Moving objects
  - Potentially moving objects
- Performs low-overhead map pruning to significantly reduce memory footprint.
- Scales to large environments, such as entire neighborhoods.

2. Method

3. Results

- Evaluation performed on the KITTI dataset.
- Use LiDAR as depth ground truth.
- Compare two depth from stereo methods:
- We also show that map pruning can substantially reduce memory usage with only a small loss in map quality.

Additional Information
- Supplementary results as well as the video and source code are available on the project website: andrei-barsan.github.io/dynslam
- The experiments use both ELAS and DispNet to compute depth from stereo because they leverage very different approaches: ELAS is geometry-focused, and DispNet is learning-focused.
- The visual odometry and the sparse scene flow are computed using DAVIS2.
- The semantic instance segmentation is computed using the multi-task network cascade (MTC) architecture.
- Directions for future work include:
  - Improver speed
  - Global consistency (loop closures)
  - More robust vehicle tracking in 3D

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