BundleSDF (2023)

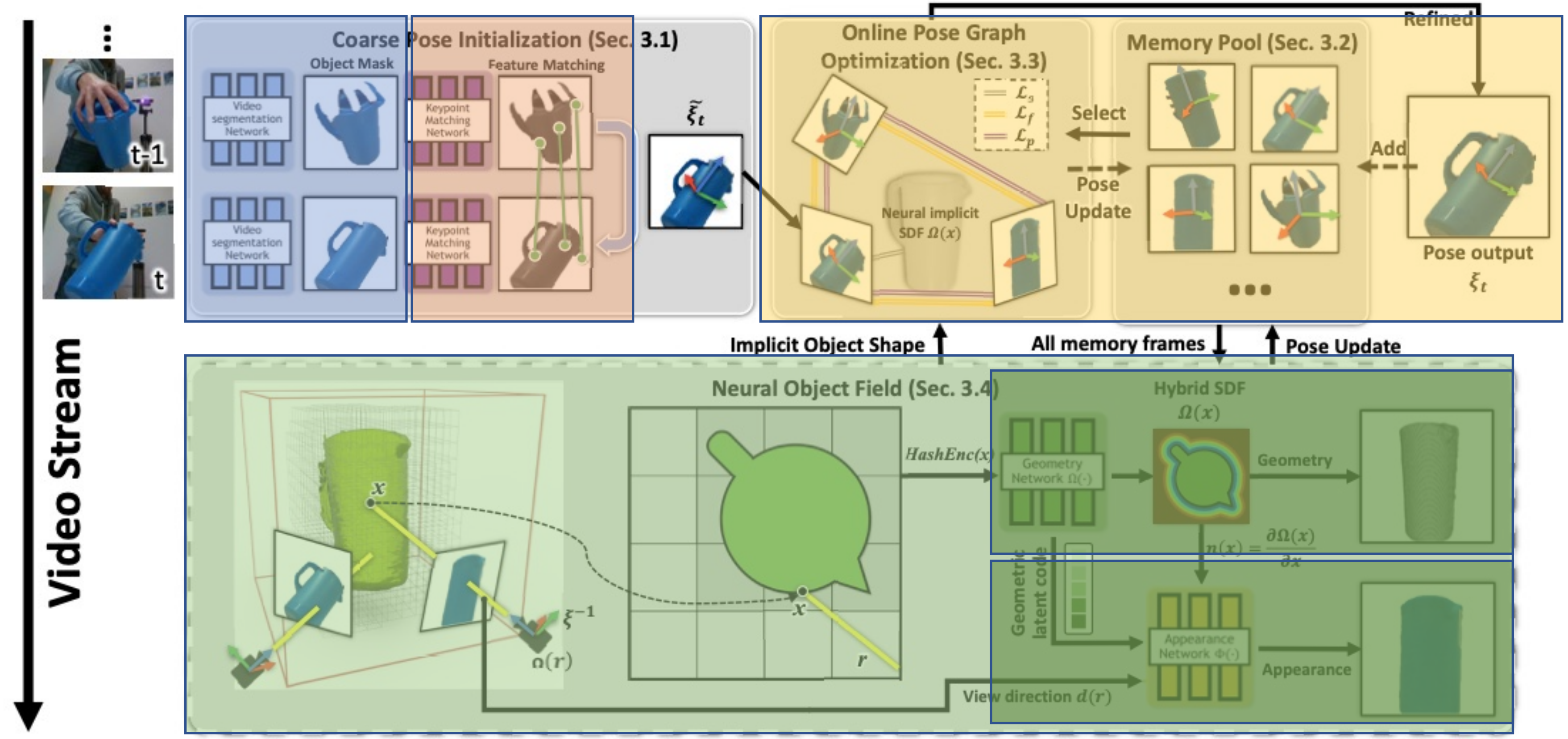


Figure 2. Framework overview. First, features are matched between consecutive segmented images, to obtain a coarse pose estimate (Sec. 3.1). Some of these posed frames are stored in a memory pool, to be used and refined later (Sec. 3.2). A pose graph is dynamically created from a subset of the memory pool (Sec. 3.3); online optimization refines all the poses in the graph jointly with the current pose. These updated poses are then stored back in the memory pool. Finally, all the posed frames in the memory pool are used to learn a Neural Object Field (in a separate thread) that models both geometry and visual texture (Sec. 3.4) of the object, while adjusting their previously estimated poses.

BundleSDF (2023)

- Code runs!
- Milk film: CUDA out of memory
  - 7.79 GB total capacity; 2.63 GB already allocated; 219 MB free; 3.31 GB reserved in total by PyTorch
- HO3D dataset: Unable to find a valid cuDNN algorithm to run convolution

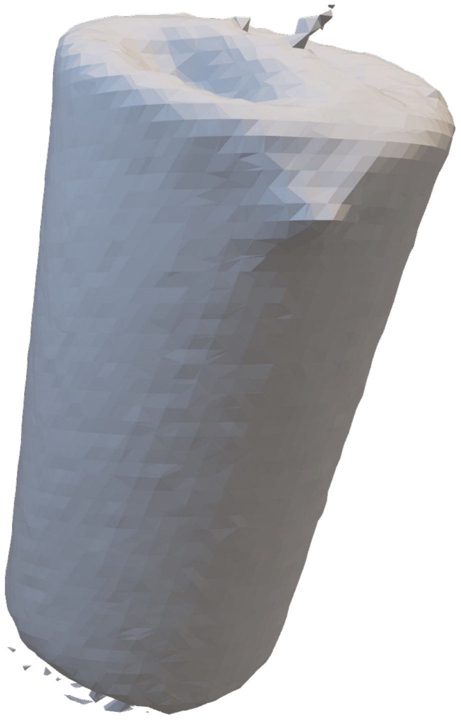
BundleSDF (2023)

- Code runs!
- Milk film: C
  - 7.79 GB … 1 GB
    reserve
- HO3D dat … n
  convolutio

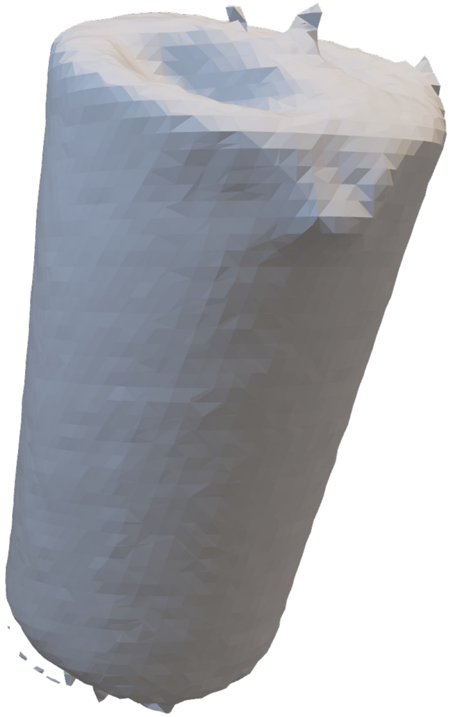
No more out of memory issues!

- Batch size from 64 to 1
- Training iteration steps from 500 to 300
- Reduce number of keyframes
  - Coinflip to take or discard keyframe
  - Change the minimal required rotation from precedent keyframes from 5° to 10°

BundleSDF (2023)



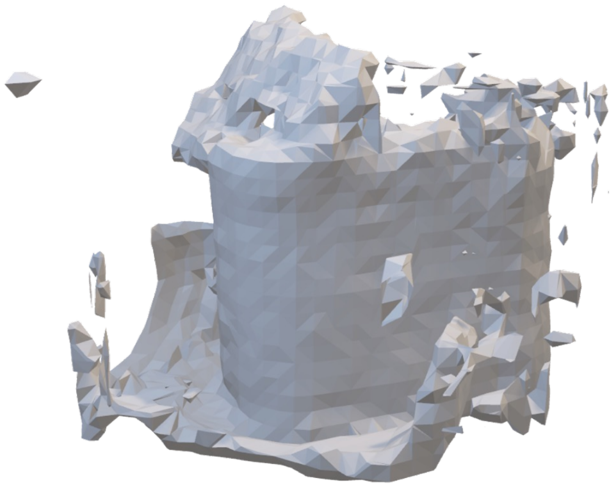
Default
190 keyframes



10°deg
90 keyframes

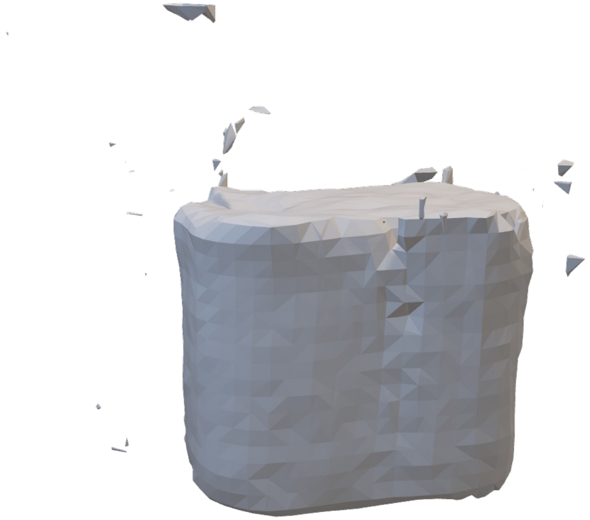
10°deg + cutoff
76 keyframes

BundleSDF (2023)



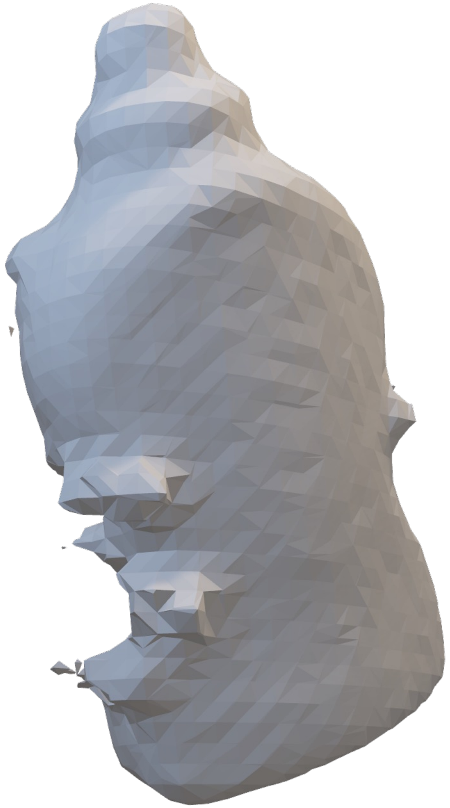
default

10°deg

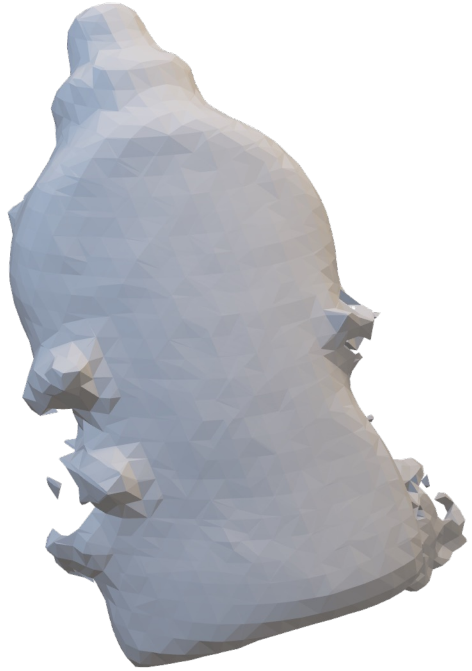


10°deg + cutoff

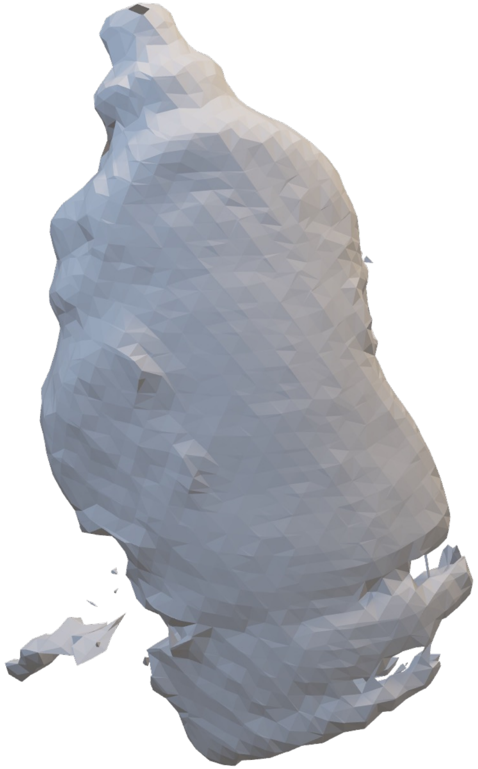
BundleSDF (2023)



default



10°deg



10°deg + cutoff

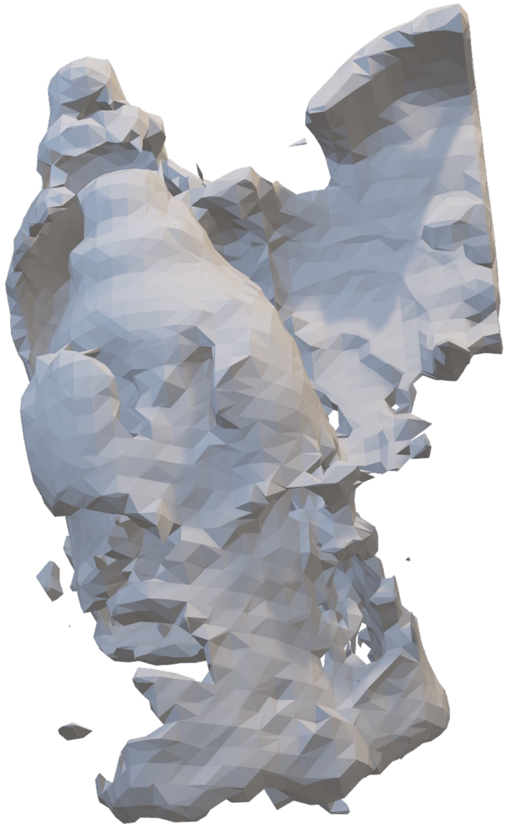
BundleSDF (2023)

10°deg + cutoff version

1st estimation, 5 keyframes

30 keyframes

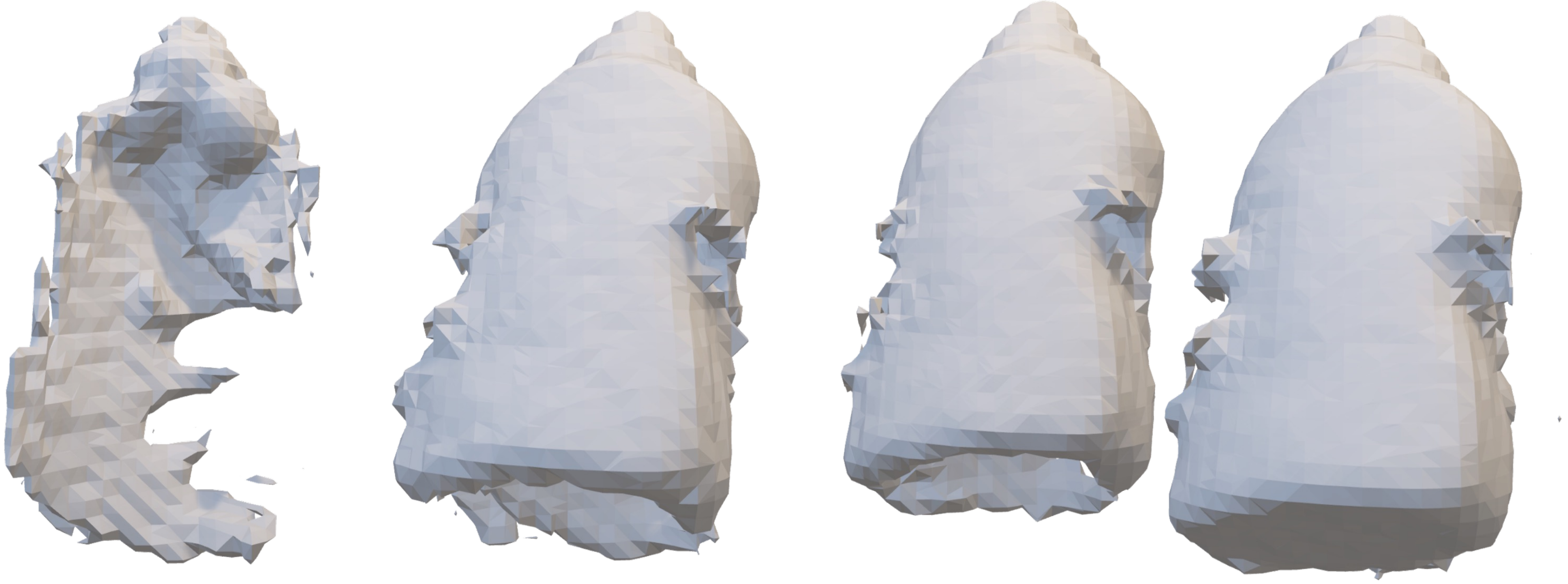
55 keyframes



85 keyframes

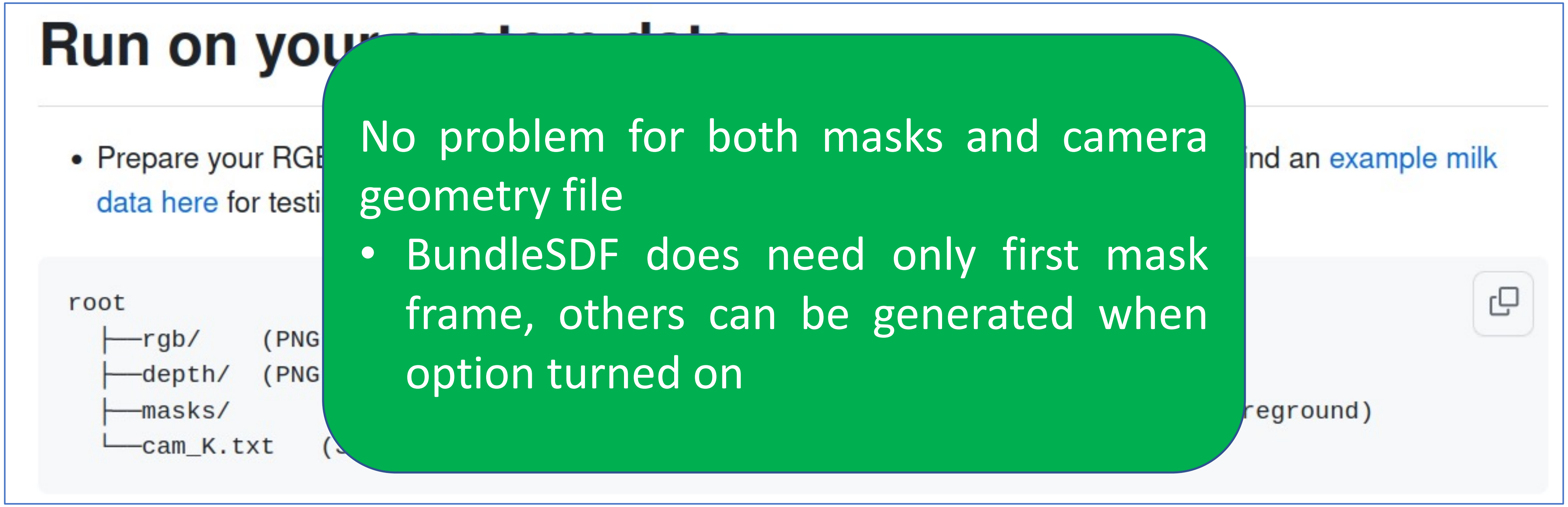
BundleSDF (2023)

10°deg version



1st estimation, 5 keyframes | 45 keyframes | 85 keyframes | 120 keyframes

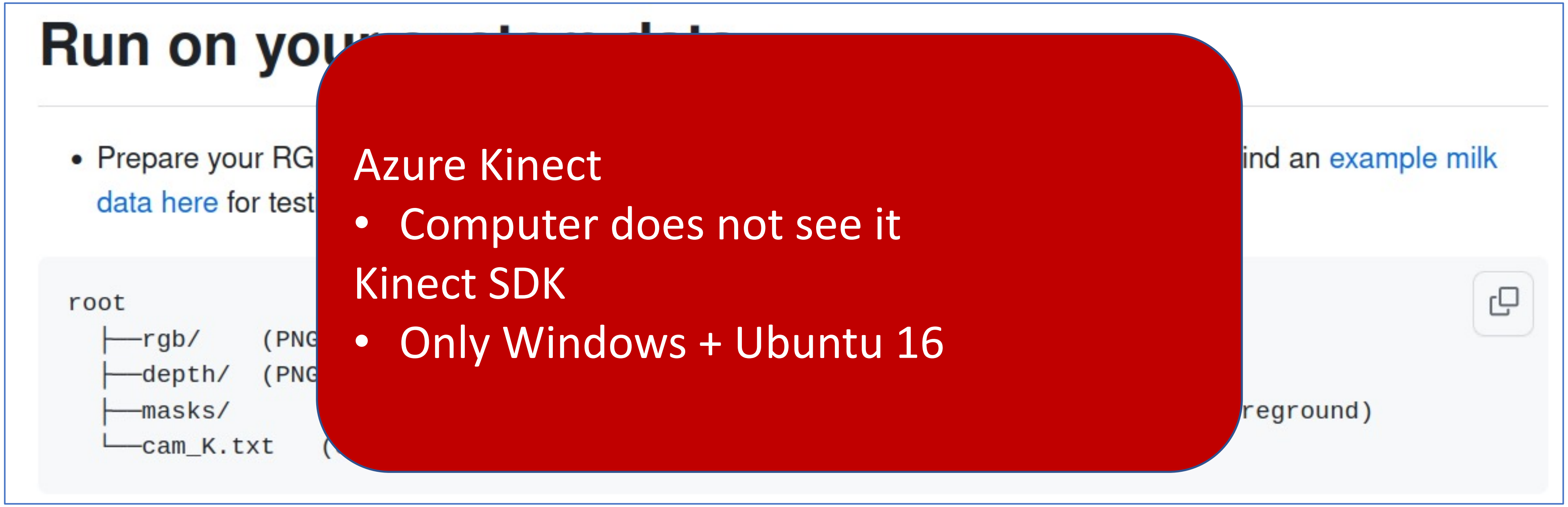
DATASETS



No problem for both masks and camera geometry file

- BundleSDF does need only first mask frame, others can be generated when option turned on

DATASETS



Azure Kinect
- Computer does not see it

Kinect SDK
- Only Windows + Ubuntu 16