Weekly Report #4

Group Nr. 9

1 Weekly Progress

Accomplished tasks:

- Ihsan Berkan, Balaban: Moved volumetric fusion to CUDA. Visualized the TSDF volume using matlab isosurface funcionality.
- Dominic, Ebner: CUDA-heavy ICP, profiling and mipmapping
- Lukas, Schneidt: Started implementation of raycasting.
- Muhammad, Faizan: Completed CUDA implementation of correspondence finding and also linear system solution on cpu. Integrated the Cuda Volumetric Grid in the main pipeline.
- Everyone: Team Discussion on progress, planning and dividing tasks
- Overall Progress: We have 4 componenets in our project: Surface measurement, Pose estimation, Volumetric Fusion, and Ray Casting. We have completed implementation of first three components and we are optimizing their performance now. We have now started implementing Ray-Casting this week. One we have the basic pipeline, we will also take a look at 3 pyramids levels and how to visualize the final output.

2 Problems

- Performance
- Drift in Frame-to-Frame-ICP
- Vizualization

3 Results

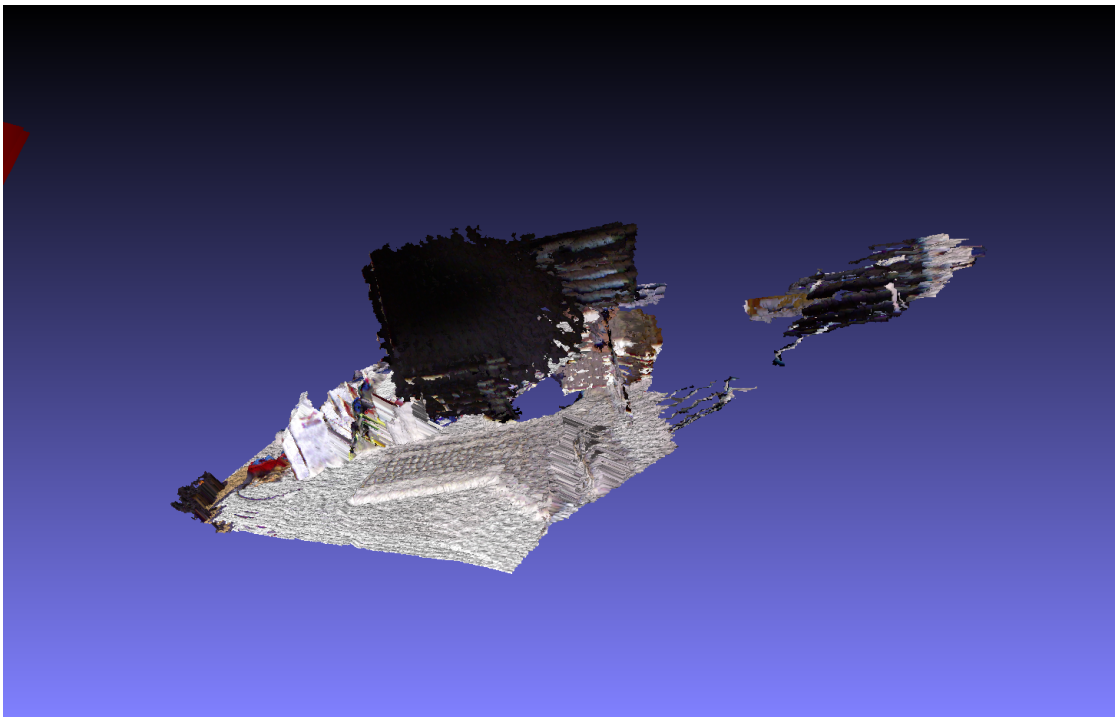

Figure 1: Mesh produced from frame-to-frame ICP for 10 frames of TUM RGB-D dataset

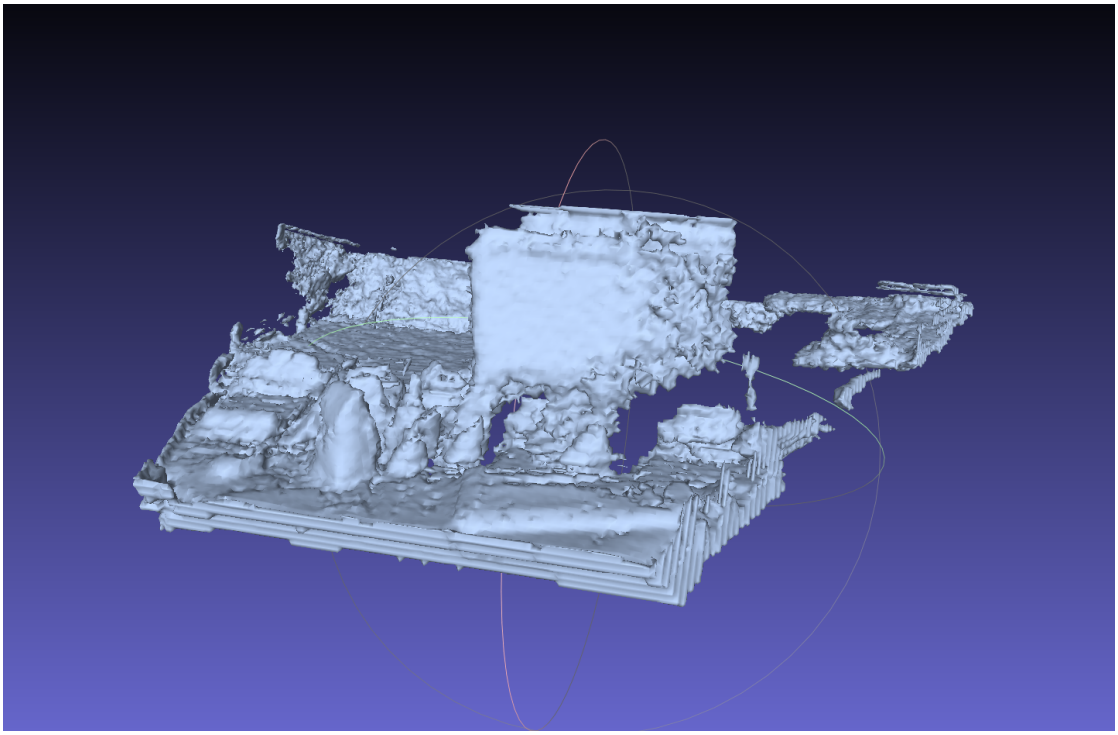

Figure 2: Point cloud produced from Volumetric Fusion after 10 frames of TUM RGB-D dataset

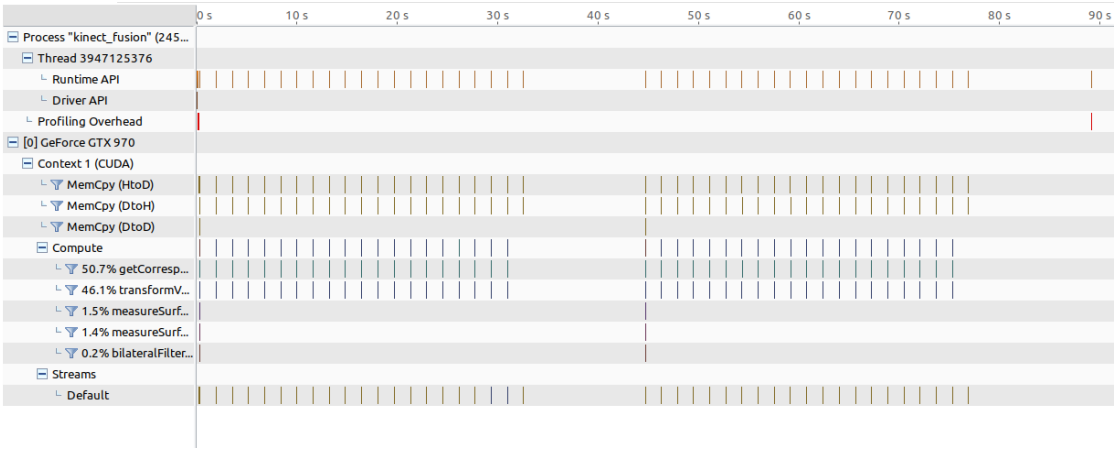

Figure 3: Profiling results for CPU-heavy ICP

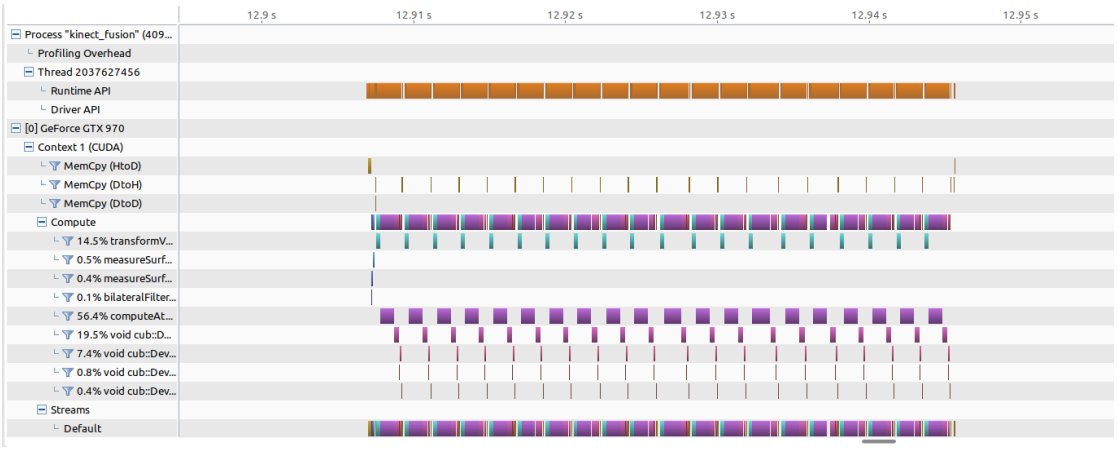

Figure 4: Profiling results for GPU-heavy ICP

4 Plan

- Finish Raycasting.
- Completing basic pipeline.
- Performance optimization.