Auto Splats: Dynamic Point Cloud Visualization on the GPU

Author:

Reinhold Preiner, Stefan Jeschke, and Michael Wimmer

DOI: 10.2312/EGPGV/EGPGV12/139-148

Abstract:

Capturing real-world objects with laser-scanning technology has become an everyday task. Recently, the acquisition of dynamic scenes at interactive frame rates has become feasible. A high-quality visualization of the resulting point cloud stream would require a per-frame reconstruction of object surfaces. Unfortunately, reconstruction computations are still too time-consuming to be applied interactively. In this paper we present a local surface reconstruction and visualization technique that provides interactive feedback for reasonably sized point clouds, while achieving high image quality. Our method is performed entirely on the GPU and in screen space, exploiting the efficiency of the common rasterization pipeline. The approach is very general, as no assumption is made about point connectivity or sampling density. This naturally allows combining the outputs of multiple scanners in a single visualization, which is useful for many virtual and augmented reality applications.

Categories and Subject Descriptors (according to ACM CCS): I.3.3 [Computer Graphics]: Picture/Image Generation-Display algorithms I.4.1 [Image Processing an Computer Vision]: Digitization and Image Capture- Imaging geometry