

Gain compensation across LIDAR scans

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High-end Terrestrial Lidar Scanners are often equipped with RGB cameras that are used to colorize the point samples. Some of these scanners produce panoramic HDR images by encompassing the information of multiple pictures with different exposures. Unfortunately, exported RGB color values are not in an absolute color space, and thus point samples with similar reflectivity values might exhibit strong color differences depending on the scan the sample comes from. These color differences produce severe visual artifacts if, as usual, multiple point clouds colorized independently are combined into a single point cloud. In this paper

we propose an automatic algorithm to minimize color differences among a collection of registered scans. The basic idea is to find correspondences between pairs of scans, i.e. surface patches that have been captured by both scans. If the patches meet certain requirements, their colors should match in both scans. We build a graph from such pair-wise correspondences, and solve for the gain compensation factors that better uniformize color across scans. The resulting panoramas can be used to colorize the point clouds consistently. We discuss the characterization of good candidate matches, and how to find such correspondences directly on the panorama images instead of in 3D space. We have tested this approach to uniformize color across scans acquired with a Leica RTC360 scanner, with very good results.