Neural Colorization of Laser Scans

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Laser scanners enable the digitization of 3D surfaces by generating a point cloud where each point sample includes an intensity (infrared reflectivity) value. Some LiDAR scanners also incorporate cameras to capture the color of the surfaces visible from the scanner location. Getting usable colors everywhere across 360 scans is a challenging task, especially for indoor scenes. LiDAR scanners lack flashes, and placing proper light sources for a 360 indoor scene is either unfeasible or undesirable. As a result, color data from LiDAR scans often do not have an adequate quality, either because of poor exposition (too bright or too dark areas) or because of severe illumination changes between scans (e.g., direct sunlight vs. cloudy lighting). In this paper, we present a new method to recover plausible color data from the infrared data available in LiDAR scans. The main idea is to train a adapted image-to-image translation network using color and intensity values on well-exposed areas of scans. At inference time, the network is able to recover plausible color using exclusively the intensity values. The immediate application of our approach is the selective colorization of LiDAR data in those scans or regions with missing or poor color data.

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