

Robust Pixel Classification Algorithm for Structured Light with Binary Patterns

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In structured light systems which use binary patterns, determining whether a pixel is illuminated or not is essential for decoding the structured light code patterns. In this paper, we introduce a robust, efficient, and easy to implement pixel classification algorithm for this purpose. Our method uses the results of the direct and global components separation proposed by Nayar et al. [2]. The direct and global components of a scene lit by all projector pixels are used to determine the up and lower bounds of the possible intensity values of an illuminated pixel and an un-illuminated one. Based on these two intervals, our method quickly classifies a pixel by determining whether its intensity is within one range and not in the other. Experiments show that our method produces dense decoded pixels, and is also robust against strong indirect lighting effects in complex scenes. Since the direct and global separation can be done using part of the structured light patterns, our algorithm can be easily applied to previous captured data.