

A Comparative Assessment Method For Map Alignment Techniques

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Abstract : In the era of autonomous robot mapping, assessing the goodness of the generated maps is important, and is usually performed by aligning them to ground truth. Map alignment is difficult for two reasons: first, the query maps can be significantly distorted from ground truth, and second, establishing what constitutes ground truth for different settings is challenging. Most map alignment techniques to this date have addressed the first problem, while paying too little importance to the second. In this paper, we propose a benchmark dataset, which consists of synthetically transformed maps with their corresponding displacement fields. Furthermore, we propose a new system for comparison, where the displacement field of any map alignment technique can be computed and compared to the ground truth using statistical measures. The local information in displacement fields renders the evaluation system applicable to any alignment technique, whether it is linear or not. In our experiments, the proposed method was applied to different alignment methods from the literature, allowing for a comparative assessment between them all.

Keywords : assessment methods, benchmark, image deformation, map alignment, robot mapping, robot motion

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