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Dimension Free Rigid Point Set Registration in Linear Time

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Abstract : This paper proposes a rigid point set matching algorithm in arbitrary dimensions based on the idea of symmetric covariant function. A group of functions of the points in the set are formulated using rigid invariants. Each of these functions computes a pair of correspondence from the given point set. Then the computed correspondences are used to recover the unknown rigid transform parameters. Each computed point can be geometrically interpreted as the weighted mean center of the point set. The algorithm is compact, fast, and dimension free without any optimization process. It either computes the desired transform for noiseless data in linear time, or fails quickly in exceptional cases. Experimental results for synthetic data and 2D/3D real data are provided, which demonstrate potential applications of the algorithm to a wide range of problems.

Keywords : covariant point, point matching, dimension free, rigid registration
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