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Review

Recent developments and trends in point set registration methods ☆

Baraka Maiseli ^{a, b} ✉, Yanfeng Gu ^a, Huijun Gao ^c

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Highlights

- The problem of registering point sets has been formulated.
- Recent developments and trends in point set registration (PSR) methods have been extensively discussed.
- Limitations of PSR methods have been exposed and some possible solutions recommended.
- Performance evaluation framework for PSR methods has been established.
- Challenging issues to evaluate PSR algorithms have been discussed.

Abstract

Point set registration (PSR) is the process of computing a spatial transformation that optimally aligns pairs of point sets. The method helps to amalgamate multiple datasets into a common coordinate system. Because of their immense practical applications, several studies have attempted to address challenges inherent in the PSR problem. However, limited works exist to discuss recent developments, failures, and trends of the PSR methods. To date, a classical work of Tam et al., published in 2013, can be regarded as a comprehensive review paper for registration methods. Nevertheless, this work has inadequately revealed a range of possible knowledge gaps of the previous studies. Additionally, since the publication year of their work, more superior and state-of-the-art methods have been proposed. The present study surveys PSR approaches until 2017, and our primary focus is to expose central ideas and limitations of the methods to facilitate experts and practitioners advance the field.

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Keywords

Point matching; Registration; Performance; Optimization; Point set

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