論　文　要　旨
Thesis Abstract

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主論文題名　（Title）
Adaptive Differential Evolution Methods on 3D Range Image Registration and Object Tracking

内容の要旨　（Abstract）

Robots have gained its popularity in many areas from industrial, household to medical applications. To perform their tasks efficiently, they must be equipped with ability of localizing themselves in the environment and determining handling objects' positions. Those remains the most challenging problems for the computer vision and robotics researchers.

The thesis presents efforts of continuing applying recent advanced natural inspired optimization methods in general and adaptive differential evolution methods in particular for above tasks. It contributes to the research area in the important way of proposing new pipelines for applying the optimization algorithms into 3D Range Image Registration. It also proves the effectiveness of those optimization algorithms in applying for object tracking problem with 2D cameras.

The proposed methods presented in this thesis have been fully implemented and empirically evaluated. The first demonstration related to registering different 3D scenes to archive the transformation matrix of camera movement. The fast, accurate, and robust results show that the proposed algorithms significantly improves on the registration problem over state-of-the-art algorithms. The second demonstration presents the model-based tracking system for textureless objects by using 2D camera. Experiment results show the ability of the methods in solving object detection and tracking problems.

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