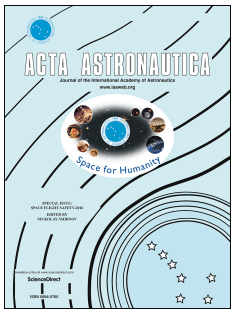
Accepted Manuscript



Non-cooperative spacecraft pose tracking based on point cloud feature

Ying He, Bin Liang, Jin He, Shunzhi Li

PII: S0094-5765(17)30487-3

DOI: 10.1016/j.actaastro.2017.06.021

Reference: AA 6356

To appear in: *Acta Astronautica*

Received Date: 1 April 2017

Revised Date: 9 May 2017

Accepted Date: 20 June 2017

Please cite this article as: Y. He, B. Liang, J. He, S. Li, Non-cooperative spacecraft pose tracking based on point cloud feature, *Acta Astronautica* (2017), doi: 10.1016/j.actaastro.2017.06.021.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Non-cooperative spacecraft pose tracking based on point cloud feature

Ying He[a,*], Bin Liang[a,b], Jin He[b], Shunzhi Li[c]

[a] *Harbin Institute of Technology, Shenzhen Graduate School, Nanshan District, Shenzhen, China, 518055*
[b] *Tsinghua University, Department of Automation, Haidian District, Beijing, China, 100084*
[c] *Tsinghua University, Shenzhen Graduate School, Nanshan District, Shenzhen, China, 518055*

Abstract

On-orbit services have been paid more and more attention for its role in spacecraft life-extension, capacity improvement and on-orbit debris removal. As most of on-orbit targets are non-cooperative, relatively accurate pose measurement is very essential for subsequent operations. However, with the rapid development of TriDAR, flash LIDAR and other laser scanning equipment in non-cooperative target measurement, it becomes more imperative to research methods for non-cooperative target pose tracking based on 3D point cloud feature. In this paper, a method for non-cooperative target pose tracking based on point cloud feature is proposed. Firstly, the target is identified using curvature, normal, density and other geometric features of the point cloud. Then the particle filter algorithm is used to recognize the position and orientation of the target being tracked by calculating the similarity of the point cloud features of two adjacent frames. Experimental results showed that the proposed method could effectively identify the features of non-cooperative targets and track their position and attitude.

Keywords: non-cooperative target, pose tracking, particle filter

*Ying He, E-mail: heying@hitsz.edu.cn

Download English Version:

https://daneshyari.com/en/article/5472263

Download Persian Version:

https://daneshyari.com/article/5472263

Daneshyari.com