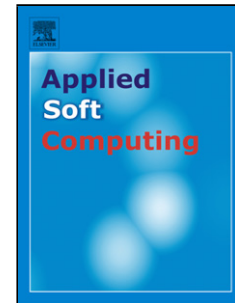


Accepted Manuscript

Title: Semi-supervised 3D Object Recognition through CNN Labeling

Author: José Carlos Rangel Jesus Martínez-Gómez Cristina Romero-González Ismael García-Varea Miguel Cazorla



PII: S1568-4946(18)30055-3
DOI: <https://doi.org/doi:10.1016/j.asoc.2018.02.005>
Reference: ASOC 4696

To appear in: *Applied Soft Computing*

Received date: 24-5-2017
Revised date: 15-1-2018
Accepted date: 2-2-2018

Please cite this article as: José Carlos Rangel, Jesus Martínez-Gómez, Cristina Romero-González, Ismael García-Varea, Miguel Cazorla, Semi-supervised 3D Object Recognition through CNN Labeling, *Applied Soft Computing Journal* (2018), <https://doi.org/10.1016/j.asoc.2018.02.005>

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.

Semi-supervised 3D Object Recognition through CNN Labeling

José Carlos Rangel^{a,c,*}, Jesus Martínez-Gómez^b, Cristina Romero-González^b, Ismael García-Varea^b, Miguel Cazorla^a

^a*Institute for Computer Research, University of Alicante., P.O. Box 99. 03080, Alicante, Spain.*

^b*Computer Systems Department, University of Castilla-La Mancha, Spain.*

^c*RobotSIS, Universidad Tecnológica de Panamá, Panamá.*

Abstract

Despite the outstanding results of Convolutional Neural Networks (CNNs) in object recognition and classification, there are still some open problems to address when applying these solutions to real-world problems. Specifically, CNNs struggle to generalize under challenging scenarios, like recognizing the variability and heterogeneity of the instances of elements belonging to the same category. Some of these difficulties are directly related to the input information, 2D-based methods still show a lack of robustness against strong lighting variations, for example. In this paper, we propose to merge techniques using both 2D and 3D information to overcome these problems. Specifically, we take advantage of the spatial information in the 3D data to segment objects in the image and build an object classifier, and the classification capabilities of CNNs to semi-supervisedly label each object image for training. As the experimental results demonstrate, our model can successfully generalize for categories with high intra-class variability and outperform the accuracy of a well-known CNN model.

Keywords: Object Recognition, Deep Learning, Object Labeling, Machine Learning

*Corresponding author

Email address: jcrangel@dccia.ua.es (José Carlos Rangel)

Download English Version:

<https://daneshyari.com/en/article/6904077>

Download Persian Version:

<https://daneshyari.com/article/6904077>

[Daneshyari.com](https://daneshyari.com)