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# Big Visual Data Analysis

## Scene Classification and Geometric Labeling

Springer

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ISSN 2191-8112 ISSN 2191-8120 (electronic)
SpringerBriefs in Electrical and Computer Engineering
ISSN 2196-4076 ISSN 2196-4084 (electronic)
SpringerBriefs in Signal Processing
ISBN 978-981-10-0629-6 ISBN 978-981-10-0631-9 (eBook)
DOI 10.1007/978-981-10-0631-9

Library of Congress Control Number: 2016932343



Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer Science+Business Media Singapore Pte Ltd.

*Dedicated to my wife and my parents, for their love and endless support*

—Chen Chen

*Dedicated to my parents for their endless love and encouragement*

—Yuzhuo Ren

*Dedicated to my wife for her long-term understanding and support*

—C.-C. Jay Kuo

# Preface

Scene understanding is a key issue in computer vision, which recognizes scene image semantic contents and their corresponding contexts. As one of the most challenging scene understanding problems, scene classification considers the semantic concepts in a scene image and classifies scene images into their associated scene categories. Meanwhile, geometric labeling focuses on the scene layouts, where image pixels are labeled and grouped into different geometrically functional classes. It is also an essential step before any further scene understanding tasks such as recognition, annotation, and retrieval, and its results affect the performance of these applications significantly. With rapidly increasing visual data in volume, variety and velocity, traditional approaches toward solutions of the two problems are not adequate in addressing the new challenges. In this brief, we attempt to provide more accurate and scalable solutions for several scene classification and geometric labeling problems: indoor/outdoor classification, outdoor scene classification, and scene layout estimation. This brief will first give an overview on the state-of-the-art algorithms for each problem. Then, it will introduce several techniques for corresponding solutions. They are Expert Decisions Fusion (EDF), Coarse Semantic Segmentation (CSS) and Global-attributes Assisted Labeling (GAL). Extensive experimental results with comparative analysis will be provided for each approaches. Finally, we will conclude and highlight the contributions of these approaches to big visual data analysis.

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