

Preface

Human action analysis plays a critical role in human-centered computing, as in many applications we require to analyze and understand human actions in the big video data, such as video surveillance, health care, and human–computer interaction. In this book, we focus on the human action analysis techniques based on randomized trees, which can handle the complexity and variations of human actions, and also provide efficient action analysis in large-scale video data. It covers both supervised and unsupervised randomized trees. When there are sufficient amount of labeled data available, supervised randomized trees provide a fast method for spacetime interest point matching. When the amount of labeled data is limited such as in example-based action search, unsupervised randomized trees can be used to leverage the unlabeled data. The goal of this book is to provide a comprehensive overview of the supervised and unsupervised randomized trees and their applications to four different tasks in human action analysis: action classification, action detection, action search, and action prediction. For students who are interested in human action analysis or randomized trees, this book provides a good guide to quickly bring the students to the research front. For researchers who have been working in this area, we hope this book provides a useful reference.

We start with a brief review of previous work on the four tasks of applications of human action analysis. Chapter 2 describes supervised randomized trees which improve both the matching accuracy and the spacetime search efficiency. Chapter 3 presents unsupervised randomized trees which are suitable for exemplar-based action search where the amount of labeled data is extremely small. Chapter 4 introduces a propagative Hough voting technique that leverages spatiotemporal contextual information in addition to the unlabeled data. Action prediction is described in Chap. 5. Finally we conclude in Chap. 6.

Human Action Analysis with Randomized Trees

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2015, VIII, 83 p. 30 illus. in color., Softcover

ISBN: 978-981-287-166-4