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Cross-View Action Recognition by Cross-domain Learning

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Abstract

This paper proposes a novel cross-view human action recognition method by discovering and sharing common knowledge among different video sets captured in multiple viewpoints. To our knowledge, we are the first to treat a specific view as target domain and the others as source domains and consequently formulate the cross-view action recognition into the cross-domain learning framework. First, the classic bag-of-visual word framework is implemented for visual feature extraction in individual viewpoints. Then, we add two transformation matrices in order to transform original action feature from different views into one common feature space, and also combine the original feature and the transformation feature to proposed the new feature mapping function for target and auxiliary domains respectively. Finally, we proposed a new method to learn the two transformation matrices in model training step based on the standard SVM solver and generate the final classifier for each human action. Extensive experiments are implemented on IXMAS, the popular cross-view action dataset, and TJU dataset recorded by ourself in one closed environment. The experimental results demonstrate that the proposed method can consistently outperform the state-of-the-arts.

Keywords: Cross-domain, Human action recognition, Action classifier,

1. Introduction

Human action recognition has attracted increasing attention from both research and industry communities in recent years. It plays an important role in video surveillance, abnormal event system, human machine interaction. Many methods have been proposed in recent years [1][2][3][4][5]. Laptev