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Abstract

Micro-expression analysis is an interesting and challenging task in computer vision. It has inspired a series of possible applications in many areas such as police-criminal interrogation and important business negotiation. One of the most crucial step in a micro-expression recognition system is the extraction of well discriminating features. In this paper, we propose a new feature based on the fusion of motion boundary histograms (FMBH). This feature is generated by combining both the horizontal and the vertical components of the differential of optical flow as inspired from the motion boundary histograms (MBH). The proposed feature is then validated and evaluated through the leave-one-subject-out (LOSO) protocol for micro-expression recognition. Moreover, the proposed method is compared to state-of-the-art methods on four well-known databases CASME, CASME II, SMIC and CAS(ME)². Comparative experimental results demonstrate that the proposed FMBH feature descriptor yields promising performance.

Keywords: micro-expression recognition, optical flow, HOF, MBH and FMBH

1. Introduction

This paper deals with the problem of automatically recognizing micro-expressions, which has attracted considerable efforts [26, 29, 25, 40, 33, 36, 28, 23, 42, 12, 21, 19, 41, 16]. A typical micro-expression involves a rapid change in parts of the face which lasts less than a half of second. This characteristic property leads to a reliable reflection of the emotions and the intentions of human being since people cannot control the micro-expressions voluntarily. Thus, the micro-expression recognition can be widely applied in security, medical and business areas applications such as catching mal-intention in airport [38], perception of psychiatric patients' distortion, and effective negotiations in business conversation [2].

Effective facial features play a crucial role for micro-expression recognition. These features can be roughly divided into two categories: appearance-based

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