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A scene-adaptive motion detection model based on machine learning and data clustering

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Abstract Due to its wide applications and importance in computer vision, motion detection has been receiving considerable attention from industry and academy. However, previous motion detection algorithms fail to achieve the flexibility and accuracy simultaneously for good detection results. In the present work, a scene-adaptive motion detection model based on machine learning and clustering technology is proposed. This model begins with training to the system by a group of testing images, in terms of various accurate parameters of one certain scene. Significant modifications have been reserved in the same area during motion detection, which are considered as a change clustering. Then, the model takes advantage of clustering technology to generate a minimum spanning tree (MST), which is one kind of average linkage clustering. The average shortest distance of the minimum spanning tree serves as a benchmark to identify the change in images. Finally the training parameters and detection algorithm are combined to monitor the scene. The clustering is introduced to this model during sample training, in order to obtain factors of higher quality followed by more accurate detection results. Finally, the experiment confirms the excellent adaptability and precision of the proposed motion detection model.

Keywords Motion detection · Clustering · Machine learning · Scene-adaptive

1 Introduction

Motion detection, as a fundamental and challenging issue in computer vision research area, has many important applications, e.g., video surveillance and medical diagnosis or treatment [23]. Haiwei Dong et al. [11] developed a moving object alarm system (MOAS) by laser to alert elderly people or workers to the fast moving objects behind them. Detection of moving objects is realized through categorization of the pixels in the video by sequencing either foreground (moving objects) or background (original image) [12]. C. Piciarelli and G. L. Foresti [22] attempted to semantically interpret video sequences as detecting anomalous,

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