Mixture of merged gaussian algorithm using RTDENN

M. Alvar, A. Rodriguez, A. Sánchez, A. Arranz

Abstract— Computer vision has been a widely developed research area in the last years, and it has been used for a broad range of applications, including surveillance systems. In the pursuit of an autonomous and smart motion detection system, a reliable segmentation algorithm is required. The main problems of present segmentation solutions are their high execution time and the lack of robustness against changes in the environment due to variations in lighting, shadows, occlusions or the movement of secondary objects. This paper proposes a new algorithm named
Mixture of Merged Gaussian Algorithm (MMGA) that aims to achieve a substantial improvement in execution speed to enable real time implementation, without compromising the reliability and accuracy of the segmentation. The MMGA is based on the combination of a probabilistic model for the background, similar to the Mixture of Gaussian Model (MGM), with the learning processes of Real Time Dynamic Ellipsoidal Neural Networks (RTDENN) for the update of the model. The proposed algorithm has been tested for different videos and compared to the
MGM and SDGM algorithms. Results show a reduction of 30% to 50% in execution times. Furthermore, the segmentation is more robust against the effect of noise and adapts faster to lighting changes.

Index Terms— Computer vision · video surveillance · object detection · image motion analysis · object segmentation · motion detection · mixture of Gaussian model · Real Time Dynamic Ellipsoidal neural network