A block-based multi-scale background extraction algorithm

ABSTRACT

Problem statement: To extract the moving objects, vision-based surveillance systems subtract the current image from a predefined background image. The efficiency of these systems mainly depends on accuracy of the extracted background image. It should be able to adapt to the changes continuously. In addition, especially in real-time applications the time complexity of this adaptation is a critical matter. Approach: In this study, to extract an adaptive background, a combination of blocking and multi-scale methods is presented. Because of being less sensitive to local movements, block-based techniques are proper to control the non-stationary objects movements, especially in outdoor applications. They can be useful to reduce the effect of these objects on the extracted background. We also used the blocking method to intelligently select the regions which the temporal filtering has to be applied on. In addition, an amended multi-scale algorithm is introduced. This algorithm is a hybrid algorithm, a combination of some nonparametric and parametric filters. It uses a nonparametric filter in the spatial domain to initiate two primary backgrounds. In continue two adapted two-dimensional filters will be used to extract the final background. Results: The qualitative and quantitative results of our experiments certify not only the quality of the final extracted background is acceptable, but also its time consumption is approximately half in compare to the similar methods. Conclusion: Using Multi scaling filtering and applying the filters just to some selected nonoverlapped blocks reduce the time consumption of the extracting background algorithm.