

Accurate classification of abandoned objects is crucial in video surveillance systems. In this paper, we experiment with different validation techniques (hold-out and 10-fold cross validation), with the aim of determining which feature set proves more useful for accurate object classification in a video surveillance context (scale invariant image transform (SIFT) keypoints vs. geometric primitive features). Moreover, we show how the resulting features affect classification performance across different classifiers. We also further analyze the best performing classifier in order to have better understanding of its classification results. Objects are classified into four different categories: bag (s), person (s), trolley (s), and group (s) of people. Our experimental results show that the highest recognition accuracy and the lowest false alarm rate are achieved by building a classifier based on our proposed set of statistics of geometric primitives' features. This set of features maximizes inter-class separation and simplifies the classification process. Classification based on this set of features thus outperforms the second best approach based on SIFT keypoint histograms by providing on average 22% higher recognition accuracy and 7% lower false alarm rate.