Recognition of Pedestrians and Vehicles Based on HOG and PCA

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Abstract

As one of the important fields in computer vision, object recognition has been paid more and more attention and widely used. With the development of society, the demand and importance of safety travel and intelligent transportation are increasing, while object recognition plays a great role in this field as well. This paper at first uses histogram oriented gradient operator (HOG) to extract features of pedestrians and vehicles from thermal video data. However, the calculation and classification efficiency are greatly influenced by the high number of HOG feature dimensions, thus the principle component analysis (PCA) algorithm is introduced in the method to project the original features into a new feature space so as to realize dimension reduction. At last, this paper uses support vector machine (SVM) to classify the objects accordingly achieve the purpose of identifying pedestrians and vehicles from the background. The first new idea of this method is using thermal data, which presents no RGB information but temperature information instead, and in result eliminates the influence of illumination. Secondly it uses PCA to get the principle features and rounds minor ones, thus greatly reduces the amount of computation and improve the computational efficiency.

Key word: thermal data, HOG, PCA, SVM

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