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Hybrid Support Vector Machines for Robust Object Tracking

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Abstract

Tracking-by-detection techniques always formulate tracking as a binary classification problem. However, in this formulation, there exists a potential issue that the boundary of the positive targets and the negative background samples is fuzzy, which may be an important factor causing drift. To address this problem, we propose a novel hybrid formulation for tracking based on binary classification, regression and one-class classification, which comprehensively represents the appearance from different perspectives. In particular, the proposed regression model is a novel formulation for tracking and plays an important role in solving the fuzzy boundary problem. Moreover, we present a new tracking approach with different support vector machines (SVMs) and a novel distribution-based collaboration strategy as a specific implementation. Experimental results demonstrate that our method is robust and can achieve the state-of-the-art performance.

Keywords: Object tracking, SVM, Binary classification, Regression, One-class classification

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