An assessment of the current state of background model evaluation and a proposal for a fair and comprehensive evaluation framework and methodology

By

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Background subtraction is a fundamental task in numerous computer vision applications. The primary aspect of this, the modelling and maintenance of a background image for a video sequence, is complicated by a large range of diverse challenges. An abundance of background modelling techniques have been developed but none of these is capable of competently dealing with all of the challenges with which they may be faced. To gain a full understanding of the capabilities of these background modelling techniques it is essential that their performance be comprehensively evaluated in many scenarios. To date, no extensive or comprehensive background model evaluations have been carried out, nor do the facilities for doing so exist. The efforts that have so far been made are inadequate and exhibit many weaknesses and limitations. This project examines these existing efforts and identifies both their deficiencies and the work that is necessary to address these deficiencies. In addition, a solution to the problem of background model evaluation in the form of a standard framework and methodology is proposed. This proposal aims to facilitate the thorough and objective assessment of background model performance in a manner that will allow for an extensive reference of performance data to easily be compiled. Without the adoption of such a solution, the comprehensive and extensive evaluation of background models cannot become a reality. A proof of concept version of the proposed system was developed and, through testing, was found to be capable of such evaluation and thus, a feasible solution to the problem of effective background model evaluation.