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Fast Learnable Methods for Object Tracking

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Report on Thesis

Overview

The thesis addresses the problem of efficiently tracking objects over long video sequences. It introduces a novel tracking technique using sequences of local linear predictors. These are designed and trained so as to give the least complex tracker capable of achieving a given accuracy. The thesis describes the method in detail, reviews relevant background material and explores the performance of the method and its variants on large datasets.

Relevance to Scientific Community

The ability to efficiently and accurately track objects is very important for a wide range of video analysis tasks. Tracking techniques are thus much studied in the Computer Vision field. This thesis makes a significant new contribution to the area, offering a technique capable of outperforming many standard methods.

Fulfilling Objectives

The primary objective is to find a fast tracking method with a pre-defined precision and robustness. The thesis succeeds in this, developing the methodology to allow a tracker to be learnt so as to achieve a given accuracy. Details of the algorithm are clearly presented, and the method is evaluated on large test sets.

Appropriateness of Methods

The adoption of a combination of simple linear predictors is both novel and appropriate for the task in hand. A single linear predictor can be very efficient, but may only have a small valid range. However, sequences of such predictors can be trained so as to have a large range. This allows the system to be accurate, robust and efficient.
Evaluation of tracking systems is difficult, largely due to the lack of appropriately annotated test data. The author has created a large dataset, with annotations, to compare his method against a wide range of standard algorithms from the literature.

Results and Contributions

The main contribution of the thesis is the introduction of the sequence of learned linear predictors and the evaluation of the tracker on large datasets. In addition there are a range of complementary contributions, including algorithms to select the optimal (most efficient) combination of predictors to achieve a given accuracy, fast training algorithms and the use of combinations of such feature trackers to track objects. This work is likely to have a significant impact on the field of feature and object tracking.

Contribution to Science

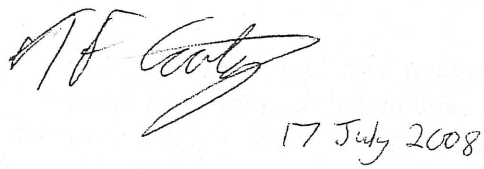
The algorithms are some of the most efficient and accurate yet developed. They are likely to be widely adopted, and thus will contribute to may future applications. Other researchers will be inspired by the work. The author has also made some of the data available, which will allow other researchers to compare their own techiques with those proposed in this thesis - a useful contribution in itself.

Creativity

The thesis presents a range of novel ideas, and is clearly creative scientific work.

Recommendation

The author of the thesis proved to have an ability to perform research and to achieve scientific results. I do recommend the thesis for presentation with the aim of receiving the Degree of PhD.



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