Temporal constraint background-aware correlation filter drives accurate visual tracking

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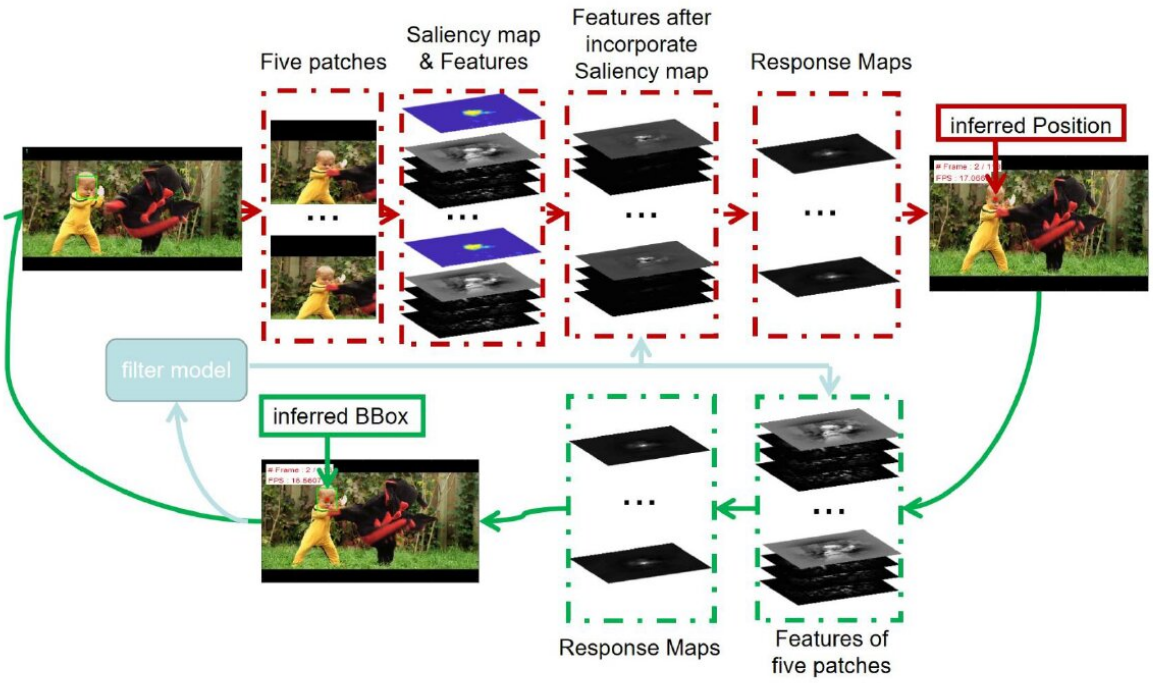

Flowchart of the proposed tracking framework. Red lines indicate the inference of target position, and green lines indicate the inference of target scale. Credit: XIOPM

Visual object tracking is one of the most challenging problems in

multimedia processing with numerous applications, such as video retrieval, video editing, video surveillance, augmented reality, motion analysis, human-computer interaction with multimedia, etc. Despite significant progress has been made in recent years, various factors, such as occlusions, out-of-view, non-rigid deformations, illumination changes, fast motion and scale variations, make it still an open problem.

There exists a stability-plasticity dilemma in the tracking community, fixed model cannot adapt to variation of the target shape, while the excessively updated model cannot preserve the target information, using a moving average operation with an empirical weight walks a fine line to some extent.

A research team led by Prof. CAO Jianzhong from the Xi'an Institute of Optics and Precision Mechanics (XIOPM) of the Chinese Academy of Sciences (CAS) proposed a new correlation filter for robust visual tracking by integrating saliency map and formulating a novel correlation filter regression model.

Via the introduction of a saliency map and the proposed novel correlation filter regression model, the proposed tracking algorithm can efficiently and effectively handle challenging scenarios in visual tracking, such as severe occlusion, dramatic deformation, and fast motion, etc.

The saliency map emphasizes the target information as well as preserves context information, the novel correlation filter regression model maintains consistency of the historical information and newly obtained one of the filters to be robust to challenging scenarios.

Artificial Intelligence is treated as the key technique in the near future. Accurate and robust visual tracking plays one of the most critical roles in computer vision. "The temporal constraint background-aware correlation

filter which drives accurate visual tracking may achieve the goal of the cognitive intelligence someday," said Prof. CAO.

The results were published in a paper in *IEEE Transactions On Multimedia* titled "Temporal Constraint Background-Aware Correlation Filter with Saliency Map."

More information: Jiawen Liao et al. Temporal Constraint Background-Aware Correlation Filter with Saliency Map, *IEEE Transactions on Multimedia* (2020). DOI: 10.1109/TMM.2020.3023794

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