Approximate Structured Output Learning for Constrained Local Models with Application to Real-time Facial Feature Detection and Tracking on Low-power Devices

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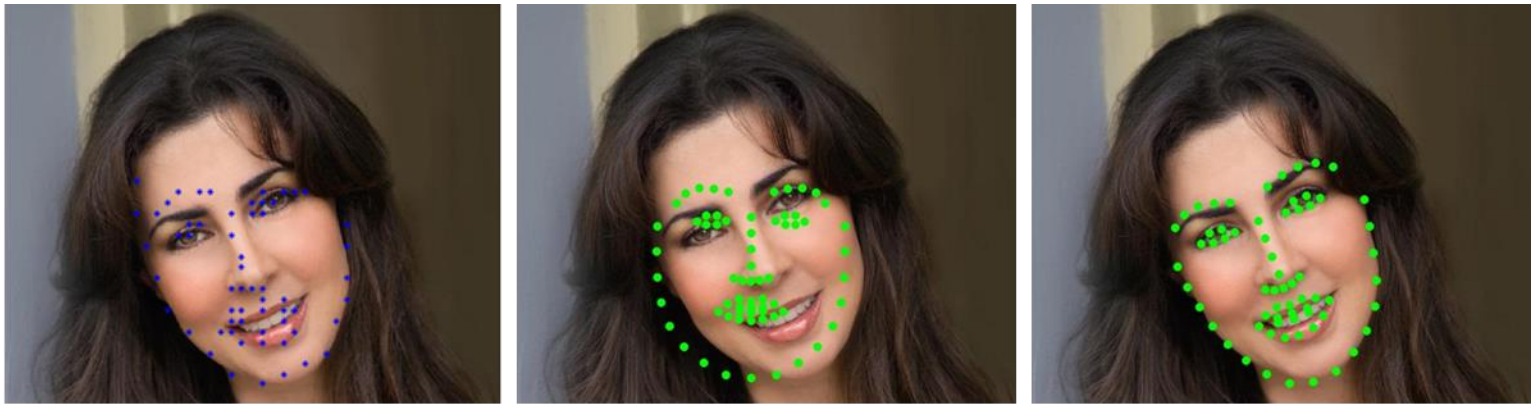
Introduction to Approximate SO-CLM

We present an approach called approximate structured output learning for constrained local model (SO-CLM).

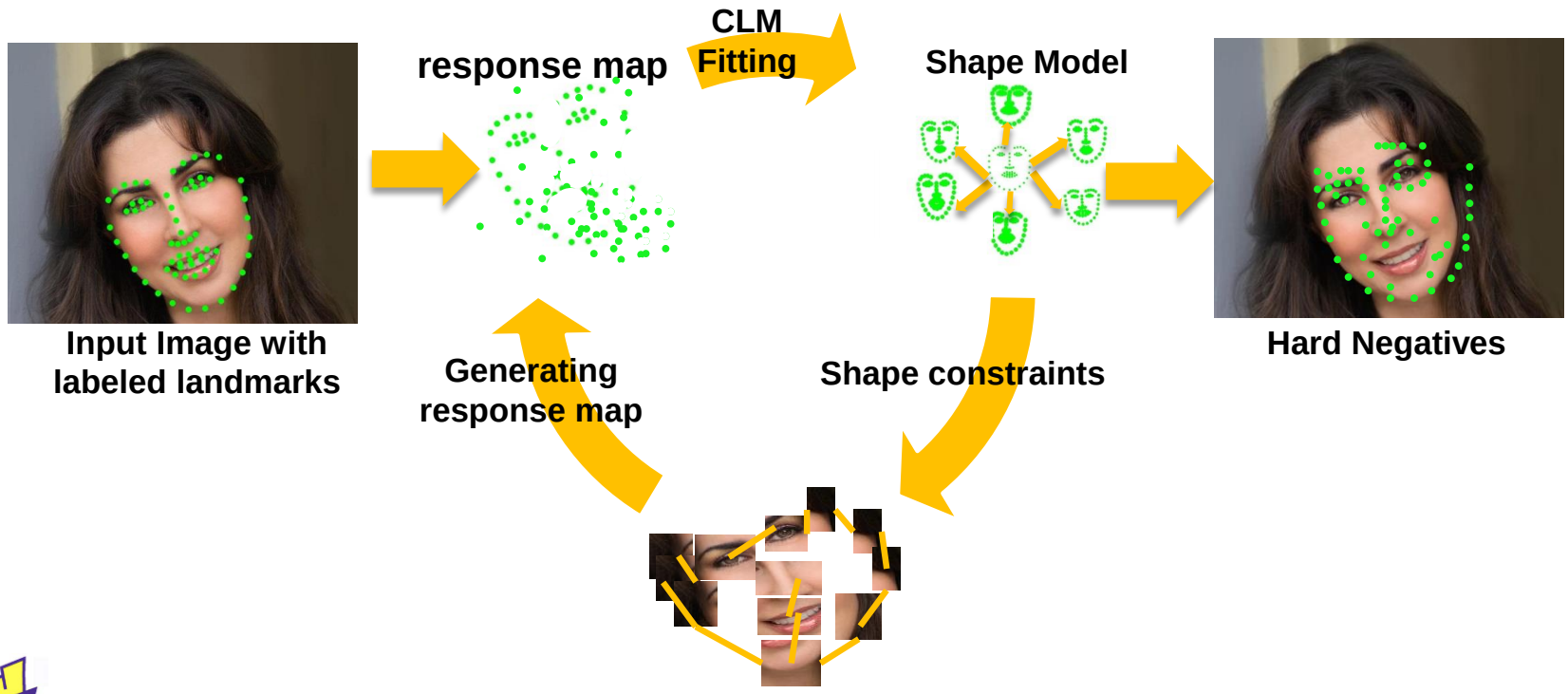
- Approximate structured output SVM
  - to jointly learn the local appearance models
- Real-time facial feature tracking on a mobile device
  - using binary model approximation



Tree structured SVM | CLMs with BRIEF | Proposed

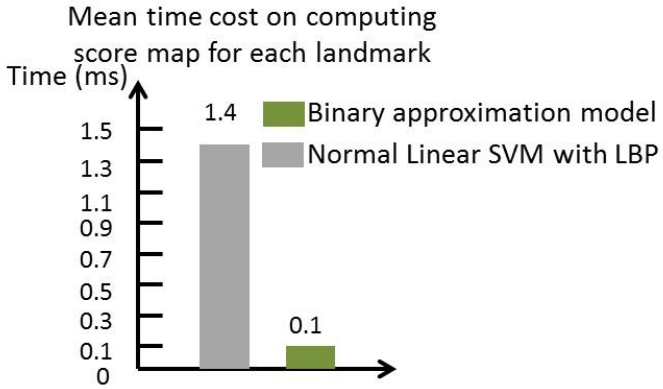
Learning SO-CLM

- Initialise CLM appearance model with linear SVMs
- Finding the hard negative samples and update CLM appearance model with online SO-SVM.



Model Binary Approximation

- We boost the speed by using binary features such as BRIEF.*
- Binary approximation of our learnt appearance model $w_i = \sum_{k=1}^{N_b} z_k a_k$.





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*Sam Hare, Amir Saffari, Philip H. S. Torr. Efficient Online Structured Output Learning for Keypoint-Based Object Tracking. CVPR, 2012.