

Contributions

- Automatically discard false positive face tracks while keeping true positive tracks intact
- Generic (confidence-based) and domain-specific (context-based) cues for identifying false positive face tracks
- Evaluation on a database of over 11000 tracks from 2 diverse TV series

Motivation

Face detection and tracking is a pre-requisite for person identification in TV series. Errors during detection such as false positive face tracks affect the results but are typically ignored.

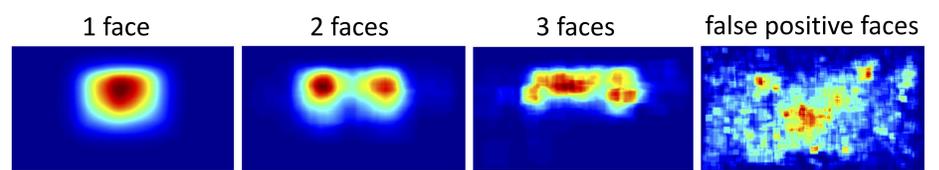
In this work, we propose a set of cues both generic and domain-specific to tackle the problem of false positive face track detection while minimizing the removal of true positive tracks.



Context based cues

■ facial location heat maps

In a TV series video frame, where do faces appear?



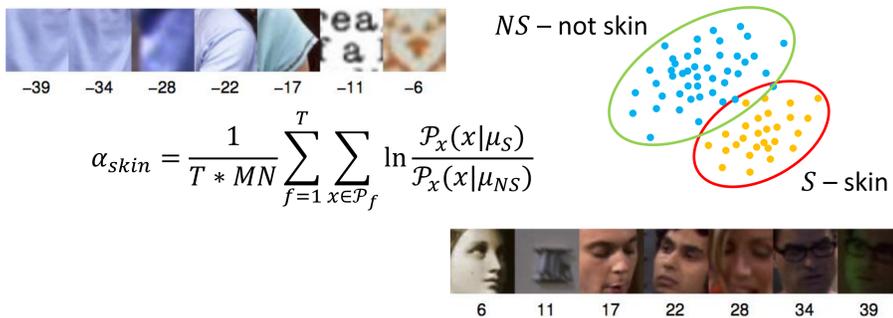
■ relative size

Faces tend to appear at the same depth in video frames



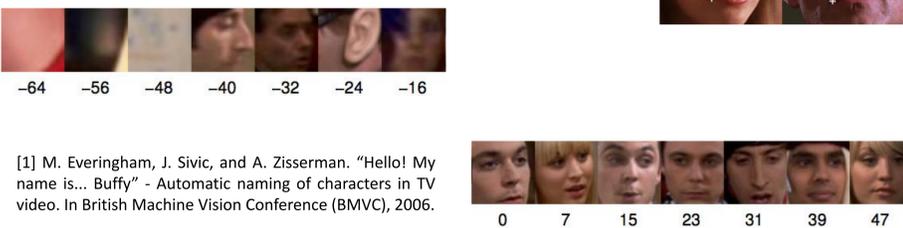
Confidence based cues

■ skin color Simple, but effective method to detect false positive faces

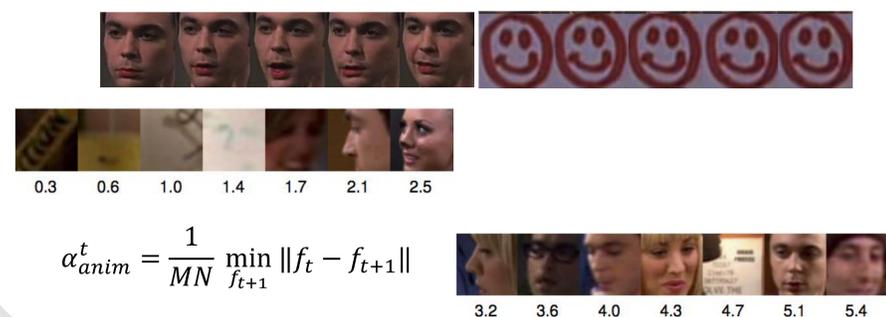


■ facial feature point (landmark) localization

Detect face landmarks using the nine point detector [1]. Compute average confidence score for each track



■ animation Face tracks are animate objects, false positives are not



Results

■ Classification Results

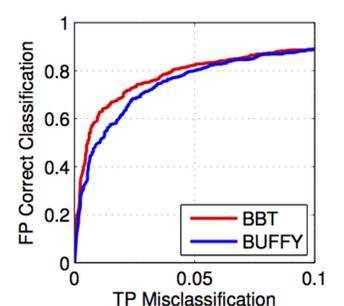
— Correctly detected false positive tracks
— Wrongly classified true positive tracks

	BBT	BUFFY	TOTAL
#Tracks	4684	6759	11443
#FPFT	903	997	1900
Skin Confidence	361 / 23	284 / 65	645 / 88
Facial Features	127 / 11	170 / 71	297 / 82
Animation	105 / 29	134 / 107	239 / 136
Facial Location	408 / 105	229 / 22	637 / 127
Relative Size	218 / 6	275 / 42	493 / 48
Combined	690 / 129	754 / 218	1444 / 347
MOTA Before	68.2	69.0	68.6
MOTA After	75.1	72.8	74.0

■ Different detectors / trackers

Detector	BBT-1	BUFFY-5
Haar + #Tracks		760
KLT #FPFT	—	94
Combined		51 / 22
MCT + #Tracks	584	
Assoc. #FPFT	53	—
Based Combined	41 / 4	
MCT + #Tracks	704	963
Particle #FPFT	79	150
Filter Combined	59 / 3	113 / 40

■ ROC curve



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Project page

<http://simitlab.itu.edu.tr>

