Real-Time Rotation-Invariant Face Detection with Progressive Calibration Networks

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April 29, 2018

Today I continue reading this article,due to my limited knowledge, I can only understand some superficial meanings. The steps of PCN shows in Figure 1 The method proposed in this article has the following advantages:

This method divide the calibration process into several progressive steps, each steps is an easy task, resulting accurate calibration with low time cost. And because the RIP range is gradually decrease, the distinguish between face and non-face become more easily.
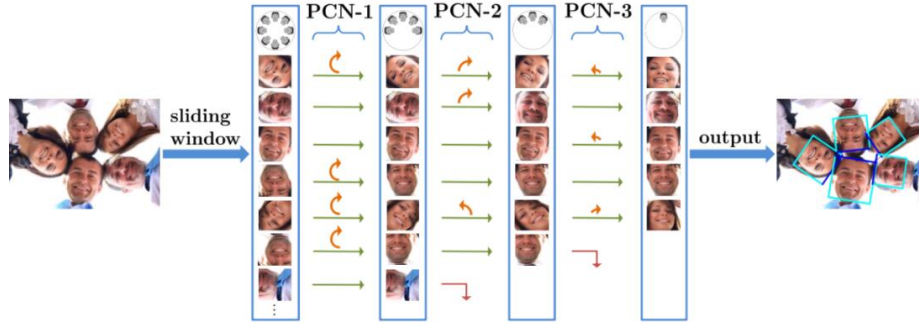

Figure 1: An overview of our proposed progressive calibration networks (PCN) for rotation-invariant face detection. Our PCN progressively calibrates the RIP orientation of each face candidate to upright for better distinguishing faces from non-faces. Specifically, PCN-1 first identifies face candidates and calibrates those facing down to facing up, halving the range of RIP angles from $[180°, 180°]$ to $[90°, 90°]$.Then the rotated face candidates are further distinguished and calibrated to an upright range of $[45°, 45°]$ in PCN-2, shrinking the RIP ranges by half again. Finally, PCN-3 makes the accurate final decision for each face candidate to determine whether it is a face and predict the precise RIP angle.

In the first two steps of PCN, only processing coarse calibration, such us from facing down to facing up, from facing left to facing right. With no additional time cost, PCN can more easily implement reliable coarse calibration and accurate RIP angle prediction. And in the other hand ,the calibration can be easier to implement as flipping original image with quite low time cost.

As evaluated on the face detection datasets including multi-oriented FDDB [1] and a challenging subset of WIDER FACE [2] containing rotated faces in the wild, the PCN detector achieves quite promising performance with extremely fast speed.

To summarize the advantages, I made a table as follows

The advantages of PCN		
Data Augmentation	1	high
Time cost	The difficult of each task	The prediction of RIP angle
Each step and overall all low	easy	Accurate prediction with low time cost

Table 1: Comparison of the three methods

References

[1] Vidit Jain and Erik Learned-Miller. Fddb: A benchmark for face detection in unconstrained settings. Technical Report UM-CS-2010-009, University of Massachusetts, Amherst, 2010.

[2] Shuo Yang, Ping Luo, Change Loy Chen, and Xiaoou Tang. Wider face: A face detection benchmark. In *Computer Vision and Pattern Recognition*, pages 5525–5533, 2016.