Clustering Millions of Faces By Identity

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The article was written by (Otto, Wang, and Jain 2018). It was was cited 44 times according to Google Scholar. The task performed was face clustering. They used the F-measure metric over clusters with distractor images.

Hypothesis

Deep features clustered using only the top-k nearest neighbors in rank-order clustering will produce a more scalable and a more accurate face clustering algorithm.

The network architecture to produce a 320D feature vector was VGG16 proposed by (Simonyan and Zisserman 2014). The rank-order clustering algorithm is based on (Zhu, Wen, and Sun 2011). The k-d tree for calculating just the 200-top nearest neighbors is based on (Muja and Lowe 2014).

Evidence and Results

Evidence is presented first over a small dataset and the over an augmented version of the datasets with million of distractor images.

Dataset

Results

Contribution

A first contribution of this paper stems from an improvement of the clustering algorithm. The Rank-Order cluster proposed by (Zhu, Wen, and Sun 2011) has the disadvantage that it requires $O(n^2)$. The authors propose to use the FLANN library implementation of the randomized k-d tree algorithm to compute the list of top-k nearest neighbors. Just one iteration is used.

Weaknesses

Future Work

References

Muja, M. and D. G. Lowe (Nov. 2014). "Scalable Nearest Neighbor Algorithms for High Dimensional Data". In: *IEEE Transactions on Pattern Analysis and Machine Intelligence* 36.11, pp. 2227–2240. ISSN: 0162-8828. DOI: 10.1109/TPAMI.2014.2321376.

Otto, C., D. Wang, and A. K. Jain (Feb. 2018). "Clustering Millions of Faces by Identity". In: *IEEE Transactions on Pattern Analysis and Machine Intelligence* 40.2, pp. 289–303. ISSN: 0162-8828. DOI: 10.1109/TPAMI.2017.2679100.

Simonyan, Karen and Andrew Zisserman (2014). "Very Deep Convolutional Networks for Large-Scale Image Recognition". In: pp. 1–14. ISSN: 09505849. DOI: 10.1016/j.infsof.2008.09.005. arXiv: 1409.1556. URL: http://arxiv.org/abs/1409.1556.

Zhu, C., F. Wen, and J. Sun (June 2011). "A rank-order distance based clustering algorithm for face tagging". In: *CVPR 2011*, pp. 481–488. DOI: 10.1109/CVPR.2011.5995680.