Active Learning for Deep Detection Neural Networks

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1 Summary

The proposed model is to perform active learning of object detectors based on convolutional neural networks on both videos and images. The proposed image level scoring process to rank unlabeled images for their automatic selection, which outperforms the classical scoring. Using the detection network, informativeness score per pixel is aggregated, selects top-b images and the score is being calculated and this pixel scores are used to train the model and is used for active learning. The performance is evaluated on CityPerson, CaltechPred and BDD100K Dataset and is evaluated based on Miss Rate vs False Positive Per image and outperforms random select method.

2 Good points

The author was able to introduce a really good scoring at pixel level and the detection module and scoring strategy was able to generate promising results. Also, the model is not limited to any single class and is capable of handling multiple classes and mutiple instances from the same class which will add up to the scalability of the technique. The method can be used for both images and videos and is not limited to only images which really helps in scaling up the model in various cases. In the videos, the temporal reasoning is also used as a complimentary selection.

3 Weak points

The model' performance is highly dependent on the dataset and the bias and variance of the dataset will result in inferior performance such as BDD100K dataset. When the dataset has high bias, the majority of visual patterns will be informative to the network and the network will not be able to learn more complex features/mappings from such dataset. This will eventually results in high scores in consecutive cycles and make the network pick redundant samples. And the trade-off between the

4 Questions

How can we account for high bias in dataset without increasing the capacity of the network and by creating more accurate network? How we could strategies the the selection technique for the image set so that the data bias will not affect the performance by a margin?

5 Ideas