Report of the Neural Network Training for the project: Assessing Economic Development and Planning Interventions in the Built Environment: The Role of Provincial Policies in Qubec and Ontario

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Abstract

The dataset was first split into the 6 categories; ”depressing”, ”lively”, ”safety”, ”wealthy”, ”boring” and ”beauty”. All the operations reported in this paper were made to the depressing category.

Data Preprocessing

After the categorization,the dataset was cleaned up by removing all datapoints that appeared in both the positive and negative sub-categories. The coordinates for all positive datapoints(images that are depressing) were retrieved.

Downloading images and training neural network

For the first batch of training, the first 250 coordinates of both the positive datapoints and their corresponding negative datapoints were retrieved and their corresponding street-view images were downloaded. After the images were downloaded, a convolutional neural network was trained on the positive and negative images.

In training the convolutional neural network, a method called Transfer Learning was employed. We first downloaded Google’s pre-trained inception-v3 model and retrained the last two layers in the network with our 250 images. The training process was first ran for 500 iterations. A graph of the training accuracy over the 500 iterations is in Figure 1.

The average training accuracy was around 85% while the cross-validation accuracy lingered around 50%.

The number of iterations was increased to 2500 and the training accuracy rose to 98% while the cross-validation accuracy still lingered around 50%. [Figure 2]This meant that our trained model was over-fitting on the training set. A common remedy for this would be to increase the number of training images.

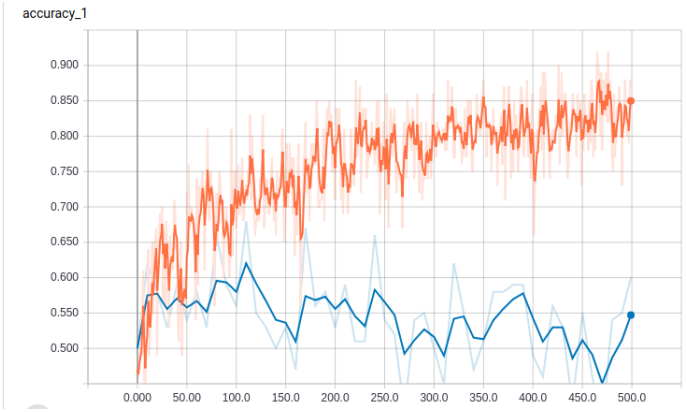

Figure 1: 250 images, 500 iterations. Training accuracy = Red, Cross-validation accuracy=Blue

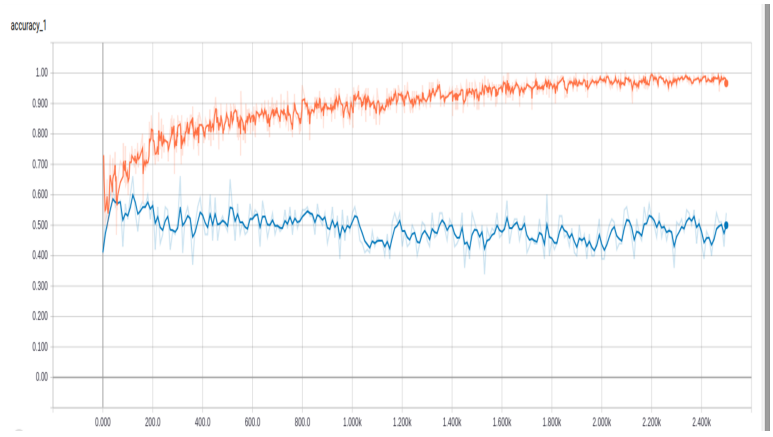

Figure 2: 250 images, 500 iterations. Training accuracy = Red, Cross-validation accuracy=Blue

References

Einstein, A. (1905). Zur Elektrodynamik bewegter Körper. (German) [On the electrodynamics of moving bodies]. *Annalen der Physik*, 322(10):891–921.

One	Two	Three
Yes	0	1
Not	1	0
Maybe	0.5	0.5

Table 1: Sample table caption.