[M2, MVA]

Object recognition and computer vision

Project proposal

November 25, 2015

Theme: Deep learning

Topic: Training convolutional networks with noisy labels

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Task 1: Paper review

For this project we will review the reference article **Training convolutional networks with noisy labels** [1] which adapts a convolutional neural network to deal with mislabeled training samples. Those mislabels could either be **label flips** or **outliers**, potentially misleading the network in the training phase.

Task 2: Code implementation

We will implement in Caffe's bvlc framework the suggested constrained linear noise layer in [1] on top of the reference implementation of the ConvNet proposed by Krizhevsky, Sutskever, and Hinton in their NIPS 2012 paper (AlexNet) [2].

Task 3: Experimental evaluation

To evaluate the suggested method we will train our network on simulated noisy datasets generated from the imagenet database with known true labels. For a more realistic setting we will use the CASIA WebFace Database to classify images with or without glasses. The training labels would be generated automatically with a *glasses detector* using histogram of oriented gradients (out of the project scope). Hence we'll challenge the method with a simple binary classification where the probability of a noisy label is dependent on the image features to test the assumption $p(\text{noisy label} = j | \text{true label} = i) = q_{i,j}$ [1].

References

[1] Training Convolutional Networks with Noisy Labels, Sainbayar Sukhbaatar, Joan Bruna, Manohar Paluri, Lubomir Bourdev, and Rob Fergus - arXiv:1406.2080

[2] Krizhevsky, Alex, Sutskever, Ilya, and Hinton, Geoffrey E. Imagenet classification with deep convolutional neural networks. In Advances in Neural Information Processing Systems 25, pp. 10971105, 2012.