Training Convolutional Networks with Noisy labels

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M2 MVA 2015/2016

January 8, 2016

Motivation

- The performance of CNN depends on the amount of labeled samples and their presumable quality.
- Hand labelling is impractical $\rightarrow$ Shift to semi-automatic labelling - prone to inaccuracy and subjectivity.

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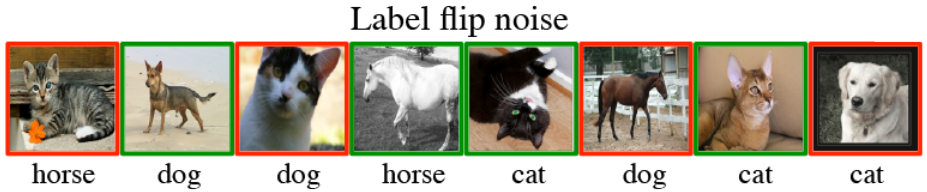
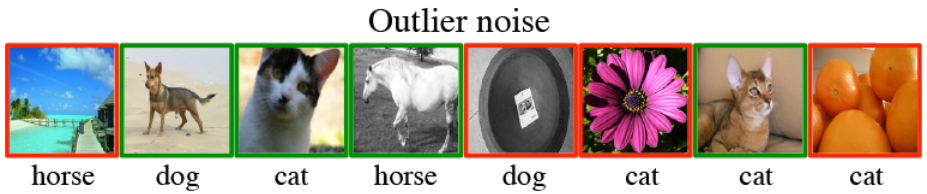
- Hand labelling is impractical $\rightarrow$ Shift to semi-automatic labelling - prone to inaccuracy and subjectivity.
- Propose a generic way to handle two types of label noise:
  1. Label flips



  2. Outliers



The Model

Noise modelling

Given a sample of labelled images $\mathcal{I} = (x_n, y_n)_n$ where y_n is the true label.
Define noisy label distrbution:

$$\mathbb{P}(\tilde{y} = i | y = j) = q_{i,k} \qquad \text{(A confusion matrix)}$$

Link the true label to the noisy label.

$$\mathbb{P}(\tilde{y}|x, \theta, Q) = \sum_i q_{j,i} \mathbb{P}(y = i|x, \theta)$$