Data augmentation
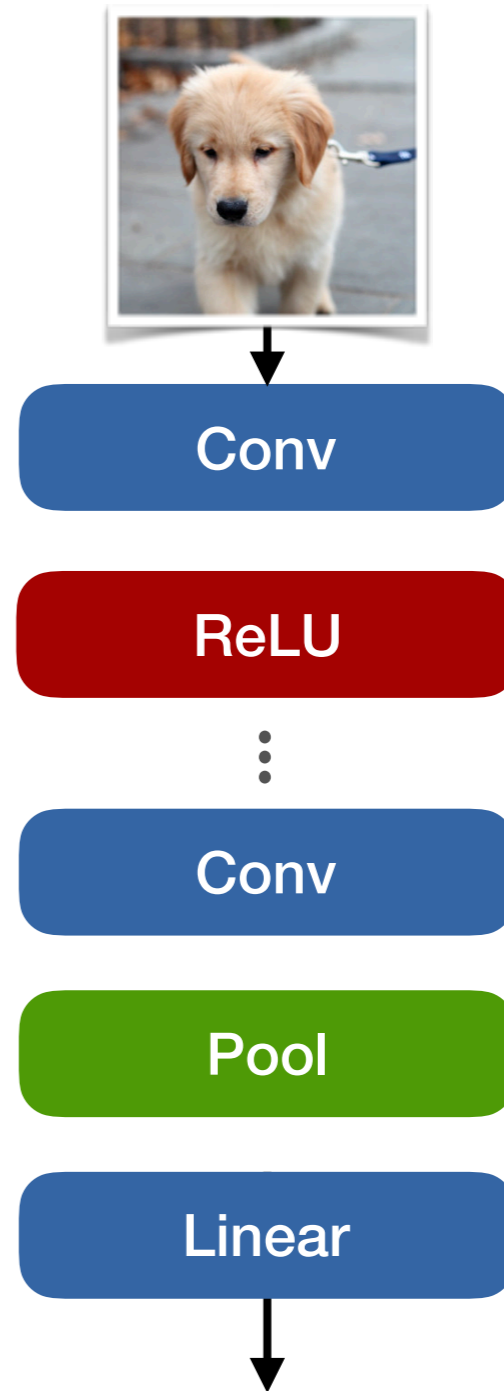
Signs of overfitting

- Does not capture invariances in data
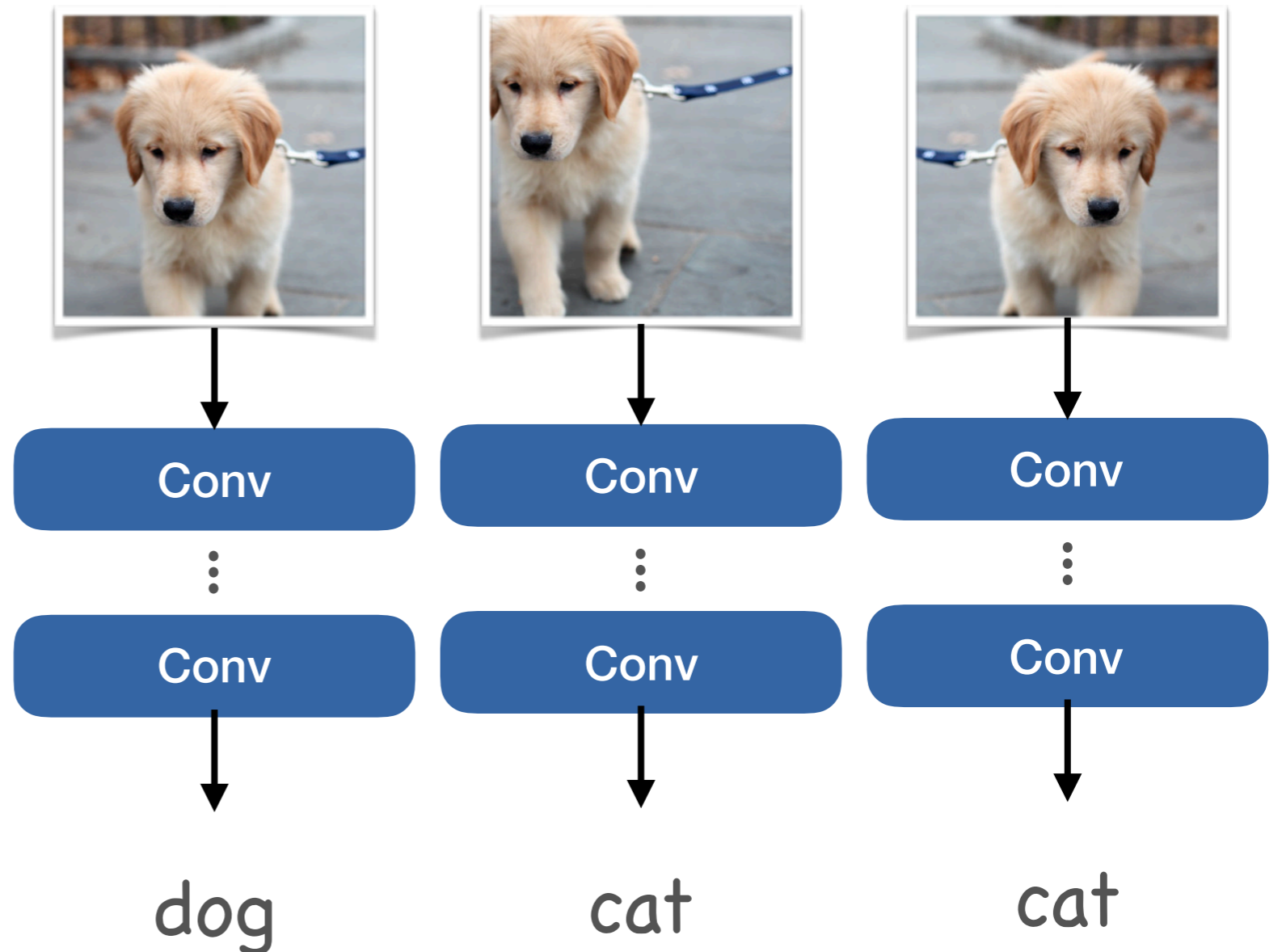
How to capture invariances?

- Build them into the model

  - Convolutions

  - All-convolutional models

- Build them into the data

  - Data augmentation

Data augmentation

- Capture invariances in data

  - (Randomly) transform data during training
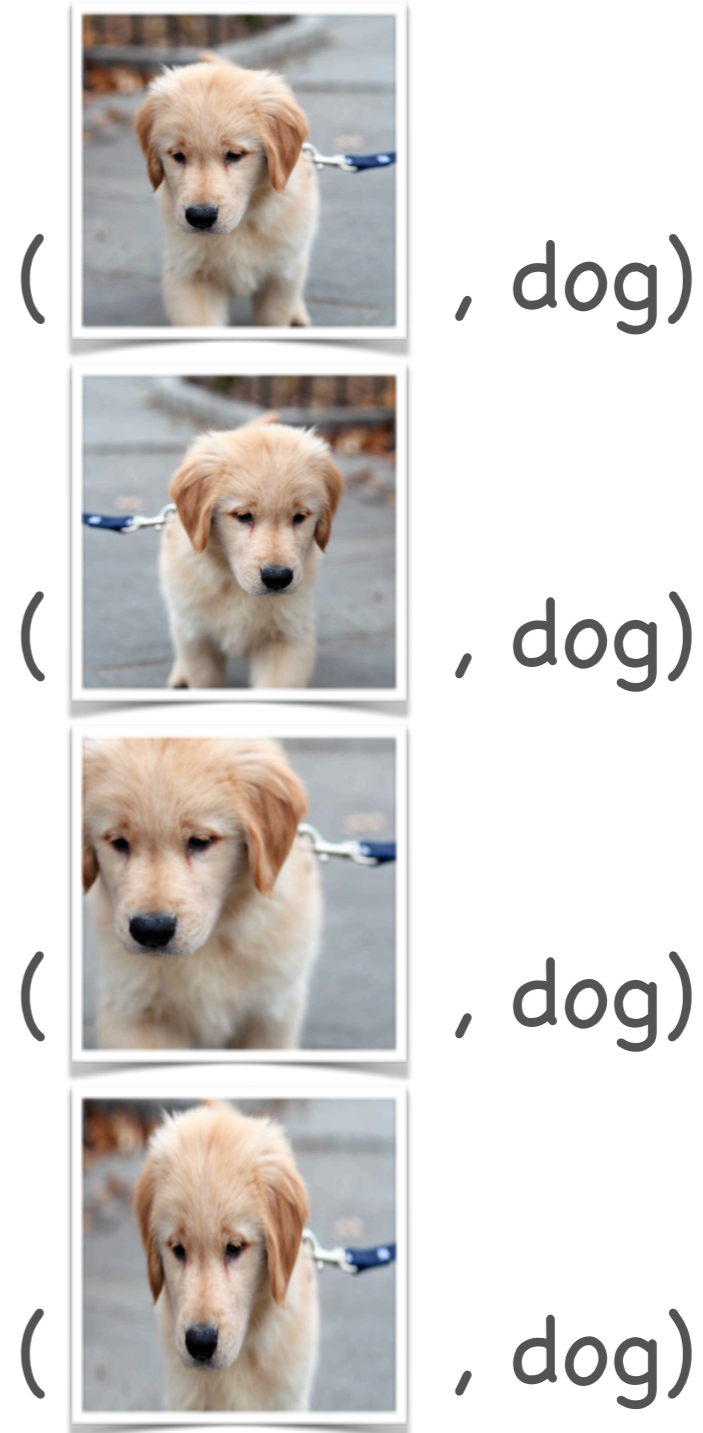
- Reuse a label

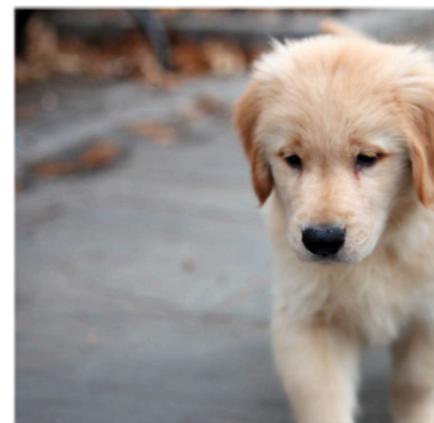
(, dog)
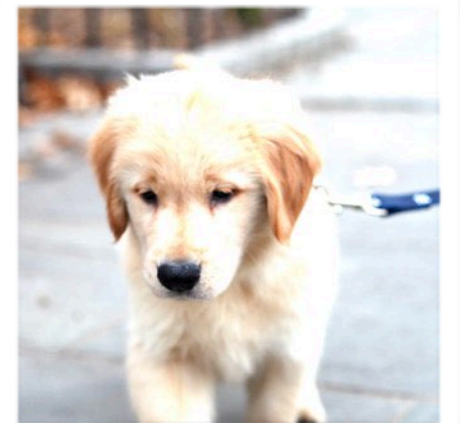
(, dog)

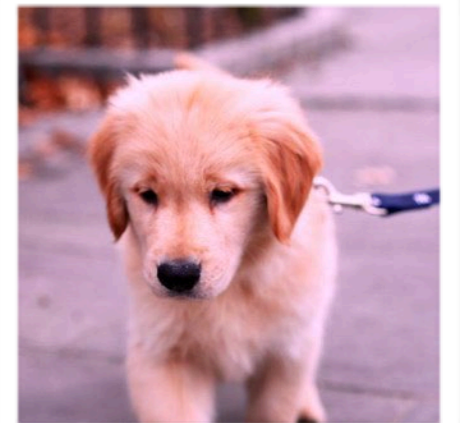(, dog)

(, dog)

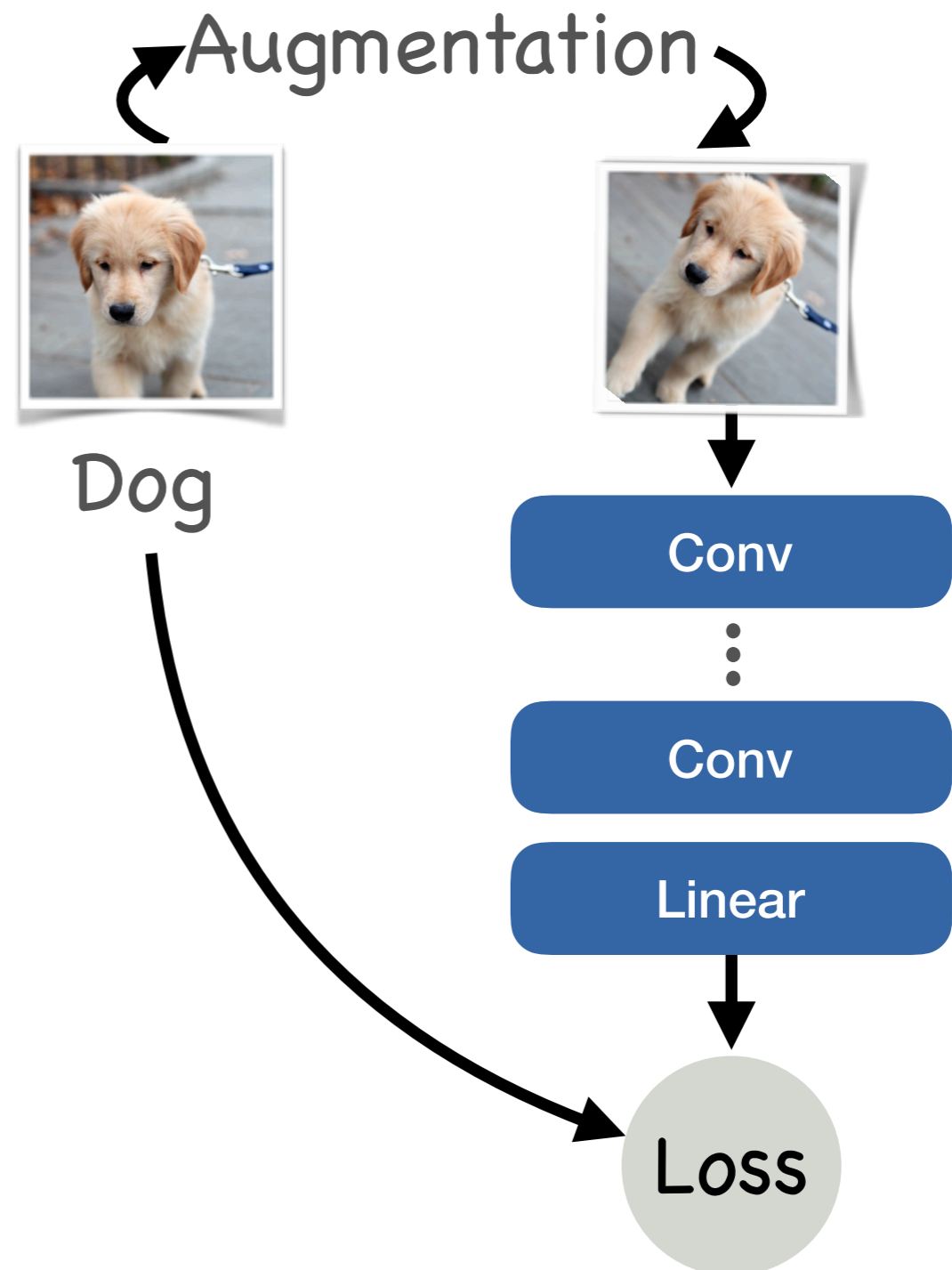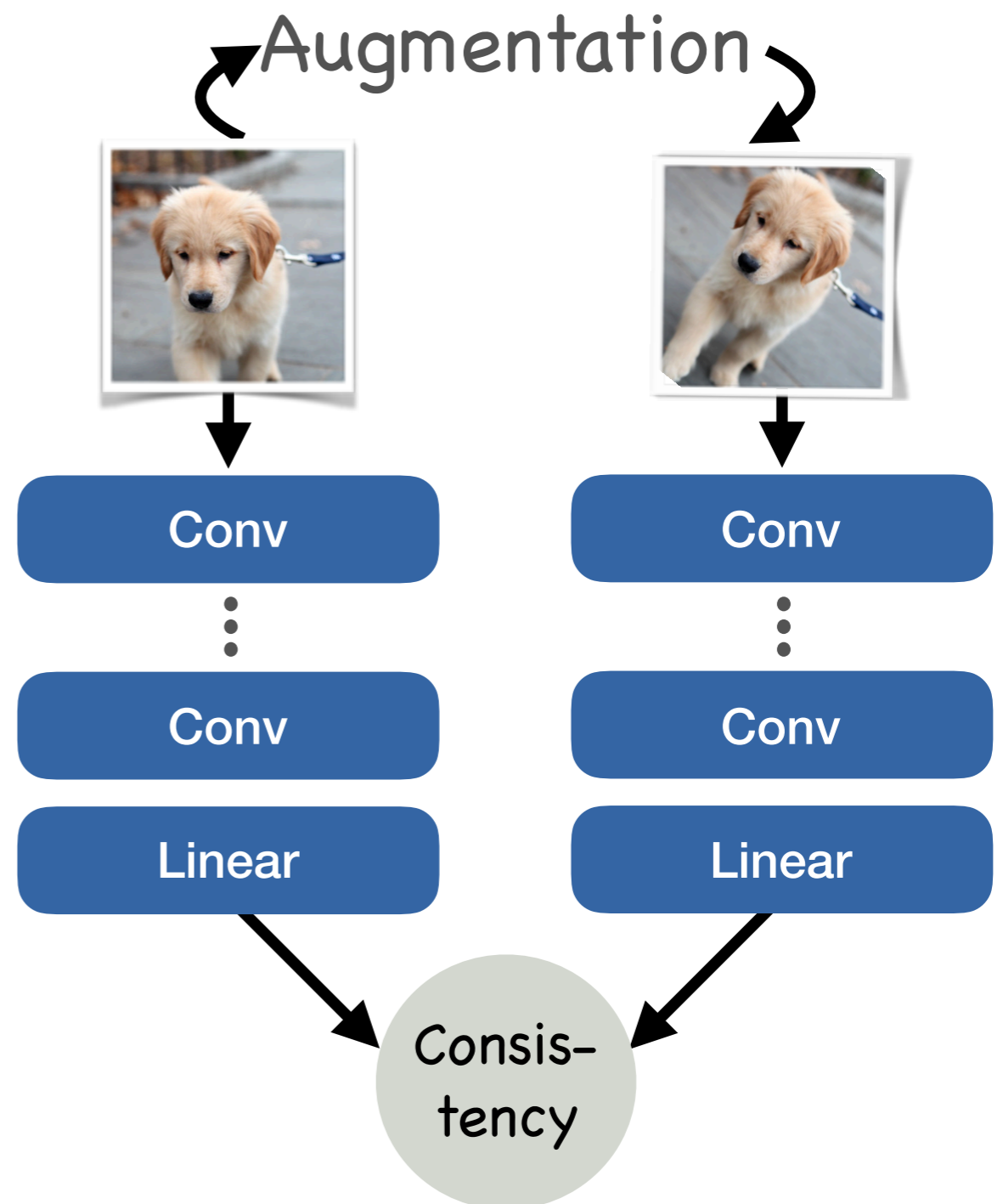# Image augmentations

flip

saturation

shift

brightness

scale

rotate

tint/hue

Training with data augmentation

- (Randomly) augment every single iteration

- Network never sees exact same data twice

Augmentation

Dog

Conv

Conv

Linear

Loss

Unsupervised data augmentation

- Captures invariances on unseen and unlabeled data

Xie, Dai, Hovy, Luong, Le, "Unsupervised Data Augmentation", arXiv 2019

Data augmentation

- Always use data augmentation if possible

- Some augmentations require augmentation of labels

  - e.g. for dense prediction tasks