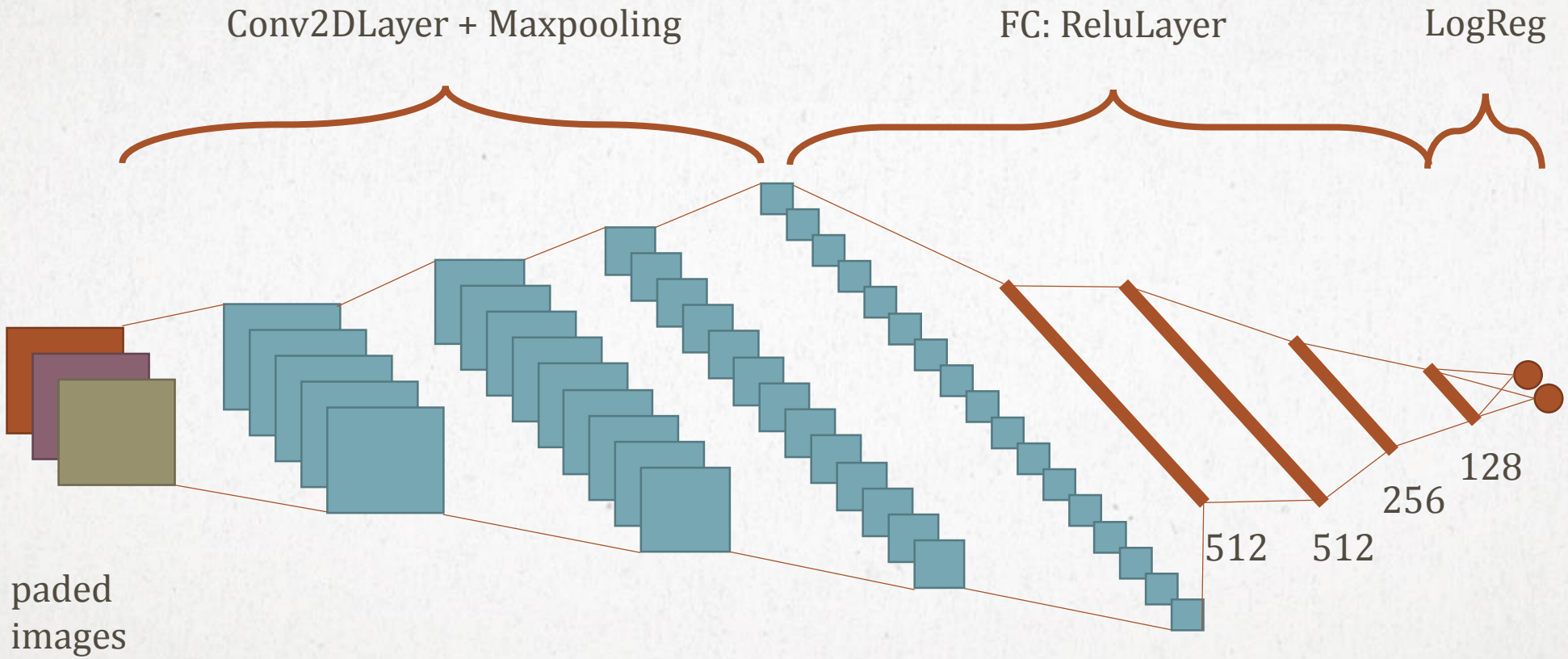
CATS & DOGS

ZHOUHAN LIN, COURSE PROJECT

OVERALL STRUCTURE



DEALING WITH DIFFERENT IMAGE SIZE

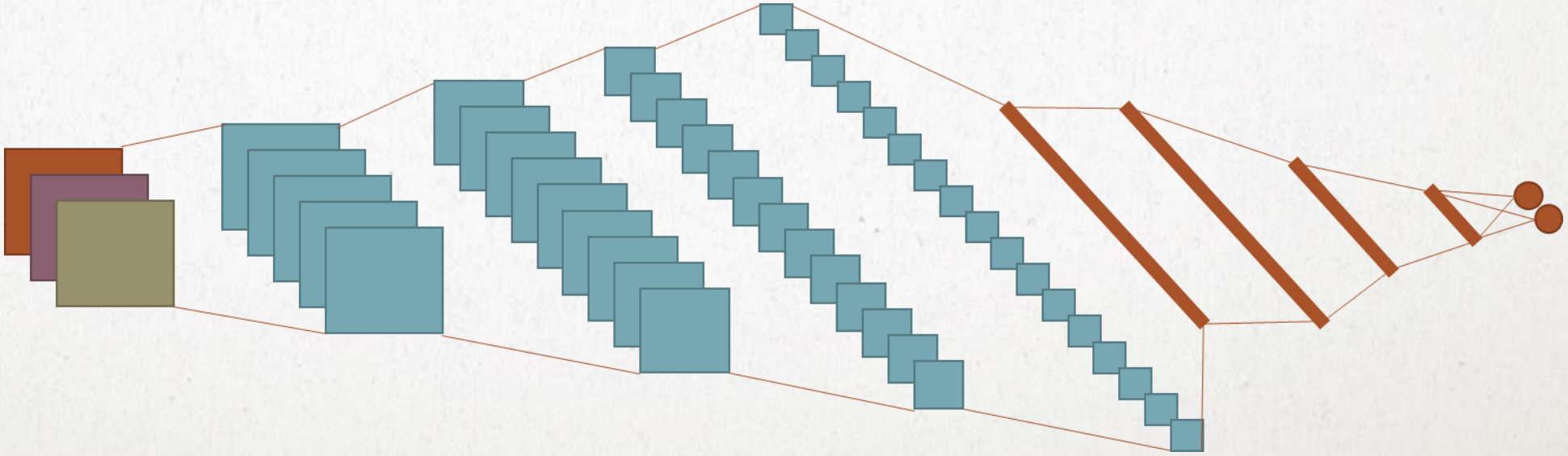
- Typically different images are resized onto a same shape, and then do recognition. That causes some distortion problems sometimes.
- In the Kaggle competition National Data Science Bowl, the winner team uses periodical padding for their planktons. http://benanne.github.io/2015/03/17/plankton.html
- Inspired by that, I use periodical padding for preprocessing.

cat.188.jpg

BASELINE RESULTS AND SUPER-PARAMETER TUNING

FIRST RUN: **87.56% ACCURACY**

TUNING SOME PARAMETERS: **87.96% ACCURACY**



DATA AUGMENTATION

FLIPPING **92.38% ACCURACY**

- Horizontal flipping and vertical flipping

ROTATION **86.24% ACCURACY**

- 90, 180, 270 rotation
- The flipped version of each rotation

SHIFTING **93.94% ACCURACY**

- Random shifts between [-5,5] pixels, on both original and flipped images
- with parametric ReLU

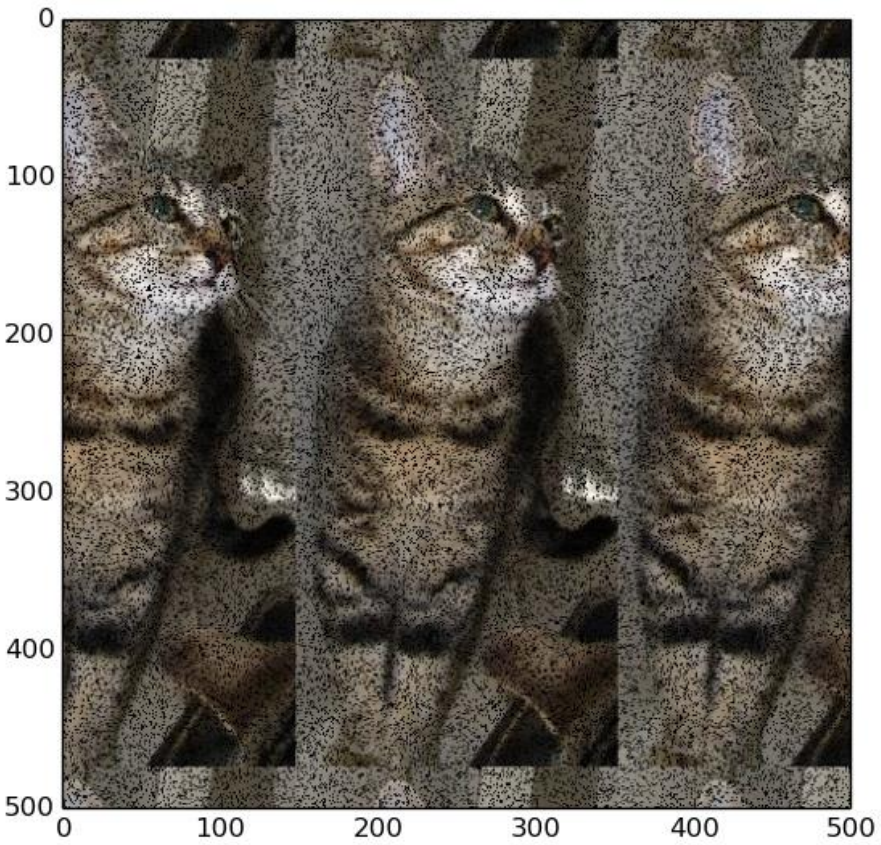



DENOISING

- Add 0.2 binomial noise onto the image
- With flipped images

86.54% ACCURACY

(Not working well for ConvNets)



PARAMETRIC RELU

93.94% ACCURACY

- Enable the slope of the negative half of ReLU activation to be learnable. Both in convolutional and fully connected layers. [*]
- Learn that slope for each hidden unit together with other parameters during backprop.
- With data augmentation: random shifts between [-5,5] pixels, on both original and flipped images

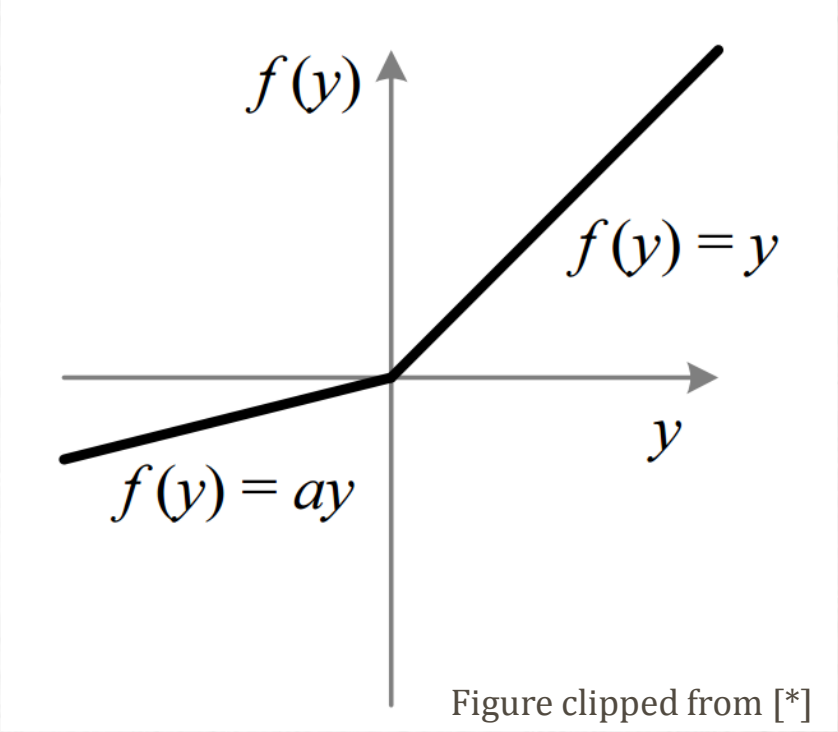


Figure clipped from [*]

[*] He, K., Zhang, X., Ren, S., & Sun, J. (2015). Delving deep into rectifiers: Surpassing human-level performance on imagenet classification. *arXiv preprint arXiv:1502.01852*.

WEIRD SAMPLES

dog.1308.jpg

FINAL ACCURACY