CNN, RNN and applications

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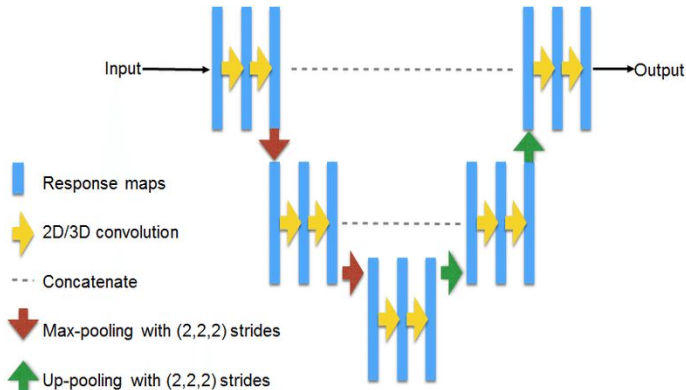
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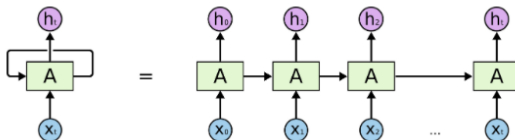
Presentation plan

- Convolutional NN.
- Recurrent NN.
- Applications.

Convolutional NN

convolution +
nonlinearity

max pooling

vec

bird $\quad$ p_{bird}

sunset $\quad$ p_{sunset}

dog $\quad$ p_{dog}

cat $\quad$ p_{cat}

...

convolution + pooling layers

fully connected layers $\quad$ Nx binary classification
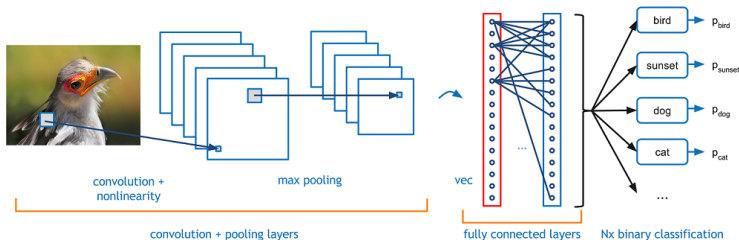
- Powerful representation extractors.

Convolutional NN: u-net

Input → Output

Response maps

2D/3D convolution

Concatenate
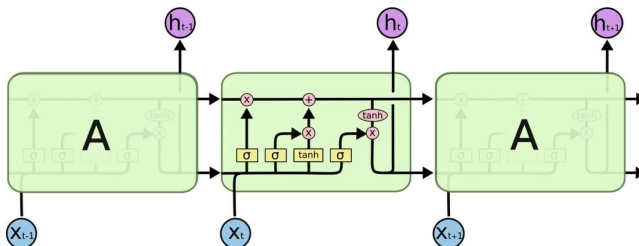
Max-pooling with (2,2,2) strides

Up-pooling with (2,2,2) strides

Recurrent NN

- Capable of universal computation.
- Natural sequence processors.
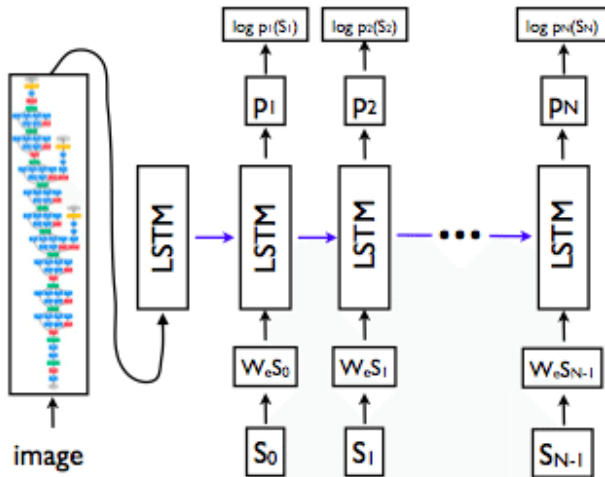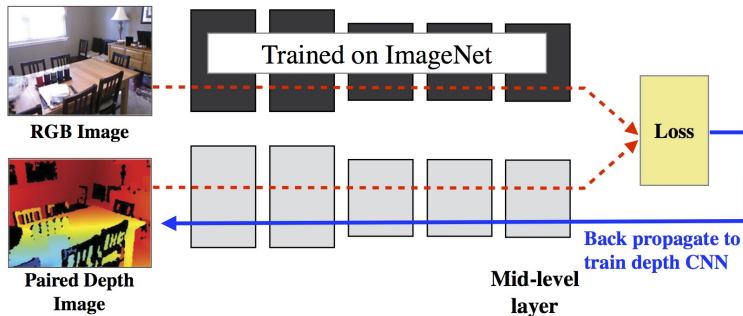- Works with variable lenght input/output sequences.

Recurrent: LSTM

Long-Short Term Memory module: LSTM

long-short term memory modules used in an RNN

http://colah.github.io/posts/2015-08-Understanding-LSTMs/   Eugenio Culurciello
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Image captioning: CNN+LSTM

Cross modal distillation

RGB Image

Paired Depth Image

Trained on ImageNet

Loss

Back propagate to train depth CNN

Mid-level layer

Object detection