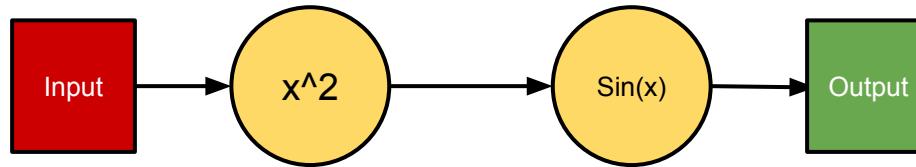


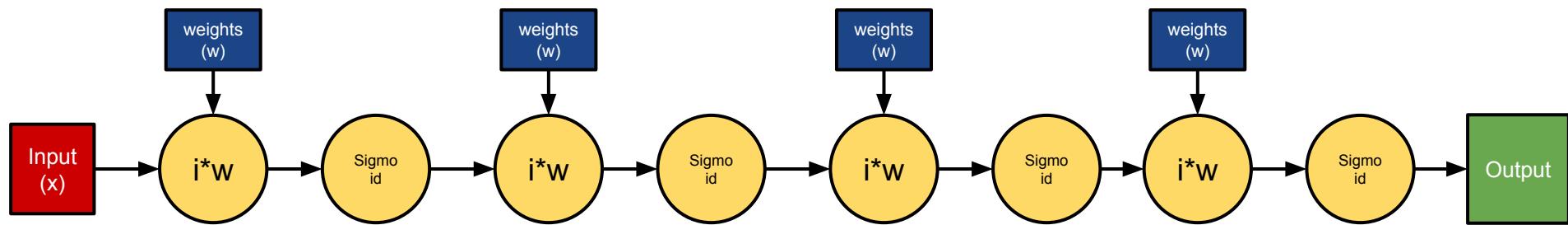
Applied Deep Learning with Torch7 for Vision, Natural Language and Audio

Soumith Chintala
GTC 2015
March 18th, 2015

What is a neural network?

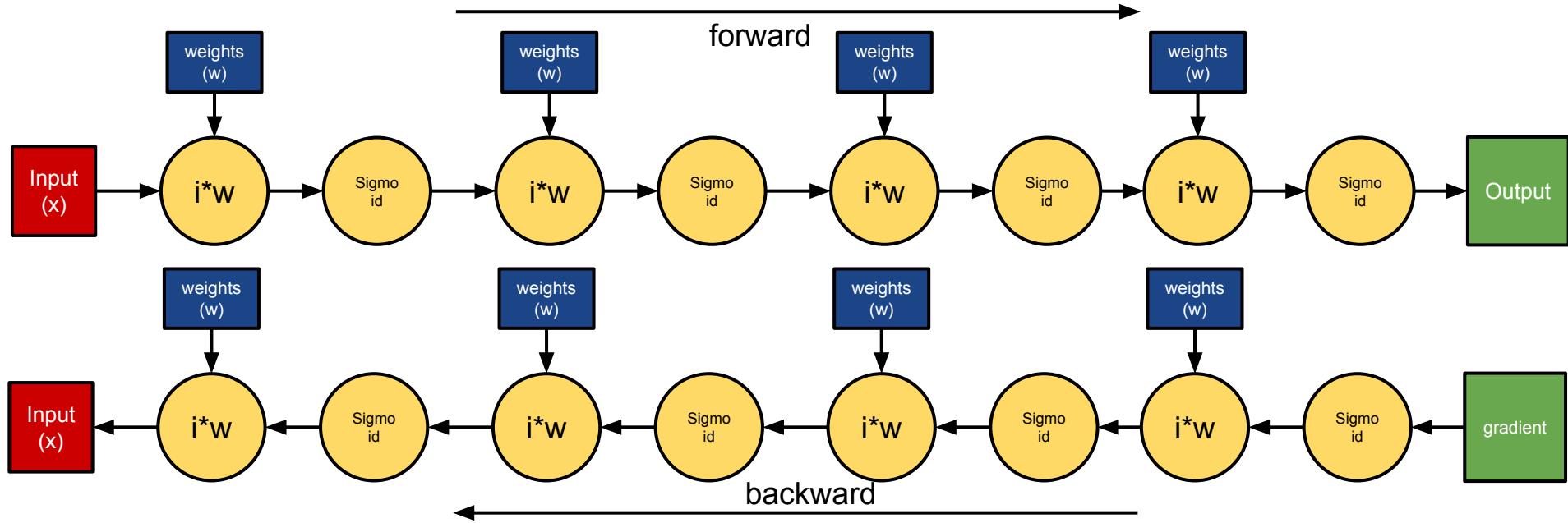


What is a deep neural network?

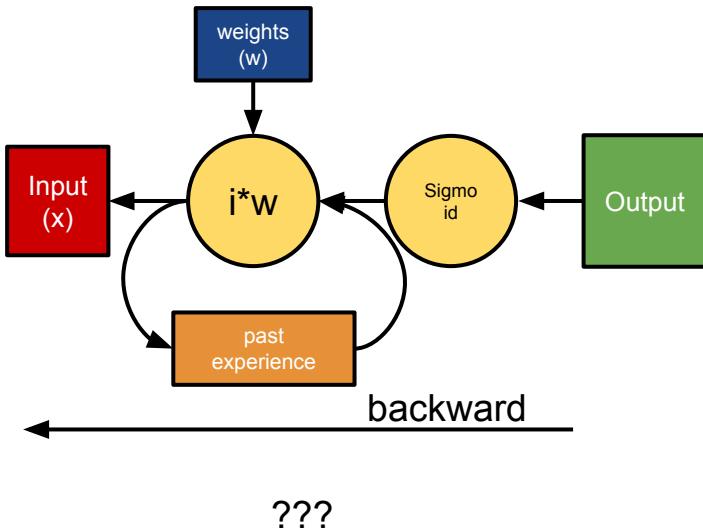
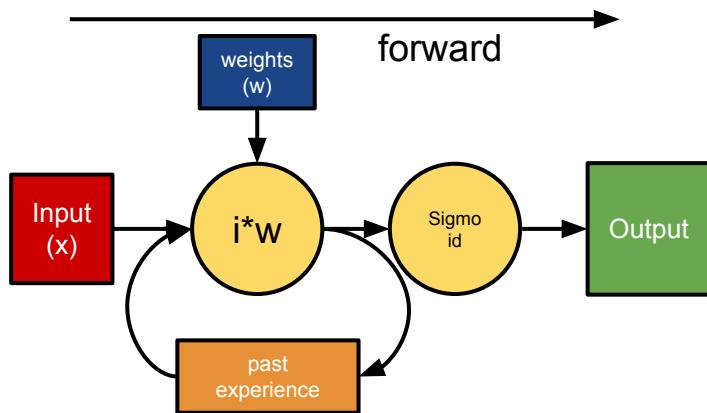


Neural networks vs computation graphs?

- Neural networks are trained via back-propagation
- Every node has $f(x)$ and $df(x)/dx$

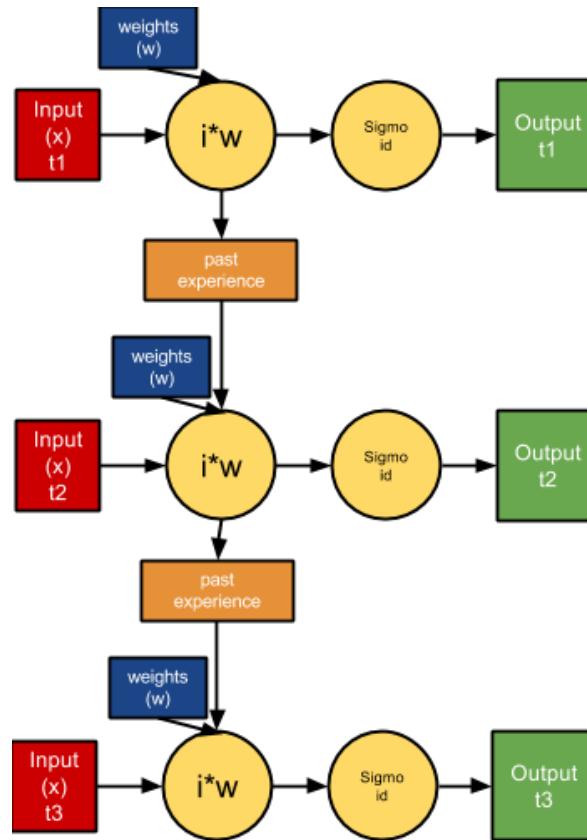


Acyclic computational graphs

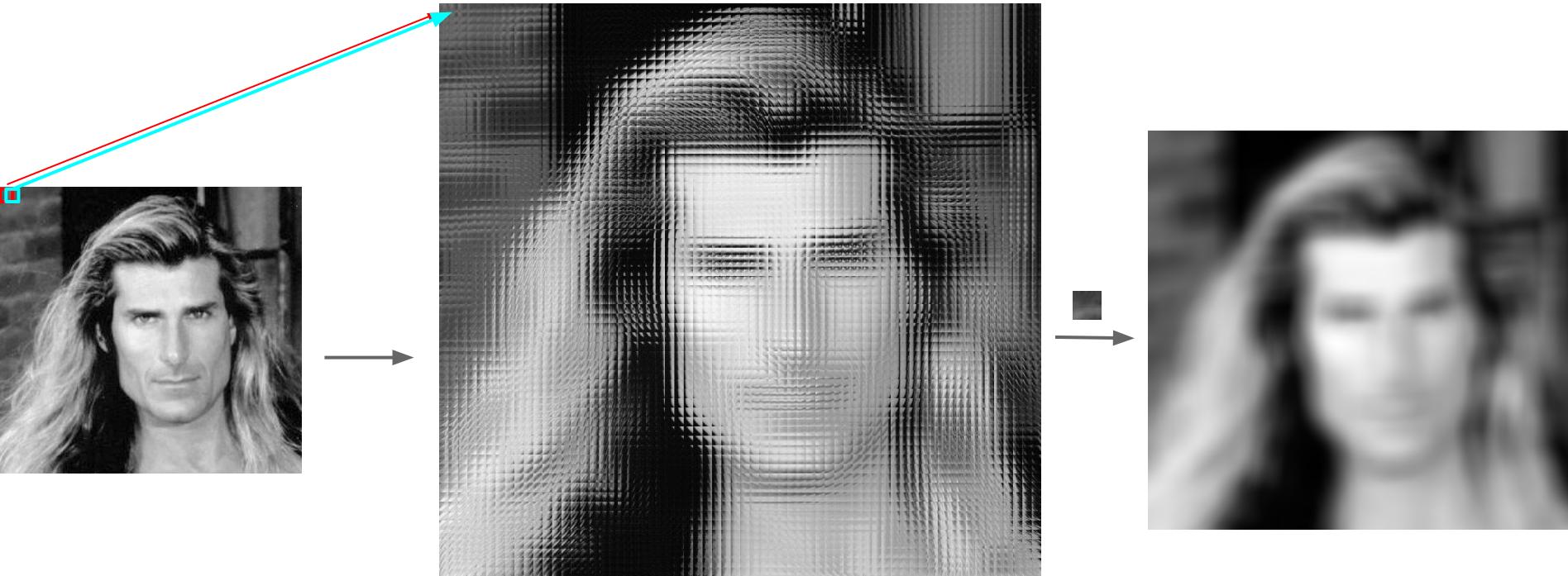


Acyclic computational graphs

Unfolding in time

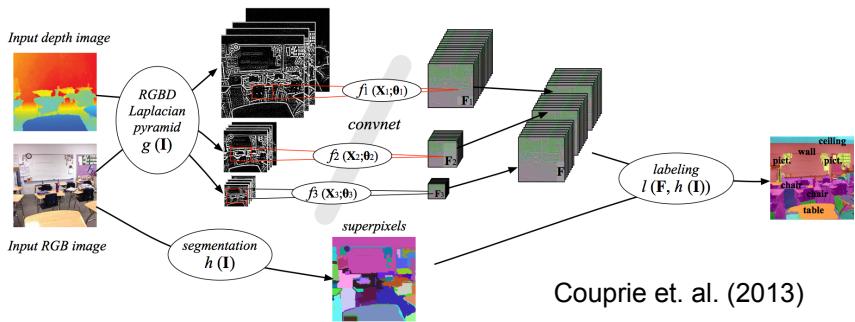


Convolutions

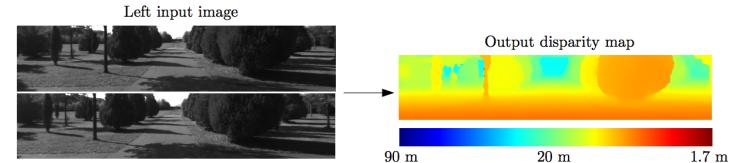


Vision

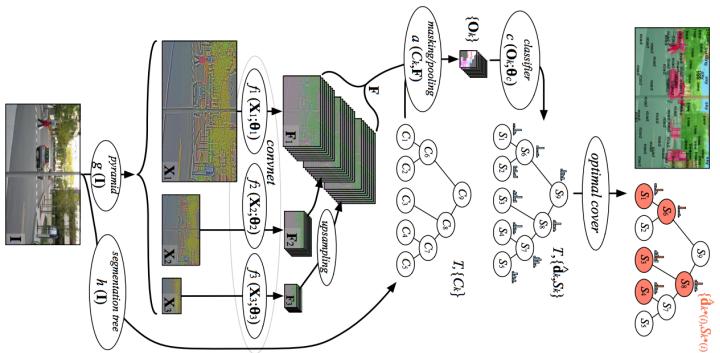
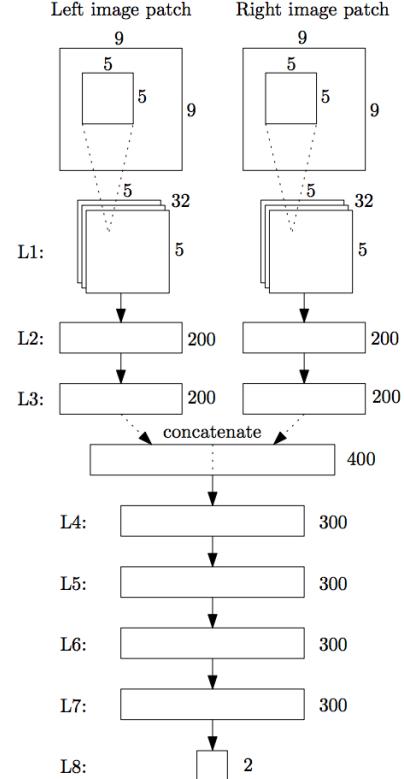
Segmentation and Stereo



Couarie et. al. (2013)



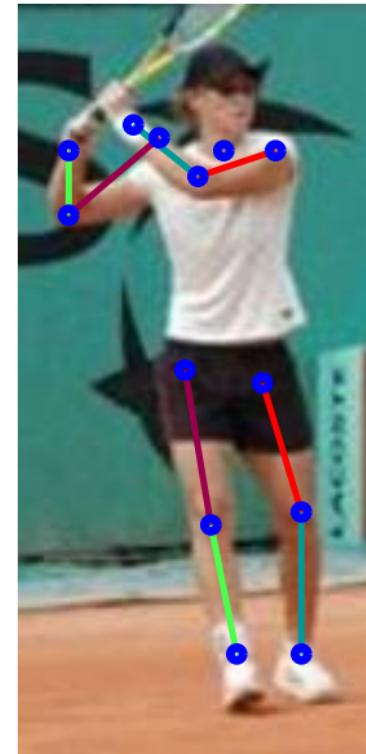
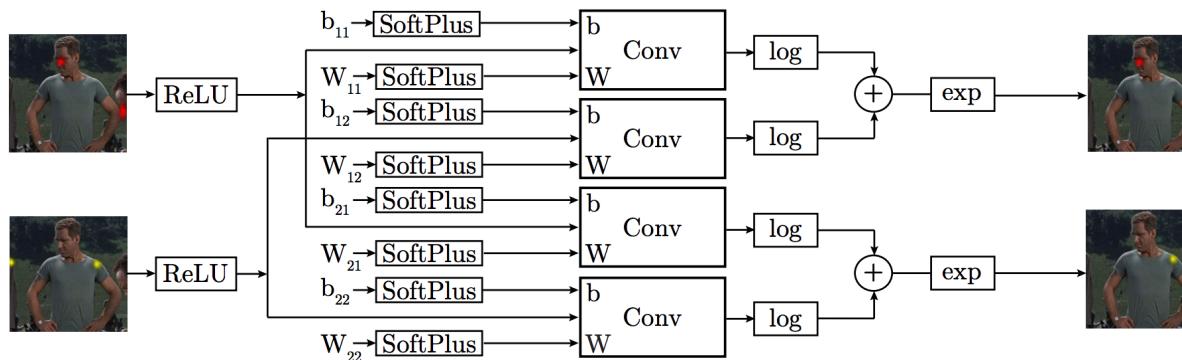
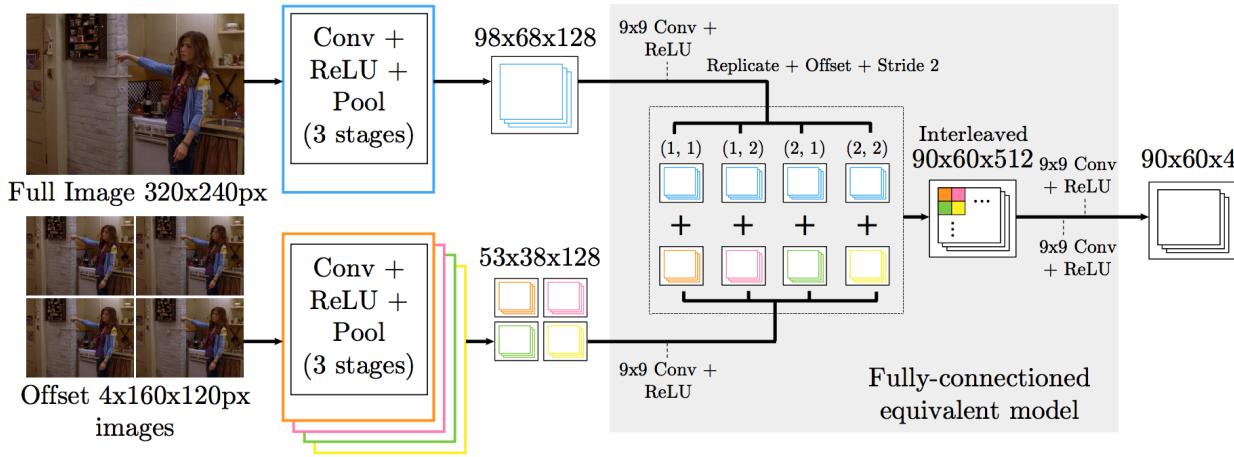
Right input image Left image patch Right image patch



Farabet et. al. (2012)

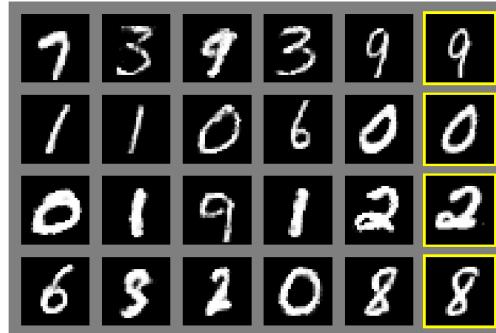
LeCun (2014)

ConvNets + Graphical Model (Tompson et. al. 2014)

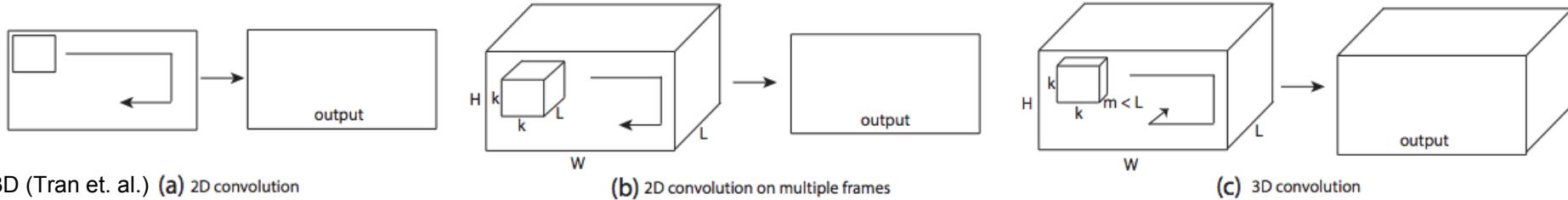


Generative Adversarial Nets

Goodfellow et. al. (2014)



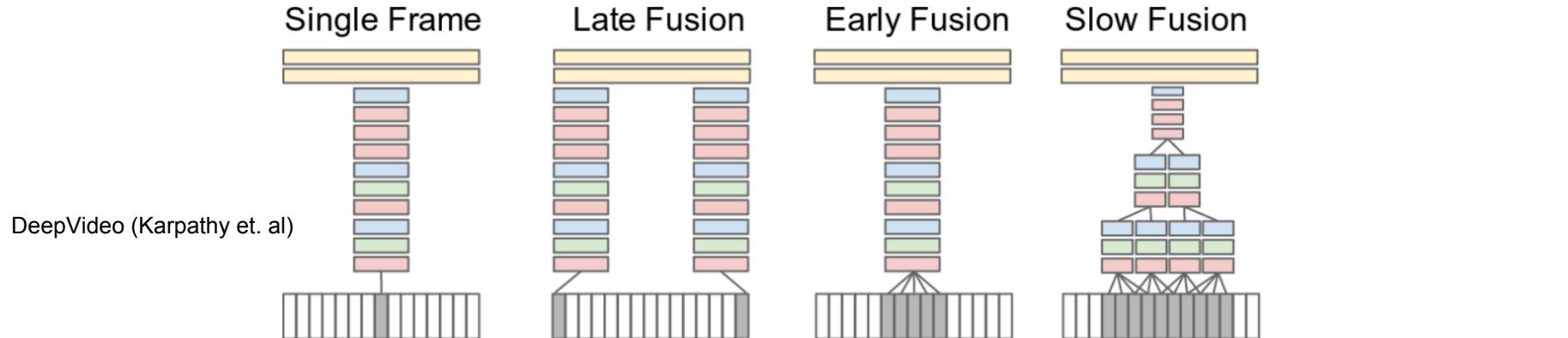
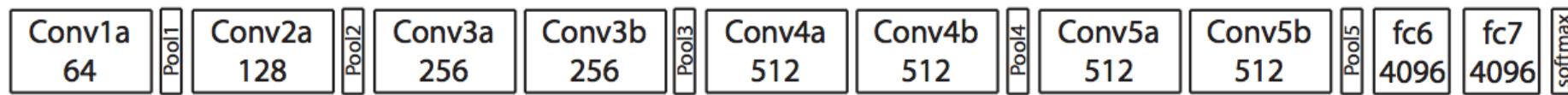
ConvNets for Video



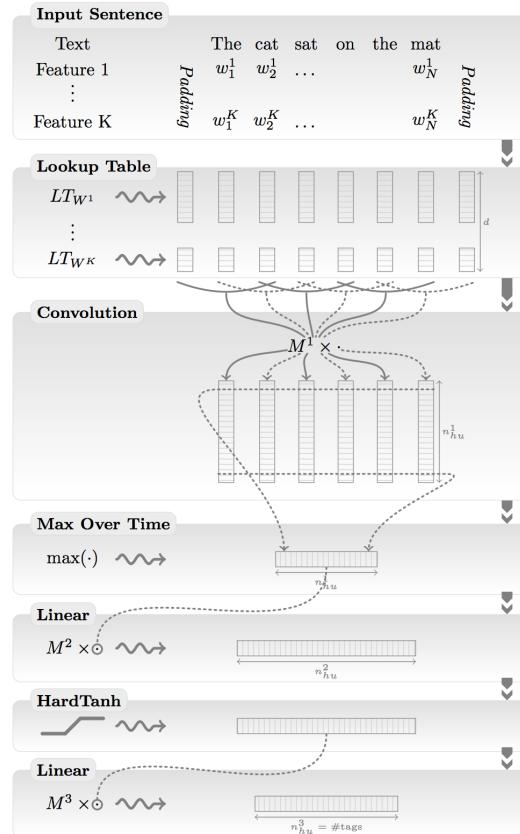
C3D (Tran et. al.) (a) 2D convolution

(b) 2D convolution on multiple frames

(c) 3D convolution

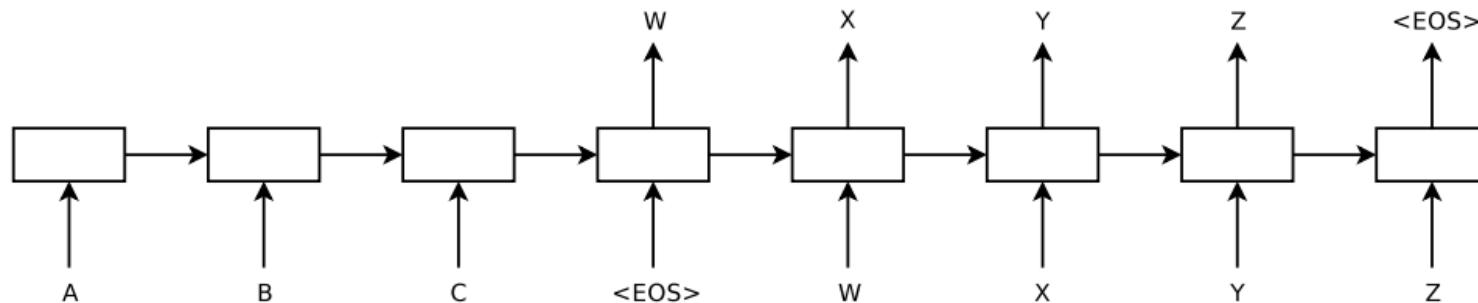


ConvNets for NLP



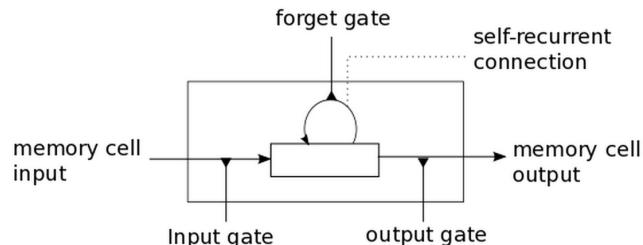
Collobert et. al. (2011)

RNN-LSTMs



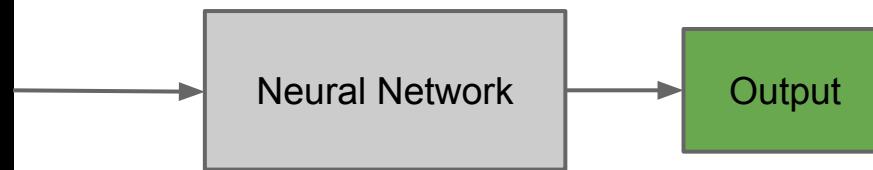
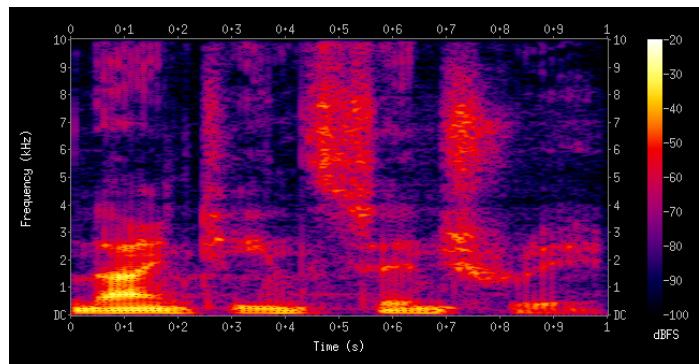
Sutskever et. al. (2014)

- Machine Translation
- Language Modeling
- Learning to execute (Python programs)



Basic LSTM unit (figure from deeplearning.net)

Audio



Hands-on Session

- Understand torch and the neural networks package at a high-level.
- Train a small neural network on CPU and GPU

Wi-fi information

For your info:

SSID: GTC_Hands_On

Password: H@nd50nGpu

CONNECTION INSTRUCTIONS

- ▶ Navigate to nvlabs.qwiklab.com
- ▶ Login or create a new account
- ▶ Select the “**Instructor-Led Hands-on Labs**” class
- ▶ Find the lab called “**Applied Deep Learning for Vision, Natural Language and Audio with Torch7**” and click Start
- ▶ After a short wait, lab instance connection information will be shown
- ▶ Please ask Lab Assistants for help!