Experiment 1:

Pytorch Introduction and Network Construction

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Deep Learning Frameworks

PyTorch

TensorFlow

飞桨

Keras

Caffe

theano

mxnet

Deep Learning Frameworks

- Pytorch： Dynamic Computation Graph
- Tensorflow： Static Computation Graph

- Pytorch: easy to read, just like python

- Active Community: supported by Facebook

会议	PT 2018	PT 2019	PT增长	TF 2018	TF 2019	TF增长
CVPR	82	280	240%	116	125	7.7%
NAACL	12	66	450%	34	21	-38.2%
ACL	26	103	296%	34	33	-2.9%
ICLR	24	70	192%	54	53	-1.9%
ICML	23	69	200%	40	53	32.5%

How to learn Pytorch?

- Understand the basis of Deep Leaning
- Learn the Pytorch tutorial
- Build a simple neural network
- Run the open source Pytorch projects
- Read deep learning papers, and implement their models
- Implement your own model

Overview

- **Purpose**

✓ Learn the basic operation of Pytorch

✓ Build a simple neural network

- **Content**

✓ Basic operation of Pytorch

✓ Build a 2-layer neural network with numpy

✓ From numpy to Tensor

Pre Done

✓ Tensor + autograd

✓ Tensor + autograd + nn

✓ Tensor + autograd + nn + optim

✓ Tensor + autograd + nn + optim + class

Focus

Content 1 - Basic Operation of Pytorch

- Tensor的构建

✓ 构建一个未初始化的5×3矩阵
✓ 构建一个随机初始化的矩阵
✓ 构建一个全部为0，类型为long的矩阵
✓ 从数据直接构建tensor
✓ 从一个已有的tensor构建另一个tensor
✓ 产生跟原来数据相同形状的tensor

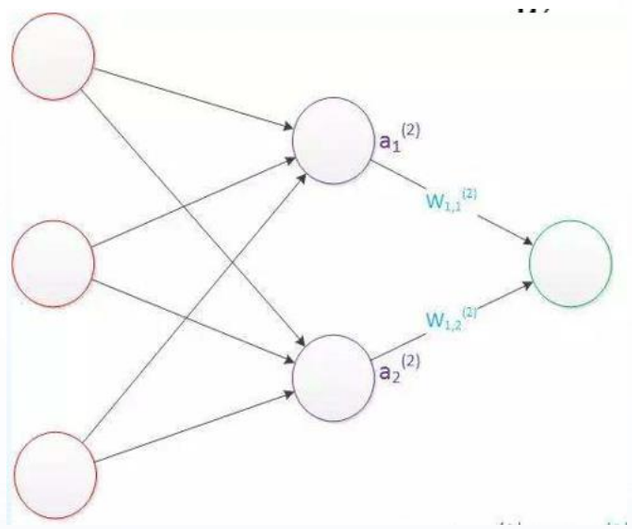
- Tensor的操作

✓ 加法运算
✓ Index 操作
✓ Resize 操作 (.view()函数)
✓ Tensor取值操作 （.item()函数）

Content 2 - Build a 2-layer NN with numpy

- 用Numpy构建一个全连接神经网络
  -- 包含一个隐含层，使用ReLU激活函数，没有bias，使用L2 Loss

- $h = W_1 X$
- $a = max(0, h)$
- $y_{hat} = W_2 a$



Content 3 - From numpy to Tensor

- 用Tensor替换Numpy构建该神经网络
  -- 包含一个隐含层，使用ReLU激活函数，没有bias，使用L2 Loss

Other Contents

- ✓ Tensor + autograd
  利用autograd直接计算梯度

- ✓ Tensor + autograd + nn
  利用nn库来定义神经网络

- ✓ Tensor + autograd + nn + optim
  利用optim来自动更新参数

- ✓ Tensor + autograd + nn + optim + class
  利用定义类的方式来重写该神经网络

Thank You!!!