

Práctica 1

Redes Neuronales

Curso 2023/2024

Máster Universitario en Inteligencia Artificial, Reconocimiento
de Formas e Imagen Digital

Departamento de Sistemas Informáticos y Computación

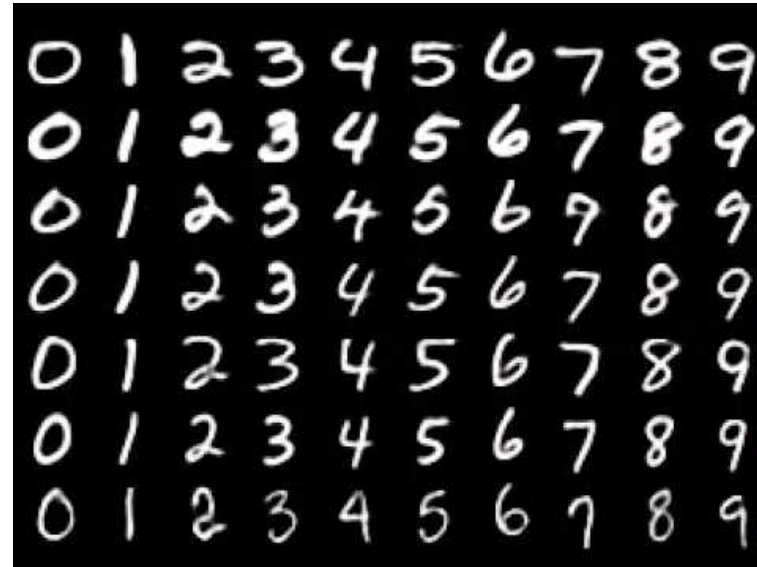
Lab Evaluation

- Lab total 4 points
- MNIST: 2 points
- CIFAR: 2 points

Dataset	Accuracy	Points
MNIST MLP	98,8%	0.5
MNIST MLP	99,0%	0.5
MNIST MLP	99,2%	0.5
MNIST MLP	99,4%	0.5

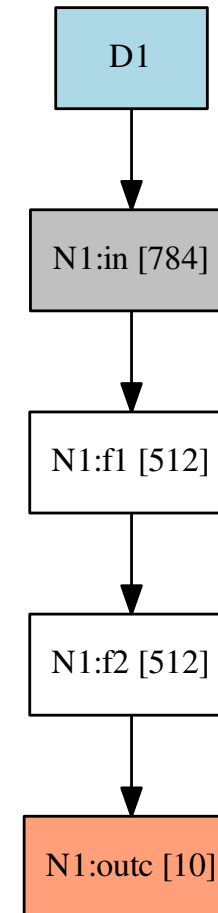
MNIST Dataset

- Digits in 10 classes
- Images of 28x28 pixels
- 60K training, 10K test



Goals

- Introduce the most important deep learning frameworks:
 - TensorFlow
 - Keras
 - Torch
 - PyTorch



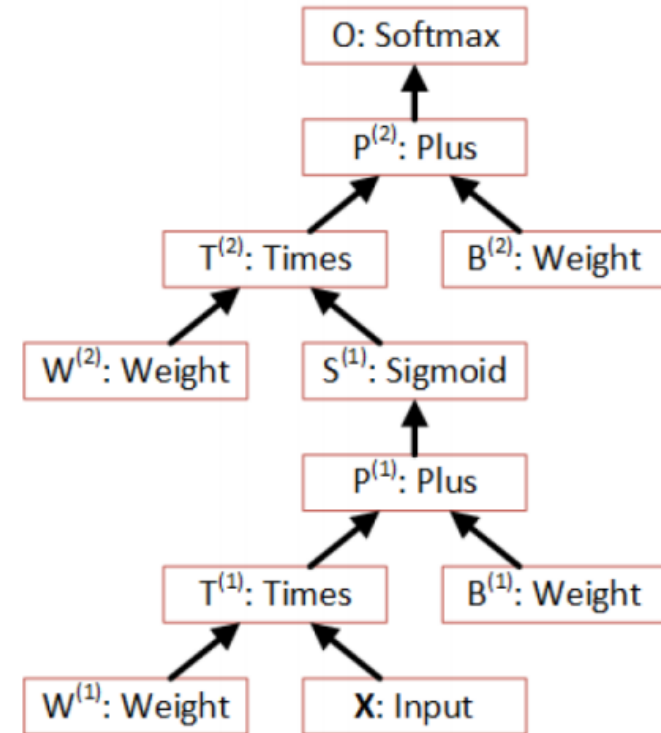
TensorFlow

- TF is an open source toolkit developed by Google
- <https://www.tensorflow.org/>
- Auto-differentiation



TensorFlow

- TensorFlow is an open source software library for numerical computation using data flow graphs
- Nodes in the graph represent mathematical operations
- Edges represent the multidimensional data arrays (tensors) communicated between them
- The system is general enough to be applicable in a wide variety of other domains



Keras

- Keras is a high-level neural networks API, written in Python
- <https://keras.io>
- Can run on top of TensorFlow, CNTK, Theano, **Pytorch**
- Allows for easy and fast prototyping



Torch

- Torch is a scientific computing framework
- <http://torch.ch>
- Wide support for machine learning algorithms that puts GPUs first
- Easy and fast scripting language, LuaJIT, and an underlying C/CUDA implementation.
- Neural network, linear algebra, computer vision...



PyTorch

- PyTorch is a python package that provides high-level features
- <http://pytorch.org/>
- Reverse-mode auto-differentiation
- PyTorch is designed to be intuitive, linear in thought and easy to use
- When you execute a line of code, it gets executed



Links to consider

- Github: <https://github.com/RParedesPalacios/DeepLearningLab>
- Google Colab: <https://colab.research.google.com/>
- Keras: <https://keras.io>
- Pytorch: <https://pytorch.org>

Make some modifications

Try different topologies and parameters:

- Number of hidden layers: [1-3]
- Size of hidden layers: [256, 512, 1024]
- Activation function: Sigmoid, Relu, other...
- Learning rate: [0.1, 0.01, 0.001, 0.0001]