Redes Neuronales y Aprendizaje Profundo

Redes Neuronales

Ph.D. Aldo Camargo [1]

[1]Postdoctoral Fellow en la Universidad de Maryland - USA
acamargo@som.umaryland.edu
aldo.camargo@gmail.com

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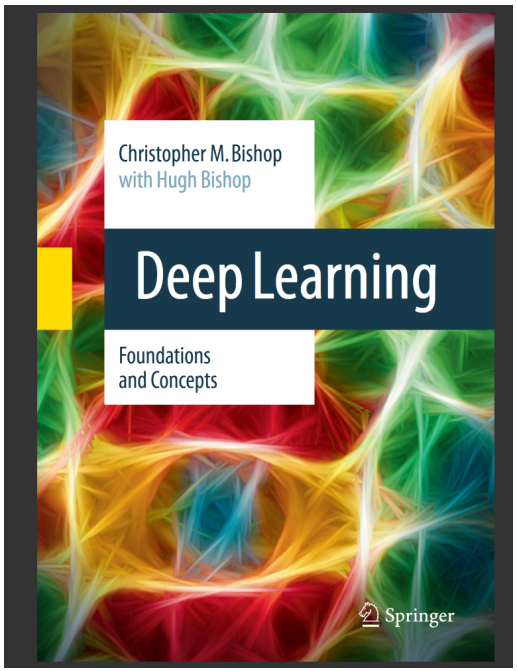
Introducción

Este curso se va a concentrar en el estudio de redes profundas (Deep Learning), vamos a ver las arqutectuas más importantes como AlexNet, ResNet, Inception, Yolo, UNet, RNN, Redes GAN, entre otras. Vamos a usar PyTorch principalmente por su flexibilidad, y facil de implementar nuevas y complejas arquitecturas. Todas las clases van a ser teóricas y prácticas, por lo que les recomiendo practiquen todo lo que se hace en clase para que lo usen en su trabajos finales de clase.



Introducción

Figure 1.14 Illustration of the Mark 1 perceptron hardware. The photograph on the left shows how the inputs were obtained using a simple camera system in which an input scene, in this case a printed character, was illuminated by powerful lights, and an image focused onto a 20×20 array of cadmium sulphide photocells, giving a primitive 400-pixel image. The perceptron also had a patch board, shown in the middle photograph, which allowed different configurations of input features to be tried. Often these were wired up at random to demonstrate the ability of the perceptron to learn without the need for precise wiring, in contrast to a modern digital computer. The photograph on the right shows one of the racks of learnable weights. Each weight was implemented using a rotary variable resistor, also called a potentiometer, driven by an electric motor thereby allowing the value of the weight to be adjusted automatically by the learning algorithm.

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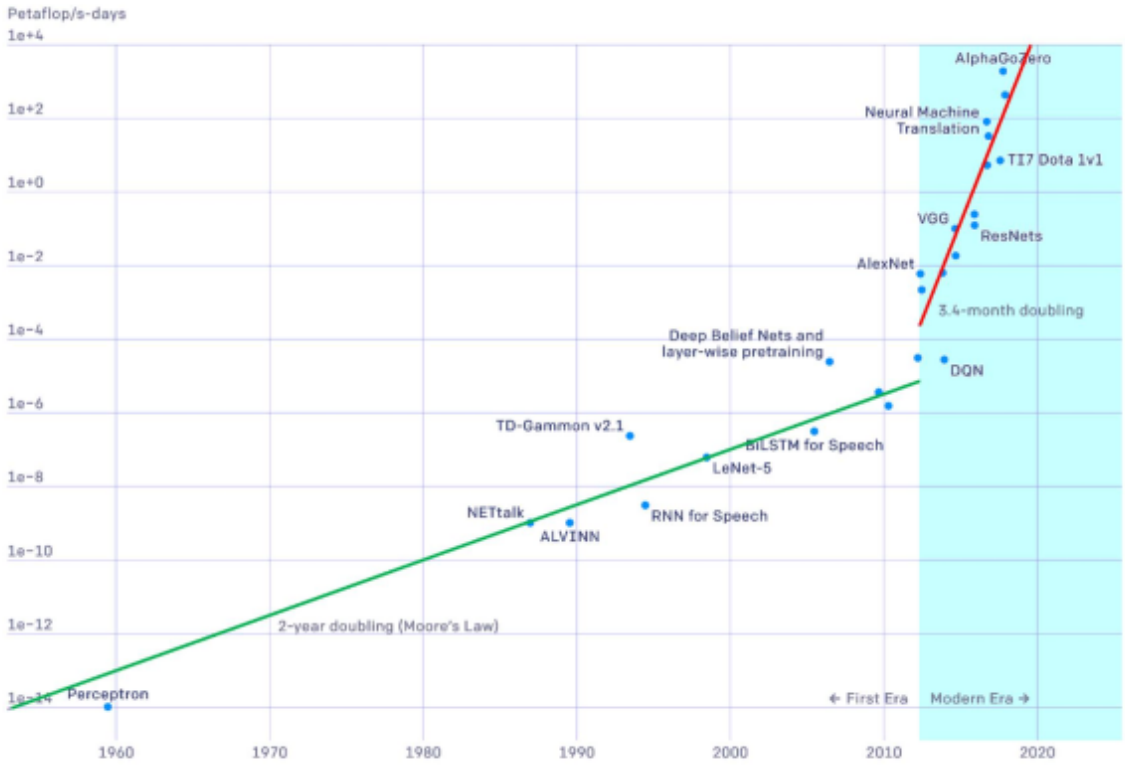

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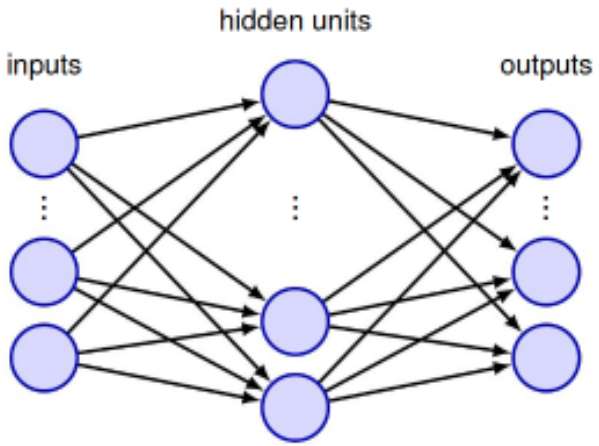
Neural Networks

Las redes neuronales artificiales son modelos computacionales inspiradas por las neuronas humanas. Consisten de capas interconectadas de nodos (neuronas) que procesan y aprenden patrones en la data. Su proceso de aprendizaje se basa en ajustar sus conexiones (weights) basados en experiencia (training data).

Figure 1.15 A neural network having two layers of parameters in which arrows denote the direction of information flow through the network. Each of the hidden units and each of the output units computes a function of the form given by (1.5) and (1.6) in which the activation function $f(\cdot)$ is differentiable.



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Back Propagation

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ConvNets

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