A brif introduction to Neural Networks

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Abstract: These notes are intended to be a generic introduction to to concept of neural network aimed to high-school level students. What can you expect: basic concepts, architecture, code snippets and few examples. What you will not find: state-of-the-art analysis, tools, techniques. I will also not include any of the 'advance' mathematical concept that is used under the hood to perform minimization. I will strive to provide references for the interested reader.

Contents

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1 What is a Neural Network

Generically, a neural network (NN) is a **nested** sequence of non-linear functions that take some input data and produce some output. Underwhelming, isn't it? Of course the devil is in the details, and how we constructed the actual output may vary between different types of networks. The name of the concept is evocative of how our neurons actually work, but needless to say that a NN is not actually modeling the inner workings of a neuron, with all of its complexity, chemistry, etc. Instead it tries to abstract away the generic layout of a network of neurons. Also, already a more primitive brain than the human one has a somewhat less clear structure in terms of inputs and outputs.

In this notes I will solely focus on the classical **feed-forward** NN. These are the basic concept upon which more evolved architectures are developed. For instance, if you want to process some image to classify its content (one of the classical examples) you may want to *do something* with your input image before feeding it to the network. This 'something' is some sort of convolution which allows a compression of the data without loosing

2 Where is d in the it usedrain than ?

3 The physics application, a closer look

References