Back Propagation

Definitions:

Backpropagation is the central mechanism by which neural networks learn. It is the messenger telling the network whether or not the net made a mistake when it made a prediction.

Sources:

- http://neuralnetworksanddeeplearning.com/chap2.html
- https://medium.com/datathings/neural-networks-and-backpropagation-explained-in-a-simple-w
- https://medium.com/datathings/neural-networks-and-backpropagation-explained-in-a-simple-w
- https://pathmind.com/wiki/backpropagation

Convolutional (CNN)

Definitions:

Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. The pre-processing required in a ConvNet is much lower as compared to other classification algorithms.

Sources:

- https://towardsdatascience.com/a-comprehensive-guide-to-convolutional-neural-networks-the
- http://deeplearning.stanford.edu/tutorial/supervised/ConvolutionalNeuralNetwork/

Dynamic Programming

Dynamic Programming:

Dynamic programming is a technique for solving problems recursively and is applicable when the computations of the subproblems overlap

DP Tools:

- Memoization (Top down)
  - an optimization technique where you cache previously computed results, and return the cached result when the same computation is needed again
  - storing the results of expensive function calls and returning the result when the same inputs occur again
- Tabulation (Bottom Up)
  - using iterative approach to solve the problem by solving the smaller sub- problems first and then using it during the execution of bigger problem
- Comparison
  - memoization usually requires more code and is less straightforward, but has computational advantages in some problems
    - mainly those which you do not need to compute all the values for the whole matrix to reach the answer
  - tabulation is more straightforward, but may compute unnecessary values
    - if you do need to compute all the values, this method is usually faster, though, because of the smaller overhead

Examples:

- Longest Common Subsequence problem
- Knapsack
- Travelling salesman problem

Sources:

- http://stackoverflow.com/questions/12042356/memoization-or-tabulation-approach-for-dynami