

Project Report

Architecture and Platforms for AI (M2)

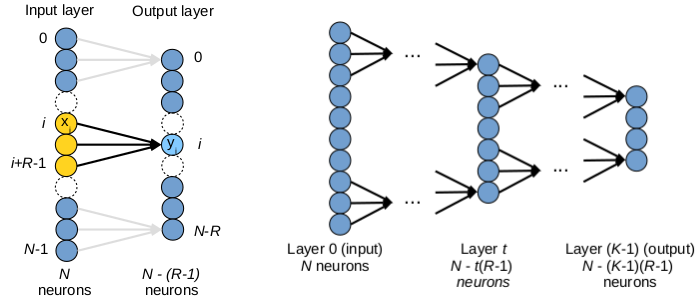
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1 Problem Brief Description

In this project we implement a simplified Neural Network. For each layer, the difference with a standard fully connected layer is that, when computing the value of each neuron node in the output layer, instead of using all neurons in the input layer, we use only R neurons, as shown in the left figure below. The activation function we use here is Sigmoid.

We then combine K such layers to form a Neural Network. The W and b parameters of each layer may be different while R is the same for all layers.



1.1 Implied constraints

Take a vertical line for instance, the total heights of all the traversed pieces should not be bigger than H , and we should check all the vertical lines. For the CP problem we use *sum* and *forall* for these two requirements respectively.

2 OpenMP Implementation

2.1 Auxilliary constraints

2.1.1 The small pieces whose heights $Hs[i] > 0.5 * H$ could only be placed horizontally

If the total heights of 2 rectangles are both bigger than half the height of the whole sheet, then they could not be placed vertically, which means that the x coordinates are different. Thus we could use global constraint *alldifferent* upon them. More strictly, suppose their width are w_i and w_j respectively, and

3 CUDA Implementation

4 Correctness Checking

5 Performance Analysis