

Can a neural network manipulate symbols and perform calculations?

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Abstract

Abstract here.

1 Preface

1. What is symbolic computation?

A symbolic computation is a calculation performed with symbolic representations of values and operations. A simple example would be the expression $(x + 1)(x - 1)$ which would evaluate to $x^2 - 1$, rather than to some numerical result.

2. What is calculation?

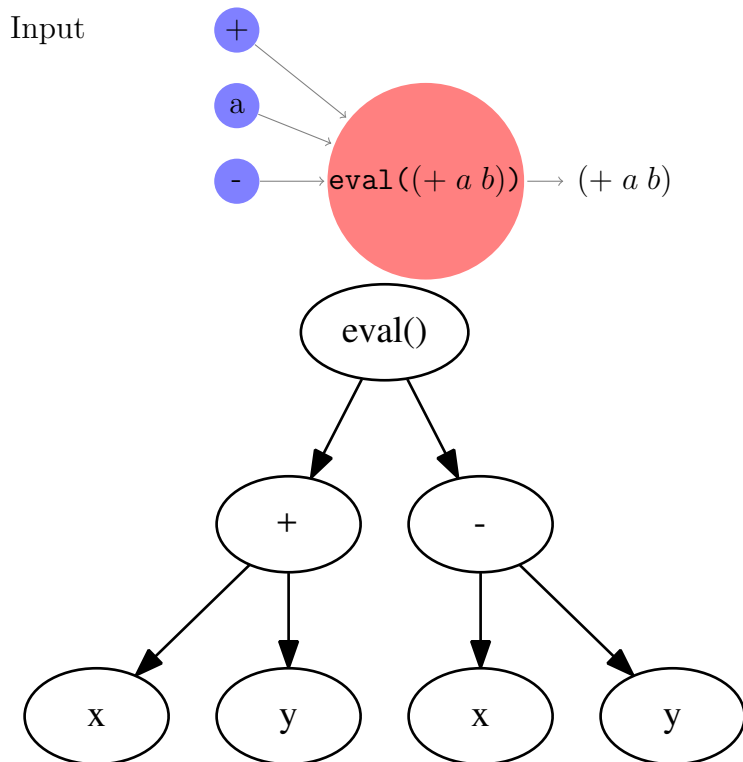
A calculation is a process by which one or more inputs is transformed into one or more results. One may calculate that the product of 5 and 4 is 20.

3. What is meant by a computational class? - do you mean complexity class?

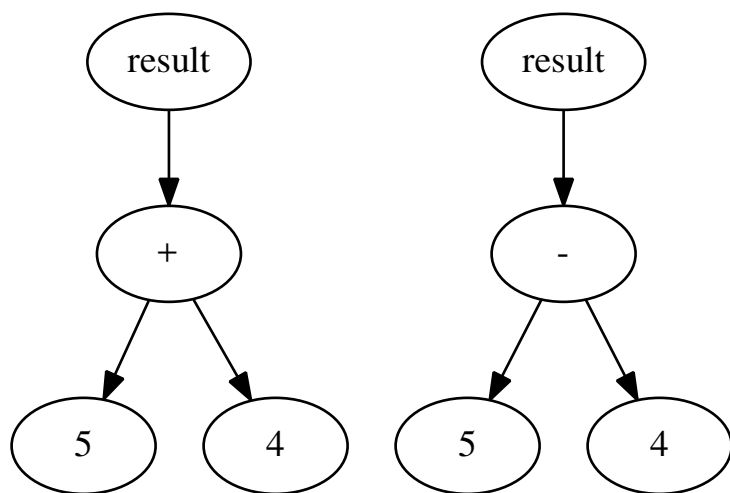
Code for each subsection of this document can be found at <https://github.com/DariusBxsci/NeuralNetworkResearch/tree/master/NeuralNets>.

2 Simple Addition/Subtraction Network

Consider the construction of a neural network to alternately add and subtract numbers. It is useful to represent all binary operations in list form, $(+ a b)$. The neural network, then, becomes a representation of a stack.



This tree-like structure closely mimics the abstract syntax tree which is generated by compilers when processing code in a program. For example, to evaluate the results of the expressions $+ 5 4$ and $- 5 4$, a compiler may generate the following trees:



To improve this sentence don't use *weasel words*. I don't know what *very similar* means to you. Neither a compiler nor interpreter *view* code. Neither are (yet) sentient beings.

The best piece of writing advice I can give is:

Mean exactly what you write and write exactly what you mean.