Using a neural network on "Coders Strike Back"

because why not

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What we try to achieve here

A light decent runner..

- Supervised learning on a good runner bot using a neural network.

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What we try to achieve here

A light decent runner..

- Supervised learning on a good runner bot using a neural network.
- Constrained memory use of the neural network.
- Low time cost with the neural network bot (to make all of this slightly less useless).

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Machine learning problem

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- Here we will try to imitate a bot.
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- Neural networks are one of many methods to do that.

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- Minimization done with simulated annealing heuristic.
- Extra points for reaching checkpoints early, for having some speed, and good angles at the end.
- Does not care about the opponent.

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- Normalizing everything (for example between 0 and 1) helps a lot the learning part of the Neural network.

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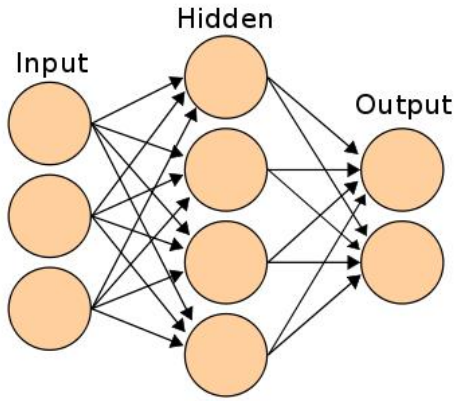
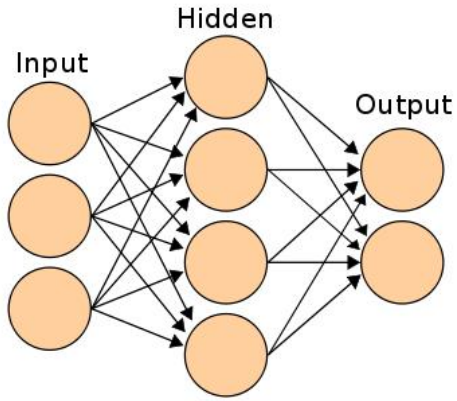
Neural network architecture

- The function defined by a neural network is easy to understand with a picture.



Neural network architecture

- The function defined by a neural network is easy to understand with a picture.
- Values go from inputs to outputs as follows : when you are on an arrow you are multiplied by a weight, on a neuron the value is the sum of the values that arrive. When you leave a hidden neuron, you apply a non linear function (for example tanh).



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- It's very simple to use after reading the short tutorial on its website, but quite slow.
- Data produced with C++ code is opened with file = open('mydata.txt','r') and file.readline().
- Saving the weights was a little tricky with PyBrain (a post on stack-overflow helped me).

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- The functions to create the inputs of the data set are used again here.
- Weights arrays are read from 4 very ugly 1-dimensional arrays that are created by the python code, and that are just copy-pasted every time.
- New arrays are something more understandable.
- Carefully implemented neural network on CodinGame using the definition/architecture of the neural network.

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- The bot may fail to cross many checkpoints, so it can be a good idea to reduce checkpoint radius in simulation.
- Another trick is to exaggerate thrust and angle difference given by the neural network.