Trading with Python

Predicting stock prices using an LSTM

How to make cash with Python


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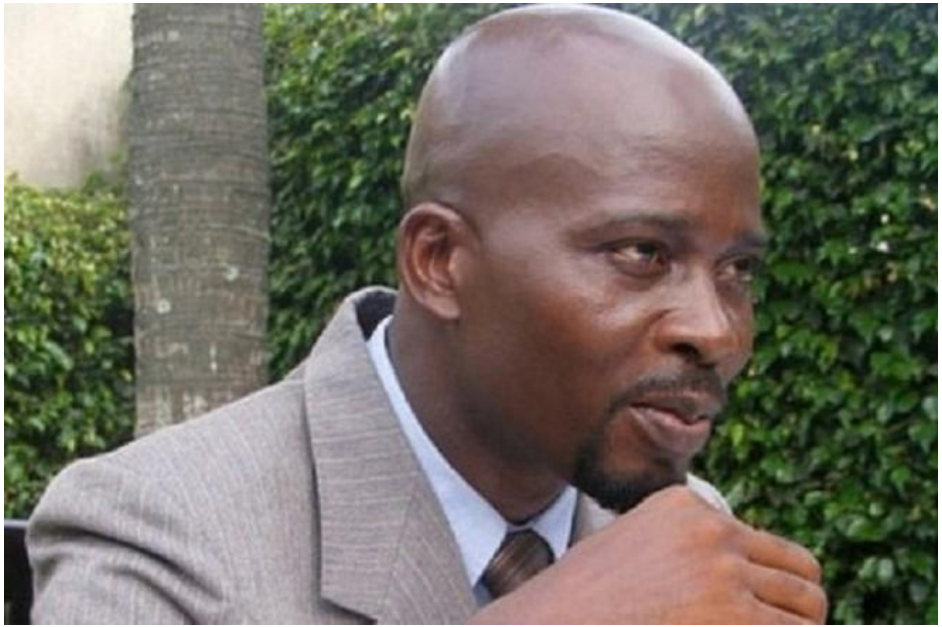

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ARE YOU SURE
YOU'RE READY?

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Some basics in finance

Trading
Using short-term movement in prices of an asset to make money as opposed to buy-and-hold investing.

Stock
A share of ownership in a company. Generally issued during an IPO.

Some basics in maths

Mean

The central value of a set of numbers. i.e: `sum(list) / len(list)`

Matrix

An array of numbers. A matrix can have multiple dimensions.

```
[1, 3, 5, 7, 9]

[[1, 1], [2, 2]]

[[1, 3, 5], [2, 4, 6]]
```

Side note

Mean Squared Error

MSE is the average of the difference between the actual value and predicted value (error) squared. It is a measure of the quality of an estimator. MSE > 0 and the closer to zero the better.

$$\mathrm{MSE} = \frac{1}{n} \sum_{i=1}^{n} (y_i - \tilde{y}_i)^2$$

Side note

Standard Moving Average

Standard moving average is a type of moving average. It lets traders identify the current trend of the asset (whether it will keep going up or down). It is a lagging indicator as it uses past prices to indicate current trend.

$$SMA = \frac{A_1 + A_2 + ... + A_n}{n}$$

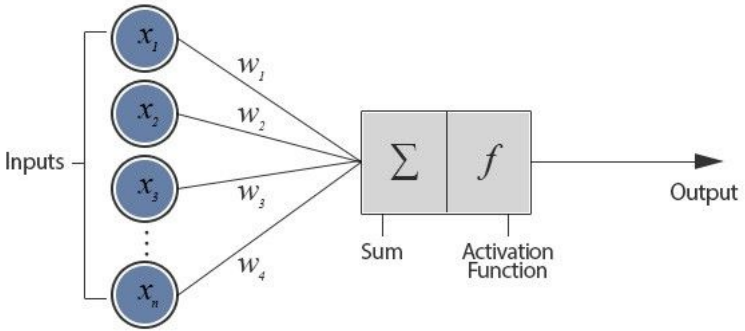

PLEASE, I AIN'T DONE
I'M JUST GETTING STARTED

Some basics in deep learning

Artificial Neurons

A neuron is a computational unit. It takes a set of inputs with weights and outputs a value, in its simplest form. Weights help emphasize useful input for learning. Neurons have a summation processor that sums inputs with their weights and an activation function which determines the output.

$$y_k = \varphi\left(\sum_{j=0}^{m} w_{kj} x_j\right)$$

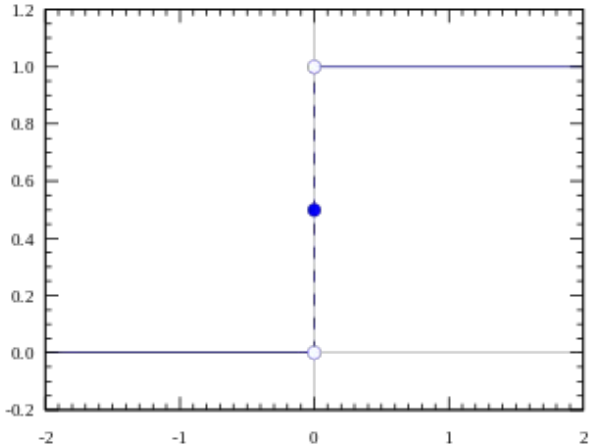


Some basics in deep learning

Activation Function

An activation function takes the sum of weighted inputs and calculates an output. It adds non-linearity to the otherwise linear neurons which helps better approximate a complex non-linear phenomenon. The simplest activation function is the binary step function.

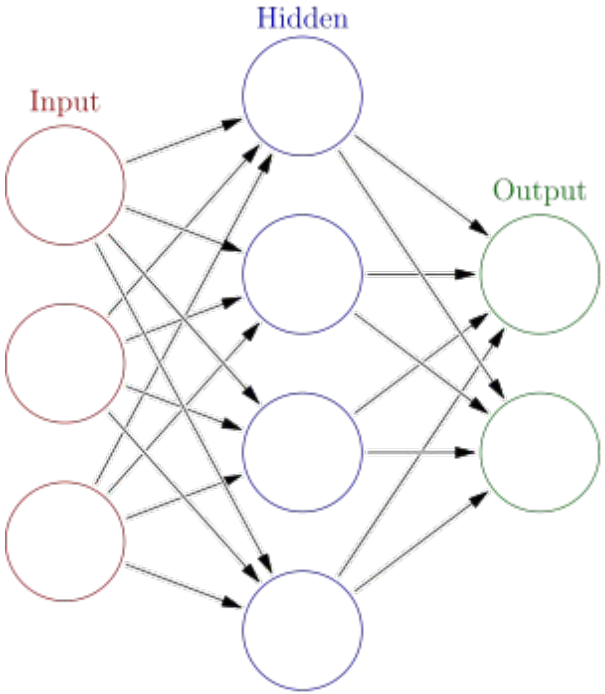
$$f(x) = \begin{cases} 0 & \text{for } x < 0 \\ 1 & \text{for } x \geq 0 \end{cases}$$



Some basics in deep learning

Artificial Neural Network

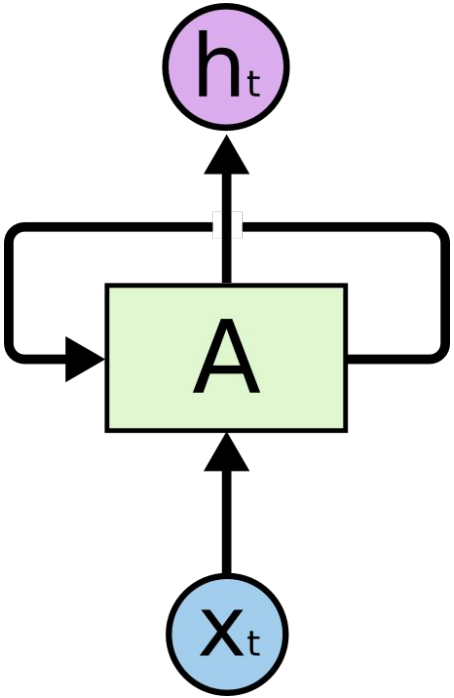
An ANN is composed of layers of neurons that take a set of inputs and generates an output which is sent to the next layer of neurons. It uses a learning algorithm to optimise the weights and activation thresholds of the different connections between neurons.



Some basics in deep learning

Recurrent Neural Network

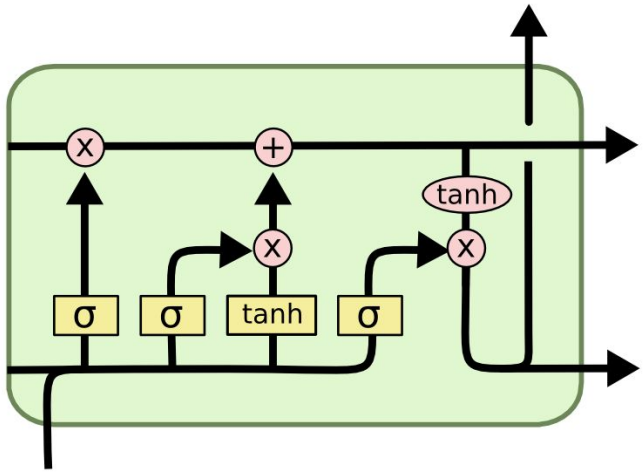
Most ANN only process data in one direction (forward). However, some problems require having knowledge of past data (like predicting the next frame in a movie). RNN solve this problem by feeding the previous output back into the network as input thereby creating a loop.



Some basics in deep learning

Long Short-Term Memory Networks (LSTM networks)

RNN suffer from the problem of short-term memory. If a sequence is long, the network will have a hard time carrying information from earlier steps. LSTM solve this problem by using gates (functions) to regulate the flow of information and deciding what to keep and what to throw.



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