Implementation of Face Recognition using Neural Networks in C

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Abstract

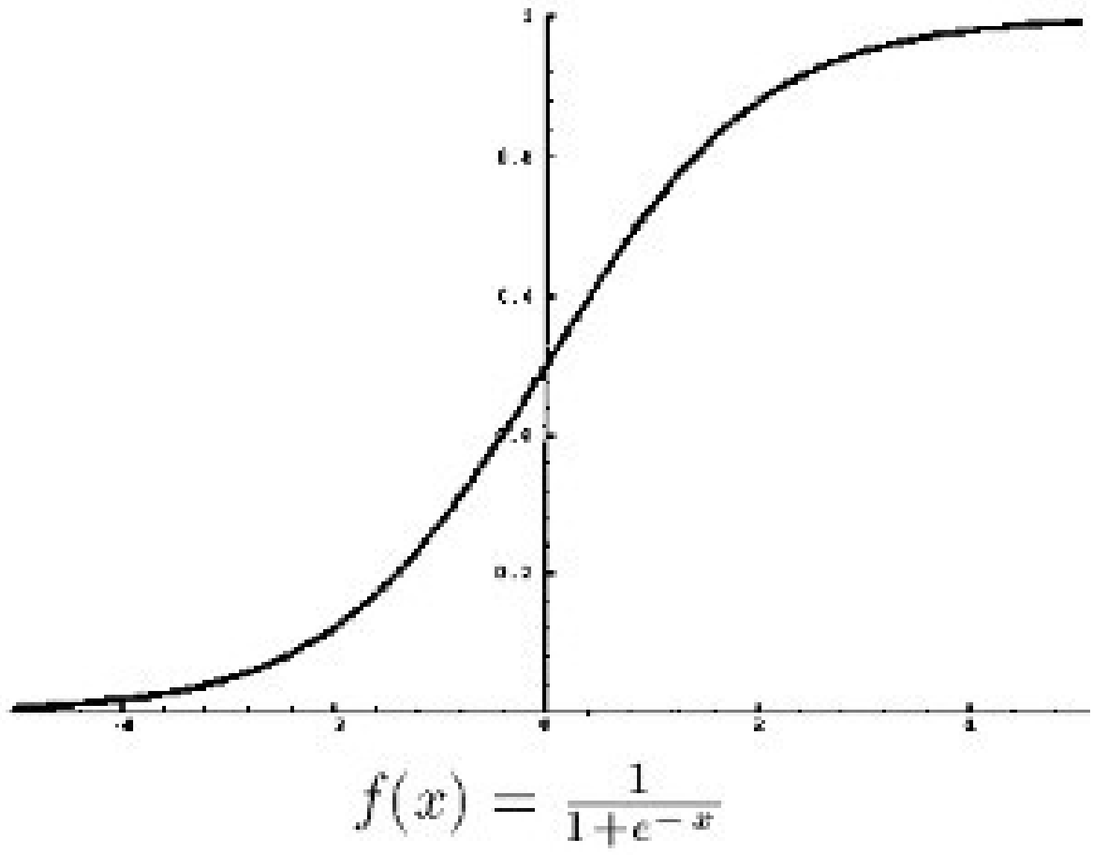
This project aims to produce an algorithm for face recognition using a double-layer perceptron neural network.

What are Neural Networks?

An artificial neural network is a computational model which emulates the biological structure of the brain. It is a system of interconnected virtual neurons which are capable of modifying their connections, adapting their responses based on accuracy. This modeling of biological networks has widespread use in such areas as pattern recognition.

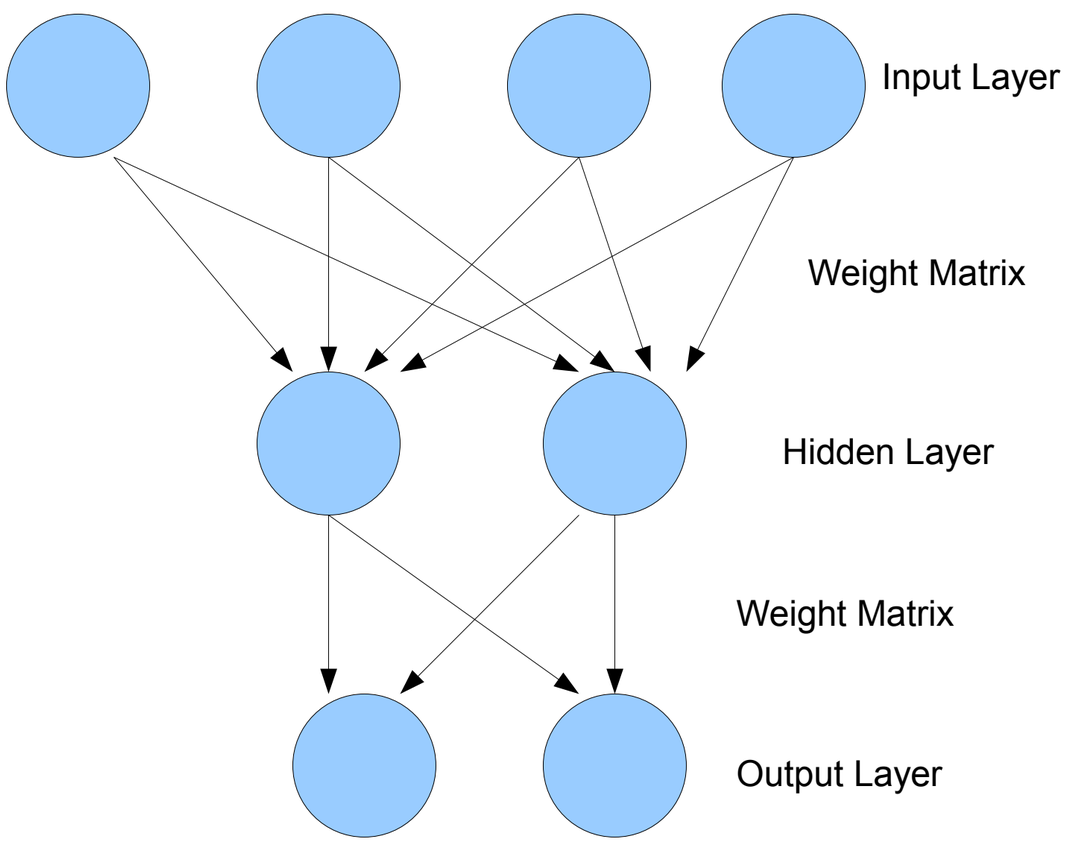
Implementation

My program is completely implemented in C. It uses the shown structs and method below to create interconnected neurons, organizing them into a structure similar to that on the right in figure 1.2. Each neuron adds up the values of each of the neurons connecting to it, multiplied by each connection's respective weight, and feeds it into the sigmoid activation function (graphic 1.1) to determine that neuron's value.



$$f(x) = \frac{1}{1+e^{-x}}$$

1.1 The Sigmoid Function



1.2 An Example Two-Layer Perceptron Neural Network

Sample Code

```
typedef struct _connection {
   float weight;
   struct _neuron * from;
} connection;
typedef struct _neuron {
   float d;
   connection * cons;
}neuron;
neuron* mkneuron(int c) {
   neuron* n = malloc(sizeof(neuron));
   n->d = 0;
   connection * a = malloc(c*sizeof(connection));
   n->cons = a;
   return n;
}
```