

Automating Snake Game using A.I.

1.0 About

This project is to automate snake game using a neural network. In this game a neural network (A. I.) is trained to play snake game. The A.I. Is able to grab food and also it tries avoid from crashing into it self.

2.0 Implementation

Here I have used a neural network with six input neurons, four output neuron and one hidden layer of ten neurons. The inputs are the x and y distances to food and four squares around the head of the snake to see if they are occupied by its own tail (x, y and 1, 2, 3 and 4 in Figure 2.0).

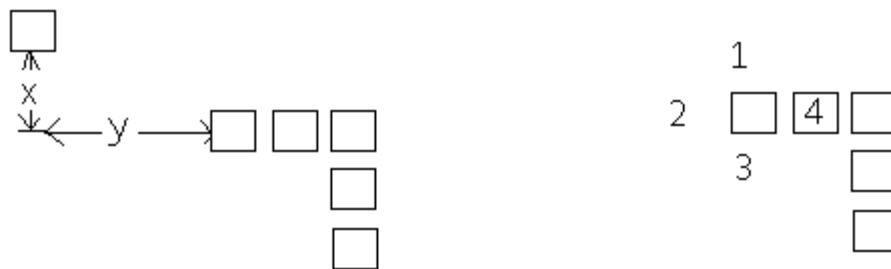


Figure 2.0

The neural network has four outputs for four directions. The program checks for the first output greater 0.5 then turn the snake to that direction.

```
if(out[0] > 0.5){
    mx = -1;
    my = 0;
}else if(out[1] > 0.5){
    mx = 1;
    my = 0;
}else if(out[2] > 0.5){
    mx = 0;
    my = 1;
```

```

}else{
    mx = 0;
    my = -1;
}

```

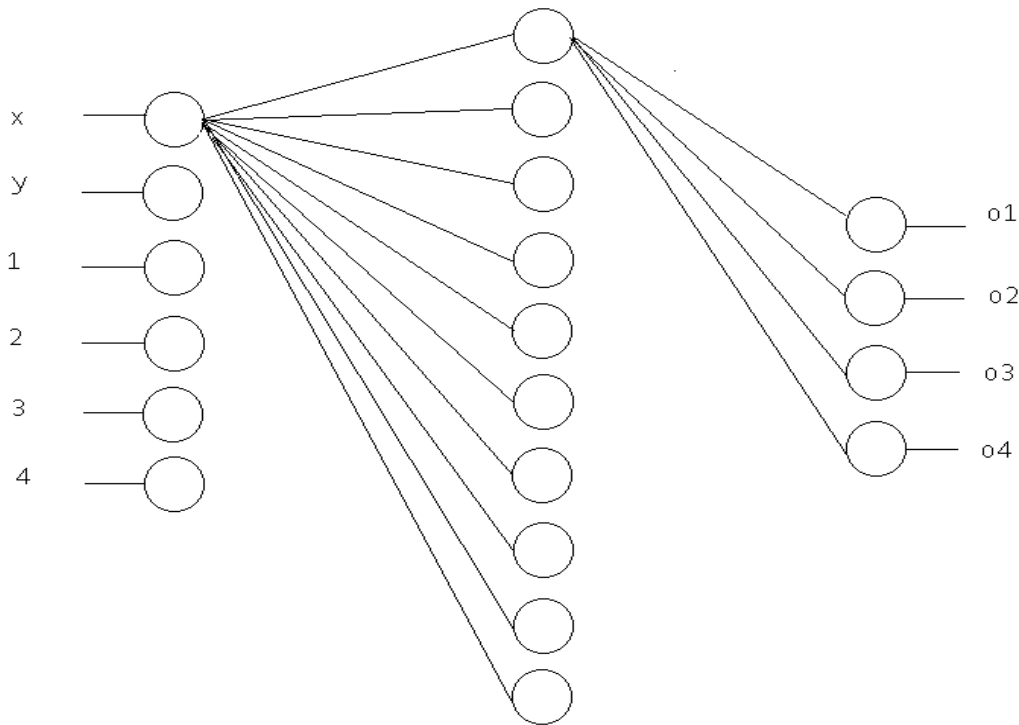


Figure 2.1

The network uses back propagation with 0.01 learning rate to learn . First the neural network starts with random weights and then the program moves the snake and sets the weights. In start the snake is restarted in every wrong move it takes. This process gets lot of time so we can minimize the time between iterations to make it fast. After about 40,000 the weights will be trained enough. Then we can lower the speed and press 'f' to stop restarting in every wrong move. Now it only restart when it crashed on it self or on the walls. But it does still the learning. To stop the learning we can press 'n'. This cannot play the game perfectly but it can score up to 30 -35 max.

3.0 Compiling and Running

You need 'openGL' and glut to compile . Install them by running,

```
sudo apt-get install freeglut3-dev
sudo apt-get install libgl1-mesa-dev
```

on terminal. Then use make command to compile.

Then to use this first you have to use trainer to train the network. Run it using terminal using,

```
./[executable]
```

command. The trainer has following keyboard commands.

- p - pause
- s – reset food
- t - increase the time between two frames
- y - decrease the time between two frames
- l – start leaning
- n – stop leaning (the color of the snake will turn into yellow when this pressed)
- f – stop resetting the snake.
- R – start resetting the snake.
- esc – close

4.0 Screen Shots

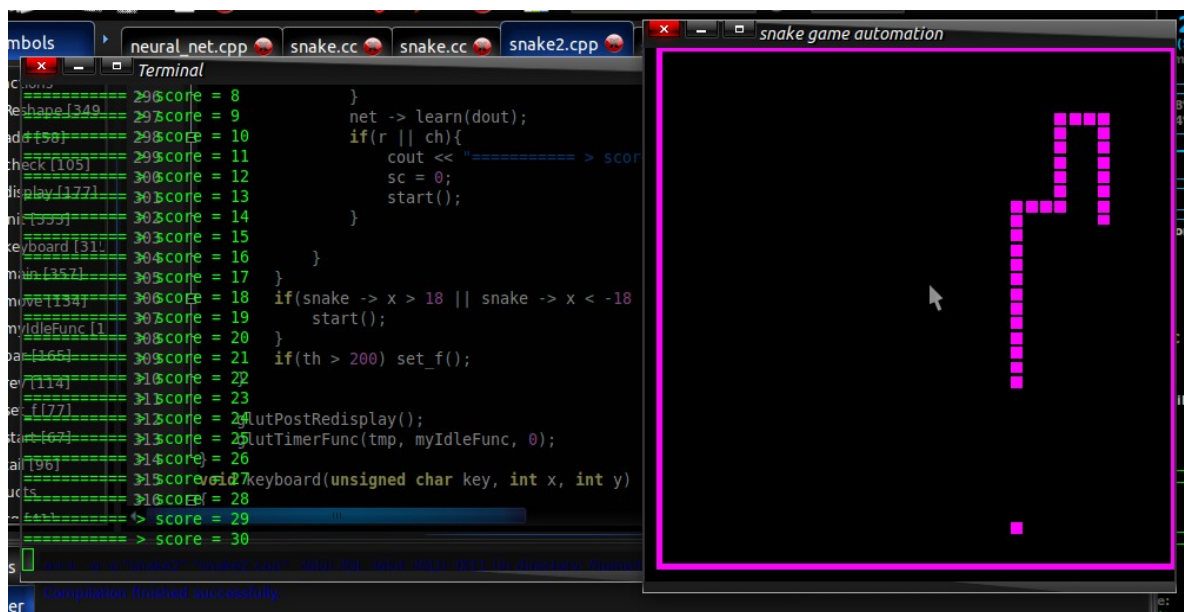


Figure 4.0

5.0 More Info

- tcg.galahena@gmail.com
- <http://www.inf0warrior.blogspot.com>

6.0 License

Copyright 2012 Tharindra Galahena

This program is free software: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation, either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with This program. If not, see <http://www.gnu.org/licenses/>.