CSCE 420 Individual Project Specification

Due: 11:59 P.M. Tuesday, April 25, 2017

The project is to design and write a computer game program using a neural network. The object of the game is to keep the computer from guessing the player’s next choice of two possible values. We will call the choices 0 and 1 below, but you are free to use heads/tails, maroon/white, on/off, up/down, etc. instead for the game storyline you choose. There are two parts to the game, a training phase and a testing phase.

In the training phase the player starts by making 64 choices, attempting to be as random as possible, which the program observes. Call the 64 values . The program treats 32 consecutive values as inputs to the neural network and the next value as the neural net output, and trains the neural net (by back propagation) to learn the mapping f for

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In other words, f uses the most recent 32 values to predict the next value.

Once the neural net is trained on these 32 cases, the testing phase begins. This consists of the neural net’s making in advance a secret prediction of what each of the player’s next 32 choices will be, one at a time. In other words, the computer secretly predicts

tells for the player to choose, and then compares its guess to that choice.

The computer then says something like “I guessed right—no points for you!” or “You outsmarted me—10 points for you!” and displays the player’s score and the per cent of the time the computer has guessed correctly so far in this game. Repeat this process until the testing phase is complete (32 predicted choices), and ask the user if they want to play again.

You may write your own code for the neural net and back-propagation training, or use a package or other source, in which case you must cite the source in comments and in the report. Note: The pseudocode is in the textbook.

Your program should run on build.tamu.edu (except for Honors credit, which must run on Mathematica 11) and must be submitted both to CSNET and also on a CD or DVD. The project report (described below) should be submitted on paper to your TA, along with your CD or DVD. Write a report according to the outline below.

REPORT OUTLINE

The project report must be printed on a laser printer. The report should include the following sections:

1. Statement of the problem, significance, etc.
2. Restrictions and limitations
3. Explanation of your approach (analysis and experiments to choose how many layers, how many neurons in each layer, learning rate and schedule, number of back-propagation iterations, etc.)
4. Sample run (screen shots)
5. Results and analysis
6. Conclusions - What did you show? What did you learn?
7. Future research (how your program could be improved or extended)
8. Instructions on how to run your program
9. Listing of the COMMENTED program
10. Bibliography - references used, if any