AI Project Report

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Introduction:

We had the task to evolve a controller for a simulator of cars i.e. TORCS

We had been provided with different sensors value and task in hand was to evolve those values on runtime such that car played best without much of the collisions. The better the values, better the car played.

Technical Challenge:

The problem in hand was to train a neural network , which could take some input and map it to an output using feature extraction and learning wait by back propagation. But to train a neural network, we needed data. Data which was correct and which we could classify as absolute truth. To **generate data,** we had to find a client which was good on most of the tracks and did less collisions. Clients available were not good enough. We researched and found out a client by the named **Ahura.** Client was very good on most of the tracks. And it helped us get some very important data. We generated a **data of the following form** using this client, Input of Sensors (7 variables), and against them there were actions written**.**

Training of Neural Network:

After we got the data, work left to do was train a neural network and learn weight matrix by using back propagation algorithm. Here, data was very big (in Mbs), so training was a hectic task. It took some hours to train the neural network.

Network took sensor values as input and predicted the action against those sensor values. Network used, back propagation for tuning the weight matrix.

Framework Used:

We used couple of frameworks for tuning neural networks. Following are the details.

i)   Deep learning 4j: It is an open source framework to train deep neural networks.

ii)   JOONE, Java Object Oriented Neural Engine: Framework is completely written in

java. It provides facility to create and tune multi-layer neural networks. You can customize the activation function, number of neurons in each layer and other parameters.

Results:

We were able to achieve fairly good results and the client managed less collisions and good speed. Turn taking ability of the client was observed to be very good.