Applications of Neural Networks

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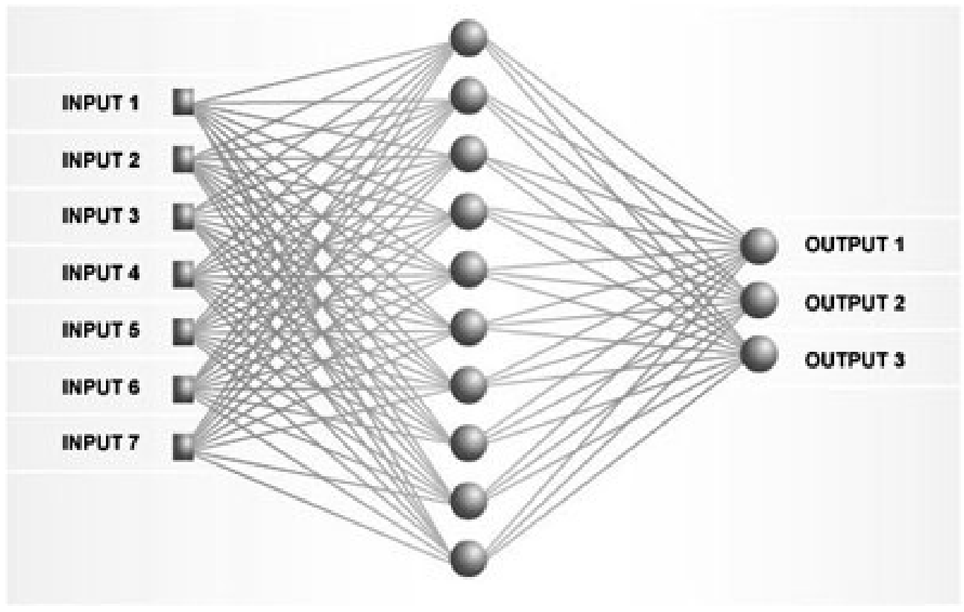
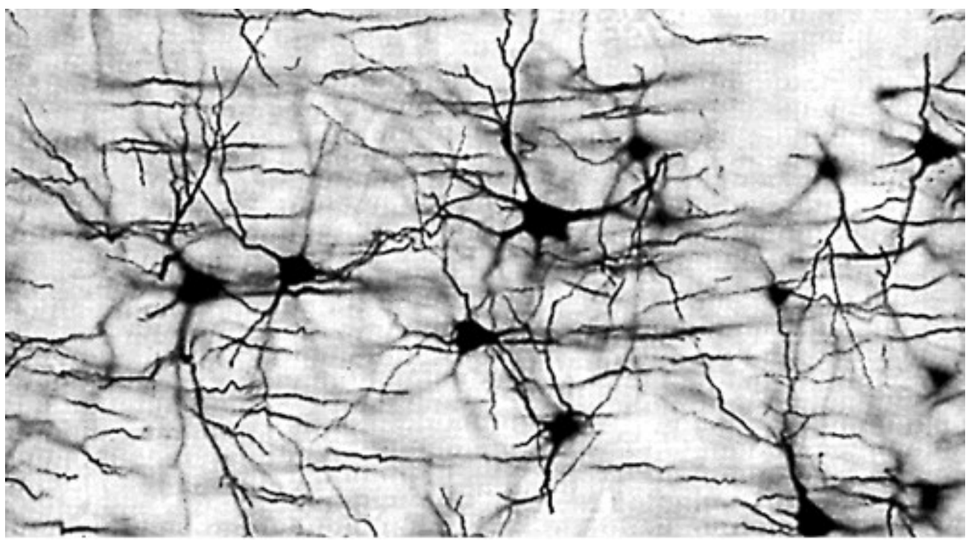
Abstract

Neural networks are a powerful way of finding patterns and functions. Traditional methods and algorithms often have trouble finding patterns in data when there are noisy data and imperfections. Neural networks are designed to handle noise and be able to find complex patterns in noisy data. In that way, they are ideal for applications like predicting the stock market, compressing data and analyzing musical compositions. Furthermore, different types of neural networks have different strong points; this project will attempt each of the applications with various types of neural networks.





Background

The purpose of this project is to present a viable solution using neural networks to applications including predicting the stock market, efficient compression of data, and the analysis and composition of music. The major problem with predicting the stock market so far has been that one cannot factor in all the events that may occur. Will there be a scandal? Will a related company go bankrupt? Thus, a concrete prediction is impossible. Similarly, musical compositions are hard for computers to compose. Neural networks do not have any creativity; they merely emulate and categorize data. Therefore, it is necessary to train the network on the music you want it to compose.

Results

Both the Backpropogation network and the Competitive network have been coded so that they will be able to be adapted for a variety of applications. The purpose of this project was not just to find good applications for neural networks and use them, but also to create a flexible set of networks and utility classes for the Java platform that anyone may use for their own purposes. Both networks require more training data to perform effectively. On test data, the Backpropogation and Competitive networks ran fast and were trained effectively.