Uses of Neural Networks

Suppose you see a breed of dog you’ve never encountered before. Would you know it’s a dog? For that matter, would you know it’s an animal? Probably so. You know, because you’ve learned by example. You’ve seen lots of living things, have learned to classify them, and so can recognize a dog when you see one. A neural network simulates this human ability to classify things without taking prescribed steps leading to the solution. A neural network (often called an artificial neural network or ANN) is an artificial intelligence system that is capable of finding and differentiating patterns.

Neural networks are most useful for identification, classification, and prediction when a vast amount of information is available. By examining hundreds, or even thousands of examples, a neural network detects important relationships and patterns in the information. For example, if you provide a neural network with the details of numerous credit card transactions and tell it which ones are fraudulent, eventually it will learn to identify suspicious transaction patterns.

Here are some examples of the uses of neural networks:

- Many banks and financial institutions use neural networks. For example, Citibank uses neural networks to find opportunities in financial markets. By carefully examining historical stock market data with neural network software, Citibank financial managers learn of interesting coincidences or small anomalies (called market inefficiencies). For example, it could be that whenever IBM stock goes up, so does Unisys stock. Or it might be that a U.S. Treasury note is selling for 1 cent less in Japan than it is in the United States. These snippets of information can make a big difference to Citibank’s bottom line in a very competitive financial market.

- In Westminster, California, a community of 87,000 people, police use neural network software to fight crime. With crime reports as input, the system detects and maps local crime patterns. Police say that with this
system they can better predict crime trends, improve patrol assignments, and develop better crime prevention programs.

- Fingerhut, the mail order company based in Minnesota, has 6 million people on its customer list. To determine which customers were and were not likely to order from its catalog, Fingerhut recently switched to neural network software. The company finds that the new software is more effective and expects to generate millions of dollars by fine-tuning its mailing lists.

- Fraud detection is one of the areas in which neural networks are used the most. Visa, MasterCard, and many other credit card companies use a neural network to spot peculiarities in individual accounts. MasterCard estimates neural networks save them $50 million annually.

- Many insurance companies (Cigna, AIG, Travelers, Liberty Mutual, Hartford) along with state compensation funds and other carriers use neural network software to identify fraud. The system searches for patterns in billing charges, laboratory tests, and frequency of office visits. A claim for which the diagnosis was a sprained ankle and which included an electrocardiogram would be flagged for the account manager.

- FleetBoston Financial Corporation uses a neural network to watch transactions with customers. The neural network can detect patterns that may indicate a customer’s growing dissatisfaction with the company. The neural network looks for signs like a decrease in the number of transactions or in the account balance of one of Fleet’s high-value customers.