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DSS-5104-091 – DEEP LEARNING

Week 5 – Task 3

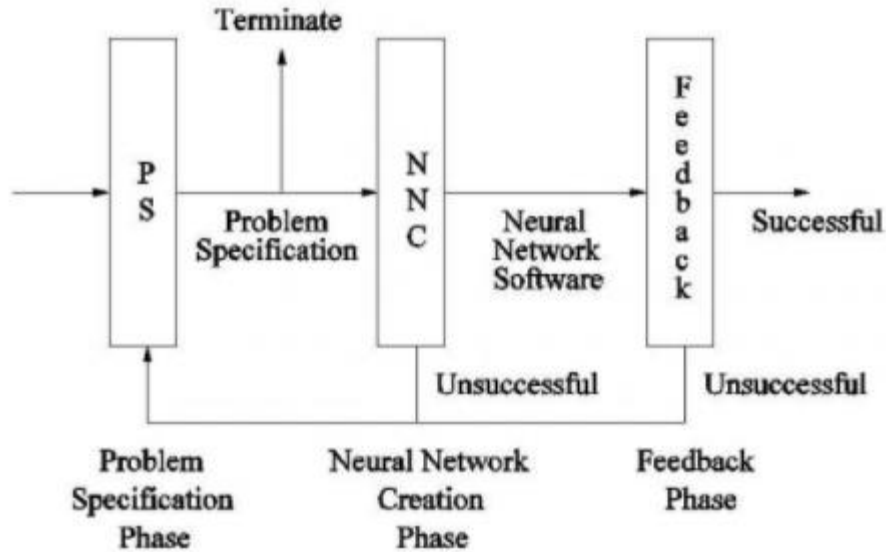
What is a neural network? According to an article written by James Chen, a neural network is a series of algorithms that endeavors to recognize underlying relationships in a set of data through a process that mimics the way the human brain operates. In this sense, neural networks refer to systems of neurons, either organic or artificial in nature. Neural networks can adapt to changing input. The network generates the best possible result without needing to redesign the output criteria. The concept of neural networks, which has its roots in artificial intelligence, is swiftly gaining popularity in the development of trading systems. (1)

There are many pros to deep learning/neural networks. They are the following:

1. Data: Because of the massive amounts of data that is being gathered, neural networks really show their potential since they get better the more data that is fed into them.
2. Computational Power: With the rise of deep learning, the higher the computational power, the more data that can be processed.
3. Algorithms: Since there have been more advances in algorithms and how fast that they can compute, the more data can be computed and processed.
4. Marketing: With the new name for neural networks being “deep leaning”, it helped open a bunch of new avenues and awareness to the field.
5. Performance: Neural networks are usually able to outperform nearly every other machine learning algorithm.

However, not everything is perfect and comes with disadvantages. The following are the disadvantages of deep learning/neural networks:

1. Black box: It is unknown why the neural network came up with a particular output.
 - a. For example, when entering the image of a cat into the neural network, and it predicts it to be a dog, it is hard to understand why it came to that prediction. Some people/companies want a prediction that is human interpretable.
 - i. Good example why banks don't use neural networks to see if someone is creditworthy since they would need to explain to them why they were not approved.
2. Neural Network Development Process: There are some libraries (Keras and Tensorflow) that make development of neural networks simpler, however, sometimes we need more control over the algorithm. Also, it is expensive for companies to build a neural network when sometimes the problem can be solved by other means.



3. Amount of Data: Usually for a neural network to be useful, we need a lot of data. The amount of data should be in at least the thousands if not millions. The amount of data can really drive whether a neural network is needed in the first place, or if the problem can be solved by other machine learning algorithms.
4. Computationally Expensive: Neural networks are very expensive compared to the traditional algorithms. Creating one could take several weeks or longer depending on what question is being asked. More traditional machine learning algorithms take much less time to train in comparison.

In conclusion, neural networks could be the great to solve problems that have huge amounts of data in the right environment. However, sometimes a more “human” touch maybe more necessary in certain situations. We need to remember that neural networks are great but only when necessary, since sometimes the problem can be solved with simpler algorithms and is more cost efficient.

(1)

<https://www.investopedia.com/terms/n/neuralnetwork.asp#:~:text=A%20neural%20network%20is%20a,organic%20or%20artificial%20in%20nature.>