Application of ANN In Health Care

Now days health care organization are moving more towards machine – learning techniques , such as Artificial Neural Networks (ANN) , to improve the delivery of care at a reduced cost . As we all know that we use ANN to identify a disease from its sign and symptoms i.e. diagnosis. But now the use of ANN is slowly increased to inform health care management decisions Neural Networks have the same approach as that of a human brain, the neural networks are a computational approach which is based on a large collection of neural units with large clusters of biological neural connected by Axons just like our human brain. The most important thing of ANN is that it is a self – learning and self – trained system.

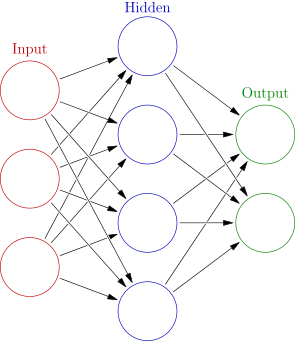


Fig 1.1 Simple ANN Model

The above diagram show the working of a neural network, where on the left side is the input which we provide to the model and then comes the hidden layer where the processing takes place and then finally it provides the output. To understand the concept of ANN in a much better and simpler way here is an example of a doctor and his patient. For example a doctor wants to know whether his / her patient as it any risk or suffering from any disease. In general cases the doctor will take blood tests, urine test and test of patient’s vitals. Now, it would be very good and helpful for the doctor if he comes to know the disease with the help of the following test but what if the doctors knows only a handful of risk – factors or at a worst case the doctor has no idea of the risk factor at all? It would be very difficult or next to impossible. In such extreme cases ANN comes very handy which help to provide the predictions in health care that the doctors and the surgeon couldn’t address alone. They first collect the data and then try to capture the complex relationship of the vital important pieces which might not be initially obvious.

Neural Networks can be seen mostly in those fields where Artificial Intelligence has taken huge step in the health care field. There are a few companies that are working on the basis of ANN and AI such as “Atomwise“which is backed by the Data collective and Khosla Ventures. The company recently publishes its first Ebola treatment drugs. Company such as Icarbonx are also developing AI platforms to facilitate research related to the treatment on various diseases and preventive care. Then there is Butterfly Networks which is also currently working on heart of the medicine and engineering sectors by bringing together world-class skills in everything from electrical engineering, to mechanical engineering, and medicine.

With the help of ANN we can reduce the mortality rates in the hospitals, by helping doctors to come up with faster treatments for serious illnesses, to provide quick and accurate diagnosis for a particular human which might be impossible to spot with human intelligence alone. As we see the increase on population and increase in global warming lead to various diseases and side effects to human which becomes a load for the doctor to access a large number of patient, this might also lead to some error which may be happen due to the exertion or lose of concentration of doctors because of fatigue or tiredness so ANN can help us to limit the errors. Improve cancer care – In the case of WATSON, an analysis of cancer patients found something new and important in 30% of individuals. Picking up the medicines and rehabilitation that suits your genetic makeup best. ANN is also used to analyse blood and urine sample as well as tracking glucose level in diabetics and determining ion fluids in fluids. It is also used to analyse medical images such as X-Ray, MRIs and tumour detection. As for every network there are a few pros and cons so for the ANN we also have a few cons such as to perform our ANN model accurately we need a large amount of data and the most often error faced is “black box” i.e. the output provided is a black box for our query. The most important usage of ANN in the field of health care is that is a self- learning model and it helps in reading large amount of data and which can be sometimes difficult to interpret with human intelligence alone. In such huge amount of data there is also a possibility of flukes of proxy, for example if we tossed a coin three times and all three times we got Tails as the result, it doesn’t mean that the coin has only tails side. It just means that we have to do further evaluation and more testing to provide a better result. Although the ANN technologies are attracting substantial attentions in medical research, the real-life implementation are still facing obstacles, the first hurdle comes from the regulations.

The second hurdle is data exchange. In order to work well, AI systems need to be trained (continuously) by data from clinical studies. However, once an AI system gets deployed after initial training with historical data, continuation of the data supply becomes a crucial issue for further development and improvement of the system. In the coming few years ANN will surely play a more vital role in the field of health care. As we know that there are few obstacles and problems which are being faced in the modelling and implementation of the model for accurate results. The deeper we will go in the study of machine learning the more helpful it will be for our future generations.