The potential of predictive healthcare

Julie Pelta, senior advisor, Healthcare at global technology consultancy, DataArt, discusses the developments in health technology and what artificial intelligence means for prevention and prediction.

With health services under significant pressure from exploding population growth and an increasingly ageing population, the focus is falling upon prevention as the best cure. The field of health technology is slowly but surely developing into this area, known under a variety of names such as predictive healthcare or more accurately predictive analytics. This is largely driven by developments in artificial intelligence, already well utilised in areas such as diagnostics but not so much in the area of prevention and prediction. The power of prediction is that a patient can be prompted to lifestyle changes or can receive minor treatment in the present to avoid costly medical procedures in the future. The theory is that while such AI systems may be expensive in the short term, they will clearly have the ability to return that investment and more over the course of its lifetime.

The key thing needed for such systems to be embraced and widely utilised is as you would expect, clear evidence that they are effective. The benchmark is that such machines are just as good as or better than doctors at predicting health issues or time of death. The early signs are that this benchmark is being more than met, although it must be emphasised that it's really early days.

One area, which is a big drain on healthcare budgets, is related to heart failure and heart disease. This is evidenced by the fact that despite increasing incidences of cancer, soon to affect one in two people, coronary heart disease remains the number one killer in the United Kingdom. One in four Americans die every year from heart disease. The London Institute of Medical Science have developed artificial intelligence with the ability to predict survival in patients with heart disease more accurately. The answer to the question of how much more accurately is about 20%. In the study, doctors were able to predict which patients would die in the

next year with a 60% success rate, compared to an 80% success rate for the artificial intelligence system. The benefit is clear; such a system can aid doctors to identify patients at risk of imminent death at an earlier stage, leading to more intense treatment in a short space of time.

The system analyses MRI scans to create a virtual 3D Heart and compare it to a huge volume of historic patient data to learn which attributes of the heart puts a patient at risk of heart failure.

An 80% success rate seems common across this small but growing field. An artificial intelligence driven algorithm engineered by McGill University in Canada can accurately predict a diagnosis of Alzheimer's 84% of the time, a rate far higher than an average doctor currently achieves. Interestingly, the AI comes to its decision in the same way as the doctor, through analysis of a brain scan. Here, the benefits of such systems become far clearer than the potential to reduce costs in the long term. The ability to catch illnesses such as Alzheimer's before they develop or soon after, is useful in putting patients forward for clinical trials that aim to delay the onset of disease. This is an area that is notoriously difficult to find appropriate patients for due to the rates of prediction currently delivered by medical professionals, which are not quite high enough to find a good pool of appropriate patients, largely because such diseases are diagnosed at far too late a stage.

The argument for predictive healthcare is very clear. Firstly it is effective at doing what it claims. Its success rate at medical prediction is consistently found in various examples and studies to hover around the 80% mark, a figure undisputedly higher than human medical professionals achieve. It has the ability to make people live longer, which would make some think that such a system would lead to increased healthcare costs. It cannot be denied that as such technologies advance they would inevitably save costs through the lack of need for late stage costly medical interventions or any kind of treatment whatsoever. It helps to provide doctors a second opinion without a need to bother or consult with human colleagues, allowing them more time to carry out necessary activities. And of course as the recent developments in predictive analysis of Alzheimer's show, perhaps the greatest potential of predictive AI is that it will be able to deliver a reliable pool of early onset patients for medical trials. This has the ability to be a game changer in the drive to cure diseases such as Alzheimer's.

While the engineers of such systems are keen to stress how early these systems are in development, success rates of up to 80% at this stage can only be seen as encouraging. If machine learning is more than matching the predictive validity of their human counterparts with years of development ahead of it, there is no telling what can be achieved, with a not so impossible desire that it could reach accuracy levels of 100% at some point in the not too distant future. Such rates of success make it likely that Artificial Intelligence, aided by big data, will be used as widely in medical predictive analytics as it is beginning to be used in medical diagnostics. The infiltration of the technology in prediction shows that there is likely to be no area in which artificial intelligence will not make a positive contribution.

Original article can be found here: http://digitalhealthage.com/the-potential-of-predictive-healthcare/