

What if analytics and machine learning could save lives?

By [Aneshan Ramaloo](#)

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The 2014-2016 Ebola outbreak in West Africa, was relentless, hopping between Guinea, Sierra Leone, Nigeria and Liberia, before making its way to the UK, US and Spain. It claimed the lives of more than 11,000 people - or nearly 40% of all reported cases.



Photo by Nevin Ruttanaboonta on Unsplash

But what if we could have predicted the outbreak months before it happened, buying us time to take proactive measures to contain it and curb its spread?

With access to overwhelming volumes of data, the computational power needed to store and analyse this data in real time, and sophisticated algorithms that can find patterns in the data and alert authorities to health problems before they become, well, problems, pandemics don't have to be as devastating as they have been in the past.

In fact, with advanced data analytics, we can better manage any disease – long-term, short-term or pandemic – resulting in better patient treatment, more efficient use of resources and cost savings.

It's been done before.

By analysing data from social media, blogs, online forums and keyword searches, we were able to [predict the 2012-2013](#)

[US flu season](#) three months before the Center for Disease Control (CDC) issued its first official warning.

Imagine the impact if the same analytical power was applied across the entire healthcare spectrum – not only on a national and global level but right down to the individual level.

Data evolution

In the past, health workers relied on manually intensive, paper-based systems to record infections and deaths during disease outbreaks. Not only was it easy for errors to slip through but because the data was anecdotal and historical, authorities did not get a complete understanding of the reach and impact of the outbreak.



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During the [Ebola outbreak](#), the CDC adopted a mobile data collection system that enabled health workers to instantly submit information to a database via text messages. This low-cost method of information gathering not only resulted in fewer errors but also allowed analysts to draw up detailed maps of population movements, which made it easier to understand how the disease was likely to spread, and where to set up treatment centres.

While this was certainly an improvement on the paper-based systems of old, the drawback was that mobile data was historic and did not provide researchers with the ability to track developments and population movements in real time.

Data-driven action

But mobile phones are just one source of data. Today, health authorities can overlay thousands of data sources – including social media, health and physician reports, keyword searches, media reports, transactional data from retailers and pharmacies, airline ticket sales, geospatial data and more – to not only better manage diseases and outbreaks when they do happen, but to see them coming months in advance – and what could happen if we don't act on the information.

By mining structured and unstructured data, we can track the movements of infected populations and who they come into contact with; we can measure the success of containment policies, education campaigns and treatments – and what to do if they're not working; we can determine the effect of weather and other environmental factors on the spread of diseases.

Never before have we been able to act on information to save lives, not just during pandemics but through better understanding and treatment of diseases.

Personalised treatment

Until now, standard treatments for diseases such as cancer and HIV have been applied to all patients, regardless of their unique profiles and with little understanding as to why some people respond well to certain treatments and others don't.

But by analysing and creating 'medical maps' of individuals that take into account their anatomy, physiology, DNA, RNA and chemical composition, doctors can prescribe personalised treatments that have a greater chance of success.

There are many other benefits of data analysis in healthcare:

- Personalised treatment can result in fewer hospital admissions and can produce faster results and better experiences for patients;
- By better understanding the impact of lifestyle and diet on health, medical aid providers can educate their members

with the aim of improving their health, which could result in cost savings for both the provider and the member;

- Governments can use data to develop proactive approaches to protecting and promoting public health, to prioritise services and to find ways to cut costs so that they can provide healthcare to more citizens.
- By sharing data and results from clinical trials and combining that data with academic, patient and industry data, medical researchers can better understand the genetics of viruses, why some strains are more deadly than others, and why some people are more resistant to viruses. This could spark innovation and generate new insights that ultimately improve treatment and outcomes.

AI and machine learning

As the use of intelligent algorithms, machine learning and natural language processing becomes more entrenched in advanced data analytics, technology will increasingly supplement the skills of humans to produce faster and more accurate medical diagnoses.

We're already seeing successful applications of artificial intelligence (AI) in [predicting relapse in leukaemia patients](#) and in [distinguishing between different types of cancer](#).

Machine learning can extract valuable insights from unstructured data like clinical notes and academic journals to provide even larger datasets that will transform the medical industry into a proactive front against diseases.

There are plenty of doomsday theories about how machines will supersede our intelligence and rise against us. But there aren't enough stories about the potential of data analytics, AI and machine learning to supplement human skills and knowledge to drastically changes lives for the better – and even save them.

Right now, it's looking more likely that machines will actually help us to live longer – and I don't know many people who would object to that.

ABOUT THE AUTHOR

Aneshan Ramaloo is a data scientist and senior business solutions manager at SAS.

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