

# IBM's Supercomputer helps doctors to fight cancer

*Watson Supercomputer gets hidden insights from 15 million pages of medical content, including more than 200 medical textbooks. The computer combines Artificial Intelligence and analytical software to perform as a question answering machine.*

A 37-year-old Indian software engineer was recently diagnosed with a rare form of breast cancer which was spreading fast in both her breasts. This increased the risk of both her breasts getting surgically removed. She went to a hospital in Bengaluru where Dr. Somashekhar S. P., a top oncologist, fed her medical records and genomics data into IBM's Watson Supercomputer. In just sixty seconds Watson threw up several treatment options and gathered evidence specific to her health needs.

This included assessing the tumour to suggest which drug should be used to target it. To speed up the diagnosis process, Watson uses natural language processing and machine learning to analyse large amounts of medical data.

“At the click of a button 15 million pages are scanned,” said Mr. Somashekhar, 42, chairman surgical oncology and the head of department at the Manipal Comprehensive Cancer Center in Bengaluru. “Besides my team, there is one more unbiased person (Watson) whose thinking capacity is infinite,” he said.

The patient showed a good response to the Watson-assisted treatment and both her breasts were saved. The team of doctors shrank the tumour with medicines and then removed the remaining cancerous tissue through surgery. “The most beautiful thing about it is that it not only comes up with the best treatment but also gives evidence,” said Mr. Somashekhar.

Watson gets these hidden insights from 15 million pages of medical content, including more than 200 medical textbooks and 300 medical journals that it has ingested till now.

## **Mimic brain**

Mr. Somashekhar said earlier eight oncologists would manually study the medical journals. They would then come up with treatment options in a couple of days. Also, the treatment would become costly due to trial and error method.

“The first treatment is the best in oncology,” he said.

The Watson supercomputer which was named after IBM's first chief executive Thomas J. Watson Sr. combines artificial intelligence and analytical software to perform as a question answering machine. It can answer questions posed in natural language. The Watson for Oncology was developed by IBM in collaboration with Memorial Sloan-Kettering Cancer Centre, one of the world's leading cancer centres.

Manipal has become the first hospital in India to deploy the system. The hospital can now combine clinicians' expertise across various types of cancers with Watson's cognitive computing technology. This involves self-learning systems that use data mining, pattern recognition and natural language processing to mimic the way the human brain works.

Rob Merkel, vice president, oncology and genomics for IBM Watson Health said that around the world on average a physician has 15 minutes with the patient to understand three smartphone worth of data and 15 million pages of medical literature. However, this task is more difficult in countries like India where the ratio of oncologists to cancer patients is about 1:2000 compared to the United States where the ratio is 1:100. IBM wants to bridge this gap in India through Watson.

"This (Watson) is the democratisation of knowledge. We are very optimistic this is going to scale in India and around the world," said Mr. Merkel in an interview. He said that IBM is willing to engage with the government, start-ups and many other hospitals to scale up the Watson platform in the country. IBM has already teamed up with the U.S. government to provide Watson technology to the U.S. Department of Veterans Affairs which operates the nation's largest integrated health care system.

### **Not ultimate**

The public-private partnership which is part of U.S. Vice President Joe Biden's Cancer Moonshot program will help doctors expand and scale access to precision medicine for 10,000 American veterans with cancer. Cancers of all type claim approximately 6,80,000 lives each year in India, making it the leading cause of death in the country after heart diseases, according to the World Health Organization. There are one million new cancer cases diagnosed every year in India, and this is expected to rise fivefold by 2020.

Pradip K. Majumder, chief scientific officer at Mitra Biotech, a Bengaluru-based start-up founded by a team of Harvard and MIT researchers said that Watson is a very good initiative. "But we should not give an impression that this is the ultimate cure to treat cancer," said Mr. Majumder. Mitra has developed 'CANScripT', a technology that allows doctors to predict the effect of drugs on a cancer patient, based on patient's own tumour microenvironment in vitro. It also measures multiple functional parameters to determine whether a tumour is responding. .

But Mr. Merkel of IBM said that by the year 2020, it will only take 30 days for the volume of medical knowledge to double and that is beyond human cognitive limits. This is where Watson would play a role.

Using Watson technology researchers from Baylor College of Medicine accurately identified proteins that modify p53, an important protein related to many cancers. This can eventually lead to better efficacy of drugs and other treatments. They did this in a matter of weeks. Watson analysed 70,000 scientific articles on p53, a feat that would have taken researchers years to accomplish.

### **Artificial Intelligence**

However, industry watchers have raised concerns about too much of dependence on Watson, which is based on artificial intelligence (AI) technology. For instance this year a Tesla driver was killed in the first known fatal crash involving a self-driving car. Reports said that the driver had put the car on

an auto-pilot mode and may have been watching a Harry Potter movie at the time of the collision in the U.S.

Industry watchers say that there are no laws in countries like the U.S., Europe and Japan governing AI.

But Vanitha Narayanan, managing director of IBM India said Watson has been designed not to replace doctors but to augment their capability, intuition and the expertise.