Human in the Loop for AI in Healthcare

The future of AI technologies in the healthcare sector in India seems bright, as there is a strong need for volume, scale, and accuracy, along with low costs. However, in many situations, patients and families still want the human doctor in the loop - to explain, to connect case histories with symptoms, and to make difficult decisions.

By Rahul De', Nitisha Ahuja, Palash Sanjay Kotgirwar

As Artificial Intelligence (AI) based products and services proliferate across industries one question emerges as the most important: should these systems include a human in the or operate autonomously? This question underlies much of the services and products that we take for granted now. Consider, for example, using Google Maps. Many of us now take this AI-based service for granted, when it gives directions to go from one place to another we follow, nearly without thinking about where it is taking us. There is no human guide or moderator behind this tool; we cannot even call a number, like in a bank, and demand to speak to someone about getting wrong directions or being led off somewhere other than our destination. There is no human in the loop to help us or one to complain to if something goes wrong.

AI is being used heavily for Healthcare applications, and this is a welcome move for many. India has a serious challenge with providing medical facilities to its citizens - the number of beds and number of doctors per thousand of population are both about half the world average. The figures are worse when rural and urban areas are compared, where urban populations are much better off with regard to medical facilities. It is not surprising then that digital healthcare products that are widely available and of lower cost, such as those enabled by AI, are appearing as solutions to offset this deep divide. These range from finding doctors and hospitals, providing quick and low-cost medical tests, enabling surgeons to decide on procedures, and also to assist with surgery. Numerous startups are offering unique AI-based services and many established hospitals are using AI extensively. But for all these firms deploying AI, is there a human in the loop?

A number of healthcare startups, like Pulse India and mFine, connect patients to doctors through online portals and apps. They use AI to mine data on patient information, prescriptions and patient care details, to suggest remedies and treatments. Though there is no human in the loop while the system identifies diseases, the main task of these applications is to connect patients to doctors, thus a human, a physician, does the final diagnosis and treatment.

Other startups, such as Artelus, Sigtuple, and Niramai, are premised on using AI technology for low-cost and fast diagnosis. They provide analysis of retinal scans, blood smears, or

thermal images to diagnose retinopathy, prepare blood reports, and detect cancerous tissue. The work of skilled operators and radiologists is done by these devices and algorithms, though a doctor is still needed for judgement on diagnosis and treatment.

Robotic surgery devices like the Da Vinci machines assist surgeons with the actual task of surgery, where they can make incisions, cut tissue, and render stitches with high precision, rivalling, and possibly exceeding, those of expert surgeons. These devices are being increasingly used in India for a wide range of surgeries that require delicate operations, which result in faster patient recovery and lesser bleeding from higher precision incisions. Here the surgeon is in the loop to point towards the areas and regions where the operation has to be done, then the machine takes over and does the detailed task. The human is in the loop, and at a supervisory level.

In a large number of hospitals and super-specialty clinics doctors are relying on finely tuned AI algorithms to deliver analysis of X-ray and other radiology images. In some cases, the level and detail of analysis far exceeds the capabilities of human radiologists. Further, some algorithms are able to reconstruct available X-ray images into composites that show tissues in finer and more precise orientations. This improves the diagnosis accuracy, reduces the time of sampling and testing, and also reduces cost. Doctors and surgeons are increasingly beginning to rely on the output of these softwares, reserving their judgement and critical appraisal for complex and difficult cases. Routine cases are analysed and diagnosed by the system.

Estimates of accuracy of these AI-based diagnosis and testing systems vary, but most are very high. This accuracy is measured against other system tools and also against human operator performance. On the other hand, the WHO estimates that more than 138 million lives are lost every year, worldwide, owing to medical errors – which arise from errors in diagnosis, treatment, surgeries, or medication. The use of AI-based systems is thus further justified, they not only reduce costs but also increase treatment accuracy.

The future of AI technologies in the healthcare sector in India seems bright, as there is a strong need for volume, scale, and accuracy, along with low costs. However, in many situations, patients and families still want the human doctor in the loop - to explain, to connect case histories with symptoms, and to make difficult decisions. Judgements, philosophers and humanists argue, are unique to humans and the qualities required to make them - empathy, subjectivity, human-ness, are some things machines cannot replace. Humans will always be required in the loop. But how humans are involved in the loop is not straightforward. Further analysis of the entire human-machine system is required to balance human subjectivity with the machine’s accuracy and objectivity.

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