

Artificial Intelligence in Radiology: A Different View

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Perspectives/Commentary

Artificial intelligence is considered the next big thing in radio diagnosis. It has been around for the last few years and apparent significant progress has been made in this field. Machine learning, convolutional neural networks, and data mining are some of the words commonly heard regarding this topic.

As far as radiology is concerned artificial intelligence is used in reporting images involving radiographs, CT, and MRI and making a diagnosis on that basis. The basic principle is that the image is scanned using a stencil and looking for a perfect fit of that stencil on that image. For example, if a stencil of a nodule is made then it is scanned over a chest radiograph looking for a part of the image which has a nodule so that the stencil fits add a diagnosis of a pulmonary nodule can be made. Like this thousands of stencils for thousands of different findings that can be potentially seen in a radiograph are made. Then each radiograph or CT or MRI image is scanned using each of the stencils till all the findings in the image are picked up and a report can be made. For creating each of the stencils a huge amount of data is needed which needs to be fed into the computer beforehand. For this radiologists have to go through thousands of previous images and then annotate those images to create a stencil. This is a lengthy and cumbersome process requiring huge manpower. Also, it has been found that despite this cumbersome process the current technology is not hundred percent accurate, and human supervision is required.

Many times the mistakes are so simple that it challenges the very foundation of artificial intelligence in imaging.

It is not that machines will not be able to read images in the future accurately. However, the author feels that the current approach to the interpretation of images is not correct. The creation of thousands of stencils using millions of images and then scanning over each image is a very lengthy approach. Although the author feels sure that one day machines will be able to read images and make a diagnosis, it is not the machine called the computer and the programming language it uses which is going to do that. There needs to be a totally different machine with a different approach which can be called truly artificial intelligence. The current approach is like making a washing machine do the work of a car or a dishwasher. Just like a washing machine might be able to clean the dishes but will also break them during the process similar is the state of using computers as a tool for artificial intelligence. Computers and programming language is built to make the machine understand certain commands and give out a result based on them. Beyond it, the capacity of the computers is fairly limited. While it can be argued that with development the computers will evolve to be artificially intelligent this is not most likely what is going to happen because a computer cannot think and cannot feel for itself the need for anything, at the end of the day. To be intelligent is to be able to understand, feel, think and then work. This is impossible for the machine which is currently called a computer running on a programming language. While it can be argued that over time computers have evolved and can process and do tasks that were unthinkable before however as far as intelligence is concerned it's a totally different ball game. Either the word "Artificial Intelligence" should be changed as it is misleading or a different machine needs to be developed which is truly intelligent. The word artificial intelligence was most likely used because it is catchy and attention-grabbing.

For a machine to be able to read an image without any error it needs to understand what it is reading. Simply creating a stencil to fit the shape, or color of a particular point in the image is not the ideal technique for image analysis. It has been found many times that the computer over-diagnoses many radiolucent areas as pneumothorax on the chest radiograph which is so obviously not that even a medical student or intern can correctly interpret it. For that matter, the computer has made mistakes of wrongly identifying a cat as a leopard on many images which even a child is easily able to tell. This is not because the programming is wrong or that the computer is not doing what it is told to do correctly. It is rather that the approach is wrong to teaching the computer and also the machine itself is as incapable of performing the task like a washing machine performing the task of the dishwasher.

The author feels that there will be a machine in the future which will be truly artificially intelligent. However, that will not be a computer with a programming language as we know it today.