

# Artificial Intelligence in the Field of Healthcare and Teaching

OPEN ACCESS

Volume : 6

Special Issue : 1

Month : August

Year: 2018

ISSN: 2321-788X

Impact Factor: 3.025

Citation:

Kadagadkai, Swarna. “Artificial Intelligence in the Field of Healthcare and Teaching.” *Shanlax International Journal of Arts, Science and Humanities*, vol. 6, no. S1, 2018, pp. 244–47.

DOI:

<https://doi.org/10.5281/zenodo.1403631>

**Swarna Kadagadkai**

*Engineering Student of JSSATE, Bengaluru*

## Abstract

*The idea of imparting intelligence to computer systems and machines took its form way back in 1950's. However, its exorbitant growth has been acknowledged only recently. Artificial intelligence is everything that has not been done yet. This paper addresses the facets and challenges of artificial intelligence in the field of teaching and healthcare. This paper introduces the past, present and future of AI in the respective fields. AI has progressed through various approaches and its contribution to the society is studied in detail in this paper. Natural language processing is a form of AI that allows computer programs to process and study unstructured data (EHR). It has a major role in improving clinical documentation, trial matching and decision support. We study about the change in role of the teachers with AI marking its abilities in the teaching sector and the combination of teachers and AI to improve the education system. One of the most important effects of AI to be considered is the risk on unemployment in these fields. We analyse the various employment opportunities brought by AI in these fields. This research aims in giving rise to deeper and more diverse solutions to the tackle the challenges of AI.*

**Keywords:** Medical Imaging, Clinical Data Support, Neural Networks, Support Vector Machine, Deep learning, reinforcement learning, Natural language processing

## Introduction

Artificial intelligence is a vital element in the field of healthcare and teaching. It uses the concepts of neural networks, natural language processing, machine learning, SVM, deep learning and reinforcement learning and many more. In this paper, we discuss how these technologies are implemented in these fields and their future.

In the field of healthcare, robots are mainly being designed to assist the doctors in various ways. They can analyse data from medical records and journals and provide a deeper insight to the surgeon's instruments and judgements. They use the concept of machine learning to do so. Machine learning is basically using algorithms to teach machines to learn by themselves. One of the algorithms used is Support Vector Machine (SVM).

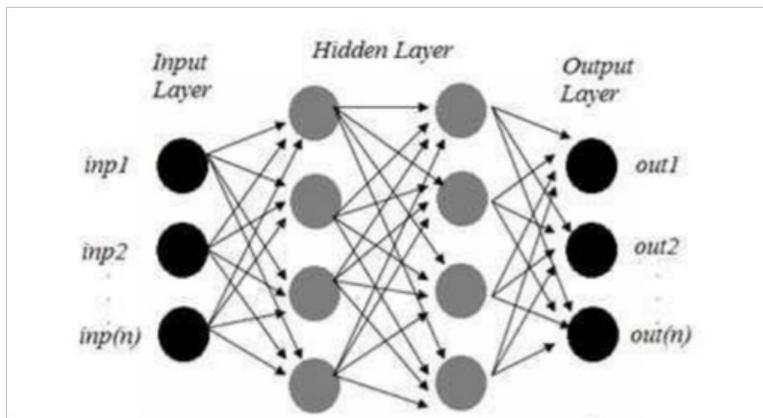
Robots can read and understand data from past operations and cases and suggest more efficient and accurate surgical techniques in the future.

A robot designed by a Dutch medical firm, could successfully perform the surgery with efficiency better than the traditional manual

method. Another role of robots in this field is medical imaging. Physicians make use of imaging to view a patient’s internal system and understand its working. Machine learning and deep learning technologies help in identifying conditions which otherwise would go unnoticed by doctors as they are focused on treating the immediate health issue. Deep learning algorithms require a lot of data, and the recent influx and unavailability in data is one of the primary reasons for putting machine and deep learning back on the map. This is one of the main reasons why fields like data mining and data science are gaining more awareness and are in most demand. Yet there are some barriers, like inadequate amount of medical data available. In order to implement AI effectively in this field, these barriers need to be defeated.

Electronic medical records (EMRs) have a huge impact on health information technology and this is one of the most controversial topics being discussed. ORALS (Open Recording Automated Logging System), is a project which is currently focusing on developing and testing an interoperable system to support routine recording of patient medical visits. The fundamental assumption behind this effort is that recording such content on smart phones is inappropriate, as if the patient loses their phone, their private healthcare information could be exposed.

A recent study was published which found how the big data extracted from EMRs and digested by an AI at the University of California, San Francisco Health helped with the treatment of potentially lethal *Clostridium difficile* (*C. diff*) infections. We believe that software like ORALS will improve the future of healthcare in maintain medical data and patient medical history and records.



The amazing thing about neural network is that we don’t have to explicitly teach a machine anything; it learns by itself! The idea of neural network is to simulate the working of a human brain. The way doctors look at the scans and medical images and analyse the diagnosis, we are teaching machines to analyse by themselves and assist the doctors.

NLP is one of the main concepts used in the healthcare sector. Natural language processing (NLP) can be defined as the ability of a machine to analyse, understand, and generate human speech. The goal of NLP is to create machine-human interactions exactly like interactions between humans. The machine should take a natural language and convert into artificial language. This is what is done in speech recognition. It uses statistical methods to understand what the human has said and performs mathematical calculations to respond to the same. By using various other mathematical functions and algorithms the machine responds as though a human is conversing with another.

The most famous NLP machine, the IBM Watson dominated the headlines recently because of its growing expertise for clinical decision support (CDS) for precision and cancer care. The AI

machines present now are investigating the use of natural language processing and the algorithms of machine learning to flag patients with heart diseases. Recently, Watson has scaled up the ladder and taken up the challenge of attacking cancer and advanced genomics.

A 2009 article from the Journal of Biomedical Informatics made the case for proactive CDS systems and intelligent data-driven alerts before the EHR Incentive Programs pushed electronic records into the majority of healthcare organizations, and pointed out the vital role that NLP technology would play in making that concept a reality. There are endless possibilities when it comes to improvising the working and efficiency of this field. The aforesaid are some of the ideas which will definitely ensure growth and development of healthcare worldwide.

AI in teaching has similar usages of concepts. We will be discussing and understanding few of these in the upcoming parts of the paper. The current hot topic is smart content where robots create digital content with the same level of knowledge and intelligence as their human counterparts, and this technology has finally reached the classroom. AI can help write textbooks and set question papers keeping in mind the student’s learning curve and potential. A platform called Netex Learning allows teachers to design a curriculum and content across a variety of devices, including video, audio and an online assistant. Digital lectures and video conferences are also becoming a vital part of the syllabus now. The advent of “AI as a Service” allows eLearning developers to write algorithms and use AI tools and components, to perform tasks which would take a lot of time. The aim is that AI can help in improving the learning and teaching and allow schools and teachers to do more than ever before. AI can acknowledge and deliver efficiency, personalization and streamline admin tasks and allow teachers the time and freedom to introduce and develop human values and ethics where machines would struggle. The main goal for AI in education is one where, the best attributes of the teachers and machines is combined and where they work together for the best outcome for students. Since the students of today will need to work in a future where AI is the reality, it’s important that our educational institutions expose students to and use the technology.

Many schools are currently training its neural network grading system in a central server that compiles the work of millions of students. Generally, a neural network consists of layers of neurons which have alternate input and output layers, respectively. The input layers receive and transmits external signals while the output layer sends out the results of the computations. There are inner ones, called hidden layers which extract relevant features or patterns from received signals. The key elements and features considered important are sent to the output layer which will present a modified and accurate output. The ability of neural network to handle complex problems depends on the number of the hidden layers. Although recent studies suggest three hidden layers as being adequate for most complex problems.

The input is the score of the students which is trained for the machine to understand. Then the topology of neural network is decided. The network is then tested with a test data set and then later implemented to analyse student records and help in the grading system. It promises an efficient way to take out the variations attributed by human subjectivity in marking.

Adjusting learning and personalized learning has been a priority for institutions for years and AI will change this face of education by making it easier to do the impossible. This type of learning is necessary as not every student has the same understanding and grasping abilities. The most important and common role of teachers in every institution is grading. The current AI technology is capable of evaluating and grading multiple choice test papers. We believe that as Ai gets more sophisticated and advanced, it will be able to grade test papers involving even elaborate/descriptive answers.

There are several companies which are currently developing intelligent devices which aim to give students the challenges they are ready for. It is also specialised for identifying gaps in

knowledge and redirects to new topics when appropriate. AI has developed platforms which can design curriculum for the academic year, with audio and video interactions and a personalized platform. As AI gets more sophisticated, it may be able to read the expression on a student's face and understand if they are struggling to grasp a subject and it will modify a lesson to suit the student's grasping abilities. However, it is important to protect this sensitive data. The main controversial effect of AI in teaching is the generation of unemployment for the teachers. But we believe that as AI gets more involved with education, the role of the teacher will not be eliminated but improvised. Teachers will not have to dedicate their precious time in performing tedious and repetitive tasks but can focus more on designing and developing the steps to effective learning and application.

### **Conclusions and A Way Forward**

Artificial intelligence and technology are limitless. We can drive it forward to any extent possible. While introducing new technological concepts which may entirely replace the traditional methods in these immortal fields, there are several considerations to be made. The inability of AI to possess human characteristics such as compassion is an important one. However, we believe that machines shouldn't be made to possess such abilities and technology should be used what it's best for: practicality and logic. The use of this technology raises a lot of social and ethical questions. These questions can be majorly solved if we restrict the usage to advisable limits. Therefore, AI and its expansion need not be stopped and can only get better. We need to find a way to simulate this technology which is adaptable by all and not restrict its growth in these sectors.

### **Web Sources**

[expertsystem.com/blog](http://expertsystem.com/blog)

<https://www.emrandehr.com/tag/artificial-intelligence/>

<https://www.techemergence.com/deep-learning-applications-in-medical-imaging/>

<https://www.zebra-med.com/imaging-analytics/>

JAMA networks

Journal of Biomedical Informatics

[machinelearningmastery.com/blog](http://machinelearningmastery.com/blog)

Nature Biomedical Engineering

[www.davincisurgery.com/da-vinci-surgery/da-vinci-surgical-system/](http://www.davincisurgery.com/da-vinci-surgery/da-vinci-surgical-system/)