Artificial Intelligence and Its Applications

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Artificial Intelligence is the new electricity. It is the science of making computers learn, without being explicitly programmed. It is a field inspired from Physics, Mathematics, Statistics, NeuroScience, Computer Science and Engineering. Artificial Intelligence is empowered because of the tons of digital data generated by humans every single second. Moreover, it has surpassed human level intelligence in many tasks like playing Go, Chess, customer preferred online advertisements, recommendation systems, machine translation, object detection etc. I have answered what Artificial Intelligence is but more important is why Artificial Intelligence? Why are we making computers to learn? Reason is simple, we take advantage of high computation and speed. Humans cannot analyse billions of data and then make predictions. Now let's take a look over its brief history.

In 1951, Arthur Samuel from IBM, wrote a computer program to play checkers. Overtime learning from itself, the program played checkers better than Arthur Samuel himself. This self learning program was one among early demonstrations of concepts of AI. The term Artificial Intelligence was coined at Dartmouth Conference in 1956. The main question that revolved around the conference was "Can we make machines stimulate every aspect of learning?" From 1950's till today, many algorithms were developed to make machines synthesize data, images or videos and then make predictions.

How do the Artificial Intelligent machines work? There are actually three steps in which the models empower themselves and achieve better accuracy. First, these artificial intelligent models try to learn a mapping from input to output. In more mathematical terms, for input x, the model computes a function h(x) which is the predicted value. Second, the model analyses the difference between the predicted value and the actual value and tries to minimise this difference. Third, the model is tested against unseen data to make predictions. This type of learning has existed for more than 200 years, being inspired from simply fitting a straight line to the data. This type of learning is called supervised learning.

There are certain examples when there are no outputs for the training data. Example - Clustering problem. Clustering problem is simply calculating results for the statement “Tell me your friends and I will tell who you are”. It is used to identify homogeneous subgroups among the data and differentiating them from other clusters. These algorithms are called unsupervised learning algorithms.

My most favorite method for making computers learn is reinforcement learning. In this, a machine learns from its mistakes. Arthur Samuel’s checkers program is an example of this. Let’s take an example, if a robot is learning how to walk and if it suddenly falls, we penalise the robot heavily. As a result, this restricts the robot to fall again and to continue walking. Real life applications of this method are discussed in the applications section.

Applications - Artificial Intelligence have benefitted every aspect of life. Best example is Google Search. We can search for anything and AI ranks all the billions of pages with respect to content and accessibility and gives out best possible results. By analysing real time data, predictions of stocks and flight prices have become easier. Chatbots like Siri, Google Assistant and Alexa can understand human language and are helpful by sending notifications and reminders. Netflix and YouTube use very powerful AI algorithms for personalised recommendations systems. In addition, AI is helping to check if an email is spam or not, to detect if an online transaction is fraud or not.

In my view, AI has played a major role in health sector. From the previous available records, AI can detect cancer, HIV, polio in its early stages and then proper steps are taken to cure them. AI is being used for patient monitoring, drug development and better understanding of X-rays.

One example of humanoid robot is Sophia, which can talk with facial expressions and understand human language. Google Translate uses AI to translate a sentence from one language to another. In reinforcement learning, Tesla is working on self driving cars to prevent accidents and ensure road safety. Google’s DeepMind has designed a general program that can play games like chess, Go, shogi(Japanese Chess). Even while typing this paragraph in Google Docs, AI is sitting behind and checking for spelling and grammatical mistakes.
All in all, AI is capable to do anything faster and better than humans.