

What Is Machine Learning?

BY EVAN GORDON

Machine learning (or ML), while not a new concept, is currently one of the most rapidly growing fields in Computer Science. Machine learning opens up many opportunities because programs that use machine learning principles are better able to adapt to new situations compared to hard coded programs. Machine learning does however pose many moral/ethical implications as well for our jobs, economy, and future of the human race. While many of the consequences of widespread machine learning use is still unclear, there is so much potential for the field that it would make little sense to ignore all that it could do for us.

So what is machine learning? As it was stated on sas.com, Machine learning is a method of data analysis that automates analytical model building. This is often, (but not always) accomplished by using algorithms that emulate how the human brain works. Neural networks are a prime example of this. Machine learning has gained popularity recently with the advent of tools like big data, and Googles recently open-sourced library TensorFlow. These tools are crucial because with big data we can better provide training data for our algorithms. Until recently lack of training data was one of the greatest hurdles that machine learning needed to overcome. TensorFlow is also an amazing tool because it puts easy to use machine learning tools in the hands of the everyday programmer. This will of course lead to more innovation in the field. Since ML works so much like the human brain, having easy to use tools, and easy access to lots of data to train programs with it can be expected that ML will be used more and more widespread over the coming years.

As described by Fei Fei Li, we can easily hand a program a picture of a cat, and tell it that this is a cat. However, for traditional programs it is very difficult for the same program to be able to take this knowledge and be able to look other pictures that may have a cat and identify it. This is where machine learning excels (though not without its own challenges). Machine learning can use given data, and be trained to give certain outputs based on what it was given. This learning process can be applied to a variety of fields, self driving cars, image/facial recognition, chatbots. The list could go on and on. The field is so new that we still cant be certain of the boundaries that this technology may have.

One shortcoming that has emerged within machine learning programs is trained biases. When a programmer gives a ML program a set of training data, great care needs to be taken to ensure that a broad enough scope of training data is given for the required task. That said care must also be taken to ensure that the training data has been purged of anything that might taint the algorithm for later use. For example, during the spring of 2016 microsoft released a chatbot named Tay on Twitter aimed at emulating the chatting habits of millennials, and also learning from chats it participated in. I had the opportunity to talk with it for a bit. It seemed to create genuinely interesting responses to my tweets that were both surprising and funny. This ML chatbot, while sounding amazing on paper, quickly deteriorated, and had to be taken down shortly after it was released. This was because the training data wasnt purged properly and Tay quickly devolved into a racist bigot. Im sure this experience will be useful for anyone wanting to create chatbots in the future, as a excellent case for how not to be implemented. However, for all of its shortcomings i did find Tay engaging and i would love to see more similar products released in the future.

As we implement more and more ML automation within the workplace we have seen an increase in job loss due to automation of menial tasks. Most factory jobs have already been replaced. It has even been demonstrated that we could see self driving cars become the norm in the near future. Recently the first self driving long haul semi truck made its first trip. Because of examples such as this, it is becoming more of a question of what jobs cant be automated. In 10, 50, or even 100 years, what will our job marketplace look like? It is conceivable that we as a species could outgrow labor as a means of survival. Or perhaps as more and more automation is used in one field causing job loss, a new field arises with new jobs for people to fill. One thing however seems certain, menial low skill forms of employment seem likely to be on their way out the door. This is ethically troubling for our society. How do we handle such large numbers of displaced workers? Many of these questions currently have no answers, but they are still questions that we must keep in mind as machine learning is used more universally.

Another cause that many see for concern is the Terminator dilemma. This is the hypothetical scenario where machine learning or in this case artificial intelligence becomes self aware. We have no way of knowing what such a system would do, but many worry that an entity such as that would deem humanity an unnecessary vermin on the planet and begin extermination on a global scale. This Terminator problem has been popularized by Hollywood in many films, iRobot, Ex Machina, and of course Terminator. To me it seems to be mostly just hype that results from the films as there really isnt a lot of hard science that can predict what would actually happen.

In closing, Machine Learning is an amazing tool with many applications that span across most disciplines. With machine learning we can take a lot of data and create models that can help us accomplish a wide variety of tasks. Machine learning systems tend to be more fluid, and can handle unexpected cases better (usually) than hard coded programs. However, machine learning, as it is more widely adopted could lead to massive job loss around the world. There are many implications that need to be taken into account. We need to think carefully about what we are doing as it is adopted as the consequences of its use might not always have clearly defined impacts on society.

References

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