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Overview

Machine Learning is the style of coding that allows a computer to make inference and recognize patterns in large amounts of data without having explicit instructions, or a programmer making the inferences for it and telling it to spit out a precalculated predictions.

A computer's learning is completely contingent on the data it is fed. If the data it is fed is incorrect, outdated, or has been tampered with in some way a computer won't be able to make accurate predictions. Assuming that the data that has been entered is complete and accurate, the ability for a computer to recognize patterns is incredibly important. Machine learning allows people to feed a computer a large amount of data and find a overlapping pattern much faster than what people would be able to do by hand. This can help people to understand large trends in people's behaviors, trace common features in diseases, and cross refence data to find correlations that might be important for people's understanding. If a computer's inferences are not accurate, then there is nothing to be gained from giving it a lot of data and nothing of use can be concluded.

Machine learning is limited to noticing patterns and make decisions through data that has been given to it. Ai, however, is trying to emulate human thoughts and impact things in the physical world. These would include Ai chat bots, dating sims, and self-driving cars. Ai can find patterns and make decisions, but it is more advanced in how it uses data to make these decisions. Once they develop further, they should be able to handle ethical and moral issues.

Snap filters are one example of how machine learning can be applied. Computers previously had a very hard time recognizing faces, but by providing a computer thousands of pictures of people's faces to train itself to recognize these faces. This is something that is simply not possible to do with traditional coding in an inclusive way. For a programmer to make the computer recognize one face, it would take hours to do and would only work for a single person. It may work for other people that look similar to that one face, but when you think about factors such as race, various skin tones, eye shapes, nose shapes, distance between eyes, distance between the mouth and nose, different mouth shapes it would become extremely tedious, if not outright impossible for a programmer to make filters that would work for everyone across the board.

Another example is the Stock Price Prediction machine. The stock market is so variable that the public has a hard time noticing patterns and even seasoned stockbrokers sometimes have to leave it to luck. However, by feeding years of data to a computer is a much more efficient and accurate way to predict the swings of the stock market. This would be impossible to create using traditional coding practices because it wouldn't be able to predict based on old patterns and would be hindered by the knowledge of its creator.

In machine learning an observation is a datapoint, generally represented in rows. Features are in column, or what the machine is learning about. Qualitative data is a single type of data out of an infinite variety excluding numerical. This means various categories, names, etc. Quantitative data is numerical data, things like temperature, heights, etc. These are all very important in machine learning as they all come together to affect the patterns and decisions a computer can make and changes the how useful that program is.

I have always wondered how machine learning worked. I know a lot of companies are moving toward machine learning and I would like to know as much about it while I'm still in school. Since this

area in computer science has been growing rapidly, I thought it would be very useful to have that knowledge under my belt. I think the best way for me to learn about machine learning and understand it is to work with R and have a more project-based class. I was excited when you announced that you were changing the structure of your class because this is exactly what I was hoping for.