Mo Garoub

BSc Industrial Engineering

MSc Data Science

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Generation Z are Intrigued!

On a busy Friday night, while I was busy solving my Master of Data Science (MDS) lab questions, my little brother called to ask me about a topic he wants to cover in a presentation next week.

Zizo: Hello! Mo, I want your help with something real quick.
Mo: What's up Zizo? I'm quite busy.
Zizo: I have been interested in machine learning ever since you told me about it two weeks ago. I asked my science teacher if I can cover this topic in our presentation next week. He was pleasantly surprised and agreed right away!
Mo: Nice!!
Zizo: Could you tell me more? How can a machine learn? Who teaches it? Does it learn from humans? Or does it teach them?

I was impressed by these questions coming from a 13-year-old. I was quiet for a while trying to contemplate how I can answer his wonderful questions in a simplified way. After a few minutes of deliberation, I finally told him a hypothetical story to explain the ways by which machines learn.

I decided to share this story here in my blog for my young readers with big minds.

Once Upon a time...

In a land not so far away, my wife and I were having dinner at a nice cozy restaurant in downtown, Vancouver. She looked at the empty table next to us with a glass full of dark red liquid and asked: what do you think is this drink? I said: 50% grape juice 50% black tea. She asked: are you sure?... I replied: one moment... I went to the table and touched the glass... it was cold, so I corrected: 70% grape juice 30% tea. She looked at me skeptically, so I picked up the glass to smell it and there was no distinct smell. With a grin, I went back to my seat and told her: it is still 70% grape juice 30% tea. She was not pleased with my answer, so I paid the waiter to let me taste the drink. I turned to my wife confidently, it is 100% grape juice and 0% tea!

You see Zizo (and my fellow teen readers), this simple scenario explains how humans identify things around them. They hypothesize, collect data, analyze, and interpret findings. Data are collected through humans' five senses and sent to their brains where the analysis and interpretation happen. Finally, identification of objects happens through comparison with things already known.

In our story, for the machine to learn what drink was in the glass, it has to rely on the data collected by the four elements (color: dark red, feel: cold, smell: no smell, and taste: sweet); however, as the element of "smell" did not add to its knowledge, the smell's value is null.

The ways machines learn do not really differ from the ways kids do. Kids learn through repetition and trial and so as machines! Therefore, other than the algorithms that depend on statistics like for example (Linear Regression) or the algorithms that depend on distance (KNN), the "Neural Network" is a direct application for machine to learn the same way humans do.

The learning between humans and machines is a two-way street. Machines analyze a lot of data to split people into groups based on certain characteristics (Clustering) or extract certain rules for example ...products in purchasing (Association rules), and so machines teach humans some of the phenomena around them. On the other hand, machines learn from humans how to classify things (Classification) through the (Labelling) of data sets. These applications are considered "Supervised" as the machine relies on humans in the learning process.

Overall, in Descriptive Analytics humans use the machine's speed, precision, and storage to recognize things around them, whereas in Predictive Analytics humans train the machine to classify things already known.

The language humans use to communicate with the machine in machine learning is the language of data! With data, the machine learns. With data, the machine teaches humans. The more the language is distorted (wrong data, missing data, clashing data) the weaker, less accurate the learning is and vice versa!
To fully understand Machine Learning, you have to know Artificial Intelligence or what is knowns as AI.

To conclude, I will leave you with the simple definition of machine learning from the Computer Scientist and machine learning pioneer, Tom Mitchill: "Machine learning is the study of computer algorithms that allow computer programs to automatically improve through experience". (as cited in Iriondo, 2021)

Now that we know how the machine learns, the two-way learning relationship between the machine and humans, and the language that facilitates this learning, I encourage you -young bright minds- to read more on machine learning and AI and educate yourselves early on. You are our future!

Target Audience Persona

The "technology addicted" teenager

Name: Zizo

Location: inner city

Age: 13

Education: high school

Siblings: 4

Popularity: medium-high

Zizo is the youngest of his siblings. He always looks up to his brothers and shares their interests. His eldest brother is studying Master in Data Science and loves to share the knowledge he gains with him.
Zizo is a technology freak. He loves reading about new innovations in science and technology. He is also addicted to video games and finds that playing video games is not only fun, but also connects him to his siblings and friends. Zizo spends almost all of his time on his phone playing or watching videos.

Goals:

To attain high scores in school for bragging rights
To be like his big brother in the future and obtain a graduate degree in something he loves

Frustrations:

Feeling that school gets in the way of gaming and watching videos
Always running out of data and phone battery

References:

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