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Overview of Machine Learning

- a. Machine learning is a type of computing in which an algorithm is created that is able to be fed data, read the data, and analyze the data. From that analysis, the program is able to make a type of assertion or conclusion about the data, similar to what the human mind would do.
- b. In machine learning, data is of the utmost importance. Depending on the data, there will be different results. The training data set also defines how the algorithm will read the data and thus will have different results. With the data provided, patterns are found. Those patterns will make it easier to analyze bigger data sets. Lastly, depending on the application, the accuracy of the results is important to machine learning. Machine learning might be used in situations where accurate results are needed, like cancer screenings, thus having good training data sets is important to having accurate results.
- c. AI (Artificial Intelligence) and ML (Machine Learning) sound similar and may intersect in some areas but they imply different things. Artificial Intelligence implies the development of technology that will mimic the human mind, with not just the data analysis in mind. Machine learning focuses on developing technologies to analyze data and find patterns in them, with the end goal of developing a structure similar to the human mind that is able to be fed data and manage it as needed.
- d. 2 Modern ML applications:
 - a. Deepfakes: This application allows a user to feed into the algorithm thousands of images of a human face to be analyzed. They can then feed a video of a person and replace that person's face with the analyzed one. This application could not be built with traditional programming because it requires analyzing patterns in how a face is structured and how external factors affect it to place them in the optimal frame of the video.
 - b. Cancer screening: For this application, the algorithm is fed data on how cancer tumors grow and how to differentiate them from benign tumors, which may also appear but not necessarily be cancer. This application would not be possible on traditional programming. The reason being the analysis of data and differentiating the factors between situations.
- e. In machine learning, you will find an observation, which is a small data set that has multiple attributes of an instance, making up what will be the complete data set. What each instance has that will define its properties is a feature. When analyzing data, we separate it into two, quantitative and qualitative data. Quantitative data, which is numeric, is all data in the features that is numeric, which helps analyze it. Qualitative data

can only occur once in the data set, meaning only one feature can be it and help categorize data.

- f. The reason I'm interested in ML is that I've just been puzzled into how it actually is implemented. I've heard about how it works but until now, it has felt like magic. I would like to learn more about it to apply it to personal projects so I can satisfy my curiosity like on learning more about deepfakes, a popular machine learning application. Besides that, we've seen a huge increase in ML in the technology industry, which means that it is knowledge and skills that would definitely not hurt to have.