Overview of ML

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a. define ML in your own words

Machine Learning is the intersection of multiple disciplines with a goal to train a computer to perform a task without giving it the instructions for that task.

b. in a paragraph, summarize the importance of data, pattern recognition, and accuracy in machine learning

Machine learning functions similarly to human learning. A human cannot learn without sensing and gathering information about the world around it. In machine learning that is the role data plays. Data is always the input for the machine to learn. It needs some set of foundational information to begin some form of intelligent analysis. Unlike the human mind however, a computer has difficult time finding general patterns. The human mind is capable of finding patterns in art, history, people, etc. Sometimes the human finds patterns that truly are not there. However, a computer preforms leagues better when given a narrow singular pattern to find. Thus, it is up to a human to organize and sift through a large dataset and determine what pattern within the data, then task the computer to learn that pattern from the dataset. The computer can then make predictions about the data with a measured degree of accuracy. Sometimes the human chose the wrong pattern to find and the training model can be updated after a prediction accuracy rate has been found.

c. describe the relationship between AI and ML

Artificial intelligence is the broader goal to make a machine that mimics human behavior. Machine learning is just one section of Artificial Intelligence with a much narrower scope.

d. list at least 2 examples of modern machine learning applications, and explain why these application could not be built with traditional programming

1. Facial Recognition
    a. This is an example of humans being unable to code all the rules involved in recognizing faces. We do not know explicitly how the human mind does this. We have good guesses, but nothing that can be written out in a coding language. That is why machine learning is needed
2. Customer Data Problems
    a. In many modern companies, there is an overwhelming amount of customer data. With that in mind, it might take an unachievable number of human hours to solve a problem using these huge data sets. Machine Learning can find useful patterns the data much

faster than humans. Traditional programming will fail us here and machine learning is the optimal solution.

e. In a paragraph, define the terms observation, feature, quantitative data, and qualitative data and discuss their importance in machine learning

An observation in machine learning is equivalent to a row of data in a database. Or in human terms it is all the information gathered and categorized at a specific instance in time and/or location. A feature is the category of data found. Think about the information you are gathering about the world around you right now. What is the temperature like? How bright is it? What are you hearing right now? These types of categories are features in the dataset, also known as columns. Quantitative data is something expressed as numbers. How many people are around you? That is a feature about the world. Qualitative data is expressed as labels, names, or in computer science terms “strings”. What are the names of those people around you? It attempts to describe the data. It might also be a true or false about the data. Like are one of those people around you your sibling? These are all important in machine learning because it sets out to turn our traditional database schemas into real life observation analogs.

f. write a paragraph describing your personal interest in ML and whether/how you would like to learn more about ML for personal projects and/or professional application

Jovially I am interested in machine learning because I welcome our robot overlords. Seriously, I am interested in seeing what ways machine learning can be applied to solve the complex problems about the world around us. I also find the philosophical nature of machine learning to be interesting. How long until machine learning plays an important part in developing a sentient machine? I see many applications for machine as it becomes more and more apparent that datasets are going to get bigger and bigger as we continue to collect more and more of it. I do not have any specific personal or professional projects in mind when I chose to learn more about this topic. Even though is see where the applications are (e-commerce platforms, traffic data, video game AI, language processing, sentiment analysis, etc.). I want to learn more of the fundamentals before I start attempting to impress myself with creative applications.