Overview of Machine Learning

Machine Learning is the process by which a computer program "learns" how to do something with a certain degree of accuracy by looking at large amounts of data.

Data, pattern recognition, and accuracy are critical aspects of Machine Learning. The way a machine "learns," is by taking in large chunks of data, and developing a bias based on that data. Pattern recognition is one of the goals when a ML program is analyzing the data. ML programs can often even recognize patterns invisible to the human eye. Ultimately, we want to feed a machine enough varied data to enable to predict future outcomes to a certain level of acceptable accuracy. "Acceptable" will depend on the use case.

Machine Learning is a Subset of Artificial Intelligence. AI is the more general term for how computers can mimic certain human qualities and abilities. Machine learning refers to the practical application of this concept using algorithms and data.

A Tesla's autopilot feature is a modern example of practical machine learning through computer vision. In order for a Tesla to say, come at a halt at a stop sign, it need to know what a stop sign looks like. We cannot an image or GPS location of every stop sign in the world. So, we simply train a program as to what stop signs look like by feeding it many images of stop signs, and then allow it to recognize the patterns. Another example would be in Predictive analytics. A Machine could aim to predict whether if it if fed enough historical weather data.

An **observation** is a row, or sample data set. An **attribute** is a column or quality of an observation. **Quantitative data**, also known as numerical data, relies on numbers and measurements. **Qualitative data**, also known as categorical data, relies on information that cannot be counted, measured, or easily expressed using numbers.

I am interested in Machine Learning, because to me, it is a great example of possibilities through computation. What can I learn from this data that I could not have recognized myself? Can I use this data to help people in any way? What can I automate? I definitely plan to keep up with it throughout my career, as I see it as a foundational structure in Computer Science moving forward.