Overview of ML

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What is ML?

Machine Learning is a process used to 'teach' a machine. It leverages techniques of data science to construct models that improve performance on specific goals.

Importance of Data

Three important parts of constructing models are data, pattern recognition, and accuracy. Data is used to 'train' and 'test' a machine by targeting a set of features. The machine uses this information to recognize patterns within the dataset. The goal of machine learning is to optimize the pattern recognition. Accuracy is measured with the predicted patterns generated by a model. If these results are close to or match the real data then the model has produced accurate inferences.

AI and ML

Machine learning as a field was born from the study of Artificial Intelligence. As AI research progressed the applications became much larger in scope. A large body of academics decided to refocus the goals from achieving a general AI to solving practical problems. Machine learning was a result of this change. It is based on a statistical approach to AI, resulting in probabilistic solutions.

Modern ML

The first example is Tesla's autopilot system. In the days before modern ML computer vision was much more primitive. The ability for a machine to adapt and react to it's surroundings would never be possible with traditional algorithms. Machine learning has allowed these machines to recognize the patterns necessary to make accurate driving decisions. A second example of modern ML is IBM Watson. This model is used in medical applications. It has learned from a massive dataset of diagnosis and can accurately diagnose new patients. Traditional methods would never achieve the level of accuracy needed for legitimate medical advice.

Data Definitions

In an arbitrary data set, parts can be defined as follows. An observation is a sample data set or row. On the other hand, a feature is a column or specific field in the data set. All types of data can be described in two categories. Quantitative data describes any numeric value in the sample set. Counter to this, qualitative data can only take on one of a finite set of values. These points of data are used in an ML model as goals or targets. The machine trains based on previous data to infer future patterns/values.

ML Personal Interestec

My personal interest in ML started years ago. I have always been fascinated by the practical nature of the field. I plan to use what I learn about ML in personal projects. One of these uses natural language processing embeded in a wearable device. I dream of a future where ML can allow us to achieve computer interaction that mirrors tha of Star Trek.