

Overview of Machine Learning

- a) Machine Learning (ML) is the art of training a computer to recognize patterns to aid in decision-making. Through the use of large data sets, a computer can be taught to recognize patterns in data and use that information to solve other problems.
- b) Data is the most fundamental component in ML. Data is used to train a machine to recognize patterns serves as the fundamental reference point that a machine uses to make decisions. Without data, there is no ML. Patterns are what a machine looks for in a dataset. They are used to classify other types of data provided to the machine or can be used to predict values based on a set of given criteria. It is important for the machine to accurately recognize these patterns, since a low accuracy means results generated based on patterns can likely be incorrect. Incorrect results may seem trivial in small applications however they may have larger ramifications in systems that heavily rely on accurate predictions or classifications.
- c) Artificial Intelligence, known as AI involves using a computer to mimic the capabilities of the human brain. The intent of AI is to be able to solve problems that are more suitable for humans to solve but use the computational power of a machine. Machine Learning is a subset of AI, which is used to teach the machine intelligence to be able to perform tasks that require knowledge.
- d) Two examples of modern ML applications include image recognition and speech recognition. For both of these applications, it is not possible to program all of the different rules needed to identify objects in pictures or patterns of human voices since there are so many variations of these data sets. For that reason the use of ML is required in these applications.
- e) In a data set, a sample data point is referred to as an observation. An observation is a collection of several attributes, typically defined as the columns of a data set. Attributes of an observation are also known as features, which are typically used in ML as the basis for making predictions. Features can be divided into two subcategories: qualitative and quantitative data. Qualitative data is non-numerical data that is typically part of a finite set. An example of this can be colors visible to the human eye. On the other hand, quantitative data is numerical data. Examples of this can include test scores, age, and temperature. The basis for ML comes from providing observations to a machine and finding patterns in the associated features. Typically, quantitative features are used to perform tasks such as regression while qualitative features are used in classification.
- f) My personal interest in ML is related to algorithmic trading of securities. I am seeking to learn more about ML to use as a tool in identifying which securities to buy and sell and the timeframe in which to do so. I have found that the best way for me to learn a new skill is to experiment with it and put it immediately to use. I want to combine the skills I learn in this course with data that I can generate through an existing project to build a new tool that uses a ML model to generate buy and sell signals for securities. I am

looking forward to learning what the fundamental for ML are so I can apply them to projects in languages that I enjoy using.

Additional References:

<https://azure.microsoft.com/en-us/solutions/ai/artificial-intelligence-vs-machine-learning/#introduction>