Kelly Trinh

CS 4375.004

Dr. Karen Mazidi

## An Overview of ML

(a.) What exactly is machine learning? Broadly, machine learning (ML) is a branch of artificial intelligence (AI) that trains computers to use different algorithms that train them to recognize patterns within or learn from datasets, allowing them to predict outcomes from the data. ML essentially allows computers to mimic the way a human would think without explicit human intervention.

(b.) In order to have any type of machine predict certain outcomes, one needs to have data. Data is the driving force of machine learning, as we use this data in order to actually figure out what we want to know. We create algorithms within machine learning to allow computers to figure out these outcomes for us, so without the data itself, there would be no machine learning. Although data is extremely important, being able to recognize different patterns within that data is of equal significance. With the use of the data, we are able to train computers to see what can be learned from it, and what conclusions can be derived. The conclusions derived from data must also be accurate, because if not, then they aren't true conclusions at all, but rather they are guesses. The predictions from machine learning must be better than other baseline conclusions [1].

(c.) Machine learning is a branch of Artificial Intelligence (AI). AI is programming computers to "mimic human cognitive functions" [2]. Since ML is essentially creating algorithms so that computers can read and interpret data as a human would, an AI system can be created using ML techniques. This indicates how closely connected AI and ML truly are. (d.) There are a plethora of ways machine learning is applied in the modern world. One example of this is through the banking industry. An instance of machine learning within this industry is when users are notified that there may have been a fraudulent purchase on their card or their account. In this application, traditional programming cannot be used because there is no mathematical or explicit way to know whether a purchase is fraudulent or not based just off of a singular purchase. Therefore, machine learning is used by using previous user data to determine whether or not a purchase is considered fraudulent based off of the previous data points. Another example of machine learning in the modern world is through shopping applications. When online shopping on platforms such as Amazon or retail stores, users can get recommended products

based on their search and purchase history. Machine learning uses the user's data in order to make these predictions about what the user may want. Traditional programming cannot be used because there is no way to explicitly know what the user might want without the user's data.

(e.) There are four important terms in regards to ML. The first word is observation, which is a particular data point in a set of data. Observations are important because they indicate the value of a particular attribute for that data point, and a plethora of observations can be used to predict a feature of another observation. A feature is a measurable property for observations in a data set. Features in data sets are important because they are major indications for predictions within the data set, which is why they are also referred to as predictors. Quantitative data is a numeric value for a feature. Qualitative data is a non-numeric type of data, and it cannot be measured with a numeric value. Both qualitative and quantitative data are important in ML because these types of data are what help algorithms predict aspects in a data set. For instance, the type of search that a user is making and the amount of times that user is making a particular search allows an algorithm to know how important it is to the user.

(f.) Machine learning is particularly interesting to me because it can be applied to a plethora of subsets within technology, and it can open the doors to developing valuable applications. Furthermore, one of the things that I believe runs the world today is data. As data becomes more prominent, we need a way to understand and interpret that data faster than a human would be able to. Machine learning assists in this problem. Although this class is the first step for me in learning more about ML, another way I would like to learn more about ML is going through datasets myself and applying the algorithms that I learned with more of these sets. I think that this would be helpful in strengthening my foundation of ML.

# References

[1] K. Mazidi, Machine Learning Handbook, 2nd ed. Creative Commons License.

[2] "Artificial Intelligence vs. Machine Learning: Microsoft azure," Artificial Intelligence vs. Machine Learning | Microsoft Azure. [Online]. Available: https://azure.microsoft.com/en-us/solutions/ai/artificial-intelligence-vs-machine-learning/#introduction. [Accessed: 25-Jan-2023].