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CS 4375 Overview of ML

1. Machine learning refers to utilizing previous methods to further improve existing methods and build new methods that complete tasks regarding data fields. For example, an image recognition algorithm can be used to differentiate an animal, such as a tiger, from a lion. The machine would be trained with new algorithms to increase its accuracy using existing methods or data as well. Another example would be the data recognition of trends for information such as market growth or recession predictions.
2. Data is an important factor in machine learning because it gives the machine a fundamental basis that is used to essentially create new methods or solutions for predicting future outcomes. If the machine were to not have data, the prediction would ultimately be an inaccurate guess without any evidence for an educated prediction. Pattern recognition in data is also vital to machine learning because it bridges the gap between the data and the prediction. Finding patterns, correlations, similarities, differences, etc. in data gives accuracy to the predictions, which in turn provides better support and results. Lastly, accuracy is a significant aspect to machine learning because it gives results. The purpose of machine learning is to produce better outcomes through data and algorithms. Accurate methods and data-driven learning higher performances for applications.
3. Machine learning is a substructure, or child, of Artificial Intelligence. ML serves as the brain to develop AI, and give its applications better use. For example, ML can be seen as the human nervous system, which gives the body parts (AI applications) “intelligence” to conduct actions. Ultimately, ML trains algorithms to make decisions and conduct tasks that the AI executes.
4. Two modern machine learning applications include medical diagnosis of diseases and speech recognition. Machine learning for medical diagnosis includes formulating algorithms and methods to see symptom patterns in data, along with image recognition for things such as benign and malignant tumors. Speech recognition uses machine learning to convert voiceovers into transcripts. For example, the MS Streams platform converts the voices heard on a lecture into transcript. These actions cannot be built with traditional programming because of the manual dependence of traditional approaches. In traditional programming, someone is required to develop the logic of the program, which then has data input and produced output. On the other hand, machine learning automatically formulates an algorithm using the data that was fed into the machine.
5. In machine learning, an observation is an instance of data. It is an example of information that comes from the row of a data table. Observation is important in

machine learning because it gives the state of the data at a particular moment. A feature is an attribute of data, which comes from the column portion of a data table. Feature is important in machine learning because it gives the vice versa of the observation: the particular moment itself. Quantitative data is the numbers aspect of the data table, which is important to machine learning because it gives oversight on the numerical predictions for data in the future. Qualitative data is the objectivity or category side of the data. It is important in determining frequencies or patterns in data and identifying errors in a specific portion.

6. My personal interest in ML was sparked when I started learning about the stock market and trading. In the past, I have looked at roles in quantitative trading for various companies, but I didn't really have the skills to apply for those positions because they require research in machine learning and data analysis. Upon looking through UTD courses, I decided to take this course to gain some experience on this side of computer science. I would like to learn more about stock market predictions and how to determine accurate results for stock growth or crash for my personal projects and professional application.