Meinhard Capucao
CS 4375.003
8/29/2022

**A. define ML in your own words**

I think that machine learning is the processing and manipulation of data, whether newly generated or previously established, with the goal of gaining knowledge and information based on said data observations. Machine learning involves a computer making decisions based on the data given, and with the final results being labeled accurate or not. In my understanding, what is output from computers that have machine learning is more like a guided prediction rather than facts or established answers.

**B. in a paragraph, summarize the importance of data, pattern recognition, and accuracy in machine learning**

Data is the heart of machine learning, and arguably the most important aspect. No learning can be done without data, and nothing can be concluded with it either. Data is usually a table of values. Data is processed, grouped and understood by a created model, and patterns can be drawn from a handful of data. Pattern recognition is important because data can be grouped and organized, which helps create better predictions. It is up to the model and algorithm to recognize certain patterns in data, and this drives the final result or prediction made because decisions are made to sort and qualify different sets of data through patterns found. After this, predictions are made, which can be accurate or not. It is important to have accuracy in machine learning since there would be no point in using it when the accuracy of a model is less than a baseline approach.

**C. describe the relationship between AI and ML**

Machine learning falls under artificial intelligence. AI aims to emulate human functions through a machine, such as decision making and problem solving. The fields of AI and machine learning are growing, so it's important to note that machine learning will allow AI to learn by itself from data given, or learn directly on its own through unsupervised learning. Machine learning can enhance the capabilities for AI, since it can allow those that use it to learn, think, and develop on their own.

**D. list at least 2 examples of modern machine learning applications, and explain why these application could not be built with traditional programming**

One example of modern machine learning is facial recognition. This cannot be built with traditional programming since the rules to define faces aren't complete, and there is a very large amount of faces in the world. Even humans cannot reliably recognize all faces with our decision making, so there is no way to traditionally program a facial recognition program. Another

example is a text to speech program online that uses machine learning and AI to emulate over thousands of famous voices. This is a very interesting program, as a user can choose a voice and input text, and the program will proceed to play it back to the user with the voice saying the specified text. The website is called uberduck.ai. This cannot be programmed traditionally since you can't program a computer to playback vocal inflections and learn unique voices, normal TTS programs use a pre-programmed default selection of voices. There is also an extremely large amount of voices and speech combinations for a single voice that would need to be programmed.

**E. In a paragraph, define the terms observation, feature, quantitative data, and qualitative data and discuss their importance in machine learning**

An observation is recorded data, and is an instance of a category or label. This is a row in a table of data. This is important because observations are individual instances that combine to make up sets of data. A feature is a label or attribute, and is the column in a table of data. Observations can be made under specific features. This is important because these put a label to observations and help in organizing tables with the right data. Quantitative data is centered around numbers, and is used in regression. Meanwhile, qualitative data, also known as categorical data, is centered around descriptions and categories. These two types of data are important because they cover almost all types of results that machine learning can output.

**F. write a paragraph describing your personal interest in ML and whether/how you would like to learn more about ML for personal projects and/or professional application**

Machine learning was always an interesting concept for me, although I haven't explored it much. I began my interest in high school through a club, and learned a bit of Python. Beyond that, I haven't learned much more, however when I saw this class I wanted to learn more. I want to use this for some of the project ideas I have, because recently I started to learn more about Python and other technologies. I thought of a project that would predict the likelihood of some content creators that I watch posting that day, or one that would help suggest music preferences based on your current songs through the Spotify API. I know there is a lot of applications I can do if I continue to learn Machine Learning.