Overview of Machine Learning (ML)

1. **Define ML**
   - ML is an activity to train the computer to accurately recognize the pattern from the data, then output the result as a model. Next, we use this model to predict the outcome on future data for the purposes of data analysis, prediction, and action selection by autonomous agents

2. **The importance of data, pattern recognition, and accuracy in ML**
   - ML need data for 2 purposes: to train the algorithms and to learn about the data. Then after the pattern has been recognized, we can create the model to predict future data. This model need to give an accuracy result based on a default baseline, if not, it is just random guesses.

3. **Relationship between AI and ML**
   - ML has the same mathematical foundation from statistics and probability as computer science and AI. Then both computer science and AI push the frontier of what computer could do to make ML possible.

4. **Two examples of modern ML applications, and explain why these application could not be built with traditional programming**
   - 1st example is face recognition in a photo. In the traditional programming, we need to know all the rules beforehand so we can encode them into the program. The problem is we don't even know what rule we can use for this scenario. However, we can use ML to train the computer to recognize key edges and regions which are likely to be faces.
   - 2nd example is when the scale of problem is too large. For example, when a company want to learn about their customers behavior pattern from its huge amount of customer data, it will take a very long time to do so with traditional programming method. However, ML can find these pattern more quickly and programmatically in large amounts of data.

1. **Define Observation, Features, Quantitative Data, and Qualitative Data, and their importance in ML**
   - Observation is a row of sample data point which is also called an example or instance. Features is the column in table which is also called attribute or predictor. Quantitative data is the features that can be present in numeric. Qualitative Data is the feature that can only take the values of a finite set of options. These terms are very important in ML because together, they form a sample data set in which ML can work with.

2. **Personal interest in ML**
   - As a fellow computer science student I would love to learn more about ML and become a practitioner in this field. I hope as the class advance during the semester, I

can have a better understanding of most popular and basic ML algorithms as well as become proficient in R and Python.