IS 507 - Data, Statistical Models, and Information - Discussion 4

1. Explain a concept covered in the first half of the semester and why you found it interesting.

- Some very interesting concepts were covered during the lectures. However, I found the concepts of 'Data Visualizations & Exploratory Analysis' and 'Paired T-Test' interesting.
- Data Visualization refers to a technique where we represent the information using graphs and charts. We can highlight patterns, and it helps to get quick insights. Exploratory Data Analysis is often used in conjunction with Data Visualization because it aims to analyze and summarize the dataset, often with visual methods.
- This concept is exciting because whatever the industry or organization, if they have data available, it can be used for analysis to identify the hidden trends in the data and visualize it with the help of diagrams, which can help strategize the business. Data Visualization and Analysis are useful in the majority of places.

2. Using the concept mentioned in Question 1, provide a problem/research question that you could answer with the concept for an application of your choice.

- Data Visualization and Exploratory Analysis are used in nearly all industries.
- Let us take the problem from the healthcare industry, where the hospital staff wants to access and understand the records of the patients, which include their daily vitals, their past conditions, information about allergies, and finally the improvement in the condition of the patient after medication.

3. How would you operationalize your research question (what variables would you collect to attempt to solve/answer your research question)?

- To solve the above-mentioned research problem, Data visualization will help us.
- Instead of scanning through the multiple papers and the patient files, we can have dashboards created that can reflect the data.
- For daily vitals, we need data about temperature, weight, blood pressure, pulse, SpO_2, respiration rate, etc. This can be fed from the devices, and simple bar charts can be plotted, which can help analyze the daily trends.
- With respect to the allergies, we can plot a pie chart, which can indicate the proportion of allergies with respect to the 8 major allergens listed by EDA.
- The paired T-test on pre-medication and post-medication data can be used to assess condition improvement.

4. What are some limitations that you could encounter in attempting to solve/answer your problem/research question (conceptually/statistically)?

- There can be some limitations while solving the healthcare data visualization problem.
- When a new patient comes for treatment, we may not have their past data in the medical system. So, if we want to analyze past behaviour, it might be tricky. Unless, we get the past data from patients, we might not be able to analyze it.
- Also, how we integrate the data from the electronic gadgets into the database may be tricky because we cannot directly relay the data from devices to the dashboards.

References:

Gartner_Inc. "Definition of Data Visualization - Gartner Marketing Glossary." *Gartner*, https://www.gartner.com/en/marketing/glossary/data-visualization.