**MKT 568 -Assignment 4**

Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Due: Nov 14, 11:59 PM

Scoring: 15 points total (7.5% of your grade)

This assignment aims to help you solidify your understanding of conjoint analysis and K-NN. With your team, discuss the following questions and answer them. In your submission, delete the question texts and *only* include your answers. Your submission must be written in an M.S. Word file with a Times New Roman, 12 Font. Any sources used in the assignment must be properly cited in the APA format (7th edition). Failing to cite your sources is considered plagiarism.

What you submit on the deadline includes (1) a Word document where you have responded to the questions listed in this document and (2) a Python script including the complete code used to respond to question B. The Python code must be in the format of a Jupyter Notebook (.ipynb) and without errors. You will lose at least 2 points if your Python files throw any errors. So, make sure to run it once before submission and correct any errors.

Question A. Recommender Systems (4 points)

The K-Nearest-Neighbors algorithm can help with designing an automated recommender system, such as the one Amazon, Netflix, and many other businesses use. This question is an opportunity for you to do more extensive research into this subject. Imagine you work at Barnes & Noble. Your boss is thinking of creating a recommender system to recommend books, articles, products, etc., to their customers on the website, as well as through text messages and email. Your boss asks you to do some research on recommender systems and to create a set of bullet points to use as a framework and a start for designing such a system. Search the internet to learn more about recommender systems, the available types of recommender systems, possible ways to build them, etc. and answer the following questions. You must answer all these questions in your own words, and you must cite the source from which you learned them. Any direct copy and paste from the internet (even if you replace some words with your own) or generative AI tools (e.g., ChatGPT) is considered plagiarism and will receive a zero. Believe me, I have eyes in your room and I will know if you use ChatGPT or Bard for this question. A yellow cartoon face with a nose and mouth

Description automatically generated

1. What are the different types of recommender systems, and which one would you recommend for Barnes & Noble? You must at least discuss two different types (1 point)
2. What are some data mining algorithms that can be used to design a recommender system for Barnes & Noble? (1 point)
3. What kind of data (e.g., from whom, what types of input and target variables, how many records, etc.) is required for designing a recommender system for Barnes & Noble? (1 point)
4. After implementing this recommender system, how would you measure its success? (1 point)

Question B. Chestnut Ridge Laptop – Determining the Ideal Product (11 points)

Chestnut Ridge (CR) is a well-known laptop manufacturer that sells directly to customers, renowned for delivering high-quality laptops at affordable prices. CR does not manufacture laptop parts in-house; instead, they source components from top companies like Intel (for CPUs), Nvidia (for graphics cards), and Samsung (for memory and chips), using these quality parts to build laptops for end users. By leveraging economies of scale, CR can mass-produce laptops and pass cost savings on to customers. Despite their budget-friendly approach, CR has earned a reputation for durable products that meet the needs of a wide range of consumers, from students to professionals. Now, CR’s product team aims to introduce a new laptop designed to appeal to an even broader audience and align with current market needs.

To ensure the new laptop meets consumer preferences, CR’s team conducted a conjoint analysis—a method used to identify the product features most valued by customers. Before designing the conjoint study, they surveyed customers to discover the most important laptop attributes to consumers. This preliminary survey revealed that the most valued laptop features were **RAM size** (Random Access Memory), **screen size**, **battery life**, **hard drive type**, and **price**.

With these insights, CR crafted a conjoint analysis study, selecting specific levels for each attribute to explore customer preferences effectively. They defined the following attribute levels:

* RAM size: 4 GB, 8 GB, 16 GB
* Screen Size: 13 inches, 14 inches, 15 inches
* Battery Life: 6 hours, 8 hours, 10 hours
* Price: $800, $850, $900
* Hard Drive Type: SSD, SATA

Using a fractional factorial design, CR developed 15 unique laptop profiles with these attributes, each combining different attribute levels, and asked 20 participants to rate these 15 profiles. All participants were asked to indicate their preference for each laptop profile on a 1-10 scale. The data is available on Canvas (ChestnutRidge\_laptops.xlsx). Your team is tasked to analyze this data to identify the optimal combination of features for CR’s new laptop.

Download the data from Canvas and respond to the following questions:

1. The data is already dummy coded. Based on this data, what are the features of the laptop that was selected as the baseline laptop (1 point).

Run a conjoint analysis similar to what was done in the class and use this analysis to respond to the rest of the questions:

1. Briefly explain the steps you took to clean the data. (1 point)
2. What are the average partworths across all 20 participants for the different attribute levels? (4 points- 2 for creating the correct Python script and 2 for reporting correct average partworths)
3. Which attribute plays the most important role in determining participant rating? How did you make this decision? (1 point)
4. Based on average partworths, what is the best specification for a laptop that maximizes consumer rating? In other words, what attribute levels will the highest-rated laptop have based on this data? (2 points)
5. Quantify the dollar value of each of the following attribute levels (2 points):
   1. 16GB RAM
   2. 15 inches screen size
   3. SSD hard drive
   4. 10 hours battery life