ADSProject3

Project 3: A/B Test

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- **Introduction & Research Question**

  In this project, we are designing and conducting an A/B Test experiment. A/B Test plays an important role in data science, especially for decision-making and user experience optimization. The idea behind A/B Testing is you have two group–A and B, and Group A is the original version and Group B is the modified version. You are comparing how each group behaves. By comparing the outcome for Group A and Group B, you will find out which one is better for you to use.

  Research question: Does red color for sales affect people's choice of buying clothes?

  Motivations: In a world filled with countless choices, marketing strategies—such as those used during major sales events like Black Friday—are crafted to influence consumer decisions. It is interesting to see the consistent use of the color red in advertisements across different countries. This widespread practice raises a compelling question: does the color red actually increase urgency in consumer behavior, encouraging quicker or more impulsive purchases?

- **Hypothesis**

  Our hypothesis is that the color red has a statistically significant effect on increasing the purchase click rate of the plain black shirt item.

- **Experimental Design & Methodology**

  We have two websites–Website A and Website B. On the website, we have three T-shirts–Plain Black Shirt, Code Shirt, and Graphic Shirt. The Plain Black Shirt is $100 with 25% discount. The Code Shirt is $75. The Graphic Shirt is $50. You have $75 in balance to buy the T-shirt. You can buy any T-shirt. But the balance is only sufficent for you to buy one T-shirt. If you already buy one and want to buy another. The website will

pop up “Insufficient funds to buy this item”. The Plain Black Shirt has no figures or anything on it. But the sales button is in red and it has a sale for website A, but in color similar to other items for website B to see if red color and sales affect user click rates. The Plain Black Shirt and Code Shirt have same prices of $75, but the code shirt doesn't use sale strategy and simply state the final price. Graphic Shirt is cheaper at $50 and is used to be a comparison. You can also Rate the Super Graphic Store or leave comments.

Difference between website A and website B: Website A uses red to highlight the sale item—a plain black shirt—while other items, such as the coded shirt and graphic shirt, are shown in mint green. On the other hand, Website B uses mint green for the sale item, matching the color used for the other items in the store.

Cookie-Based Assignment URL for A/B Testing: We created an index.html page on GitHub to serve as a redirect link that randomly sends users—with a 50% probability—to either Website A or Website B. The assigned group is stored in a cookie for 30 days to ensure consistent redirection on future visits.

- **Data Collection**

  We sent the two website randomly to two stats students groups and our classmates. In total, 69 students entered Website A and 57 students entered Website B. They clicked on the website and left us valuable data.

  We analyzed the data via Google Analytics. In Google Analytics–View user engagement & retention tab, we are able to download the datasets for different events such as different kinds of purchase on three T-shirts. In User Explorer, we are able to download the datasets for individual users behaviors.

- **Statistical Analysis & Results**

  To evaluate whether the color of the sale button influenced user engagement in our A/B testing experiment, we conducted a comprehensive statistical analysis comparing Group A (which saw a red-colored sale button) and Group B (which saw a mint green version of the same button). We first conducted a basic visualization of the click-through rate on the purchase button.