Vanguard®

ENHANCING VANGUARD USER EXPERIENCE

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Project overview

Business case

Vanguard, a leading investment management company, launched a digital experiment to test the impact of a new, more intuitive User Interface (UI) on client engagement. The goal was to determine if the enhanced UI, along with in-context prompts, would improve the online process and increase completion rates.

Did the new UI lead to higher completion rates among users compared to the traditional online process?

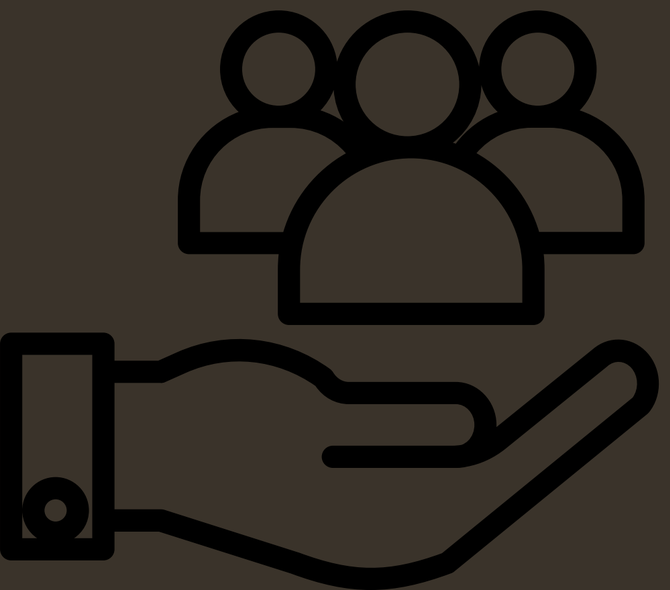
Data overview

Client Profile dataframe gave us some information about the client base by :

-Age

-Gender

-Tenure



Data overview

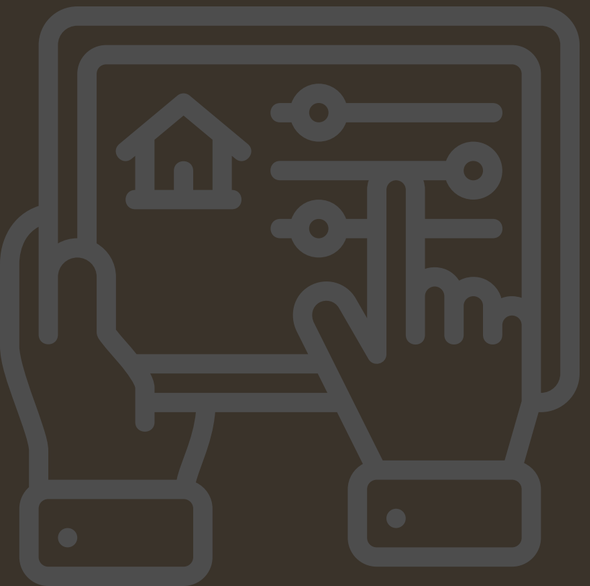
Digital footprints dataframe allowed us to:

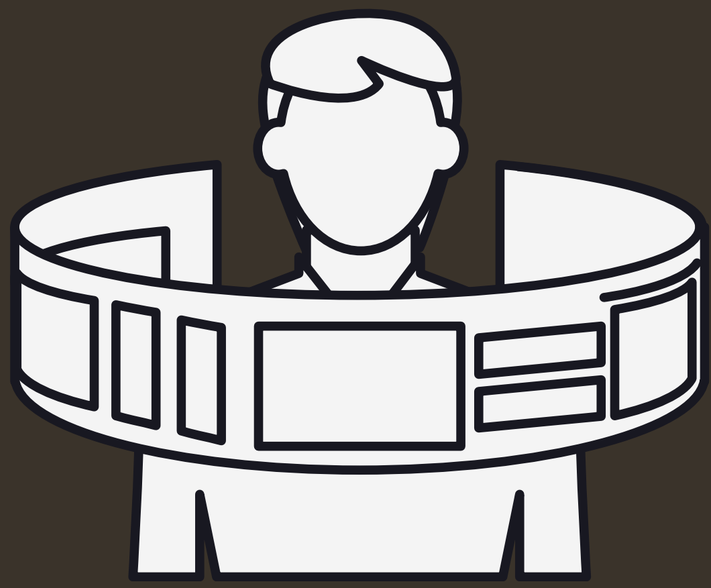
- Calculate Completion Rates
- Calculate Competition Times
- Calculate Error Rate

Data overview

Experiment Roster Dataframe allowed us to split the clients by variation :

- Test
- Control





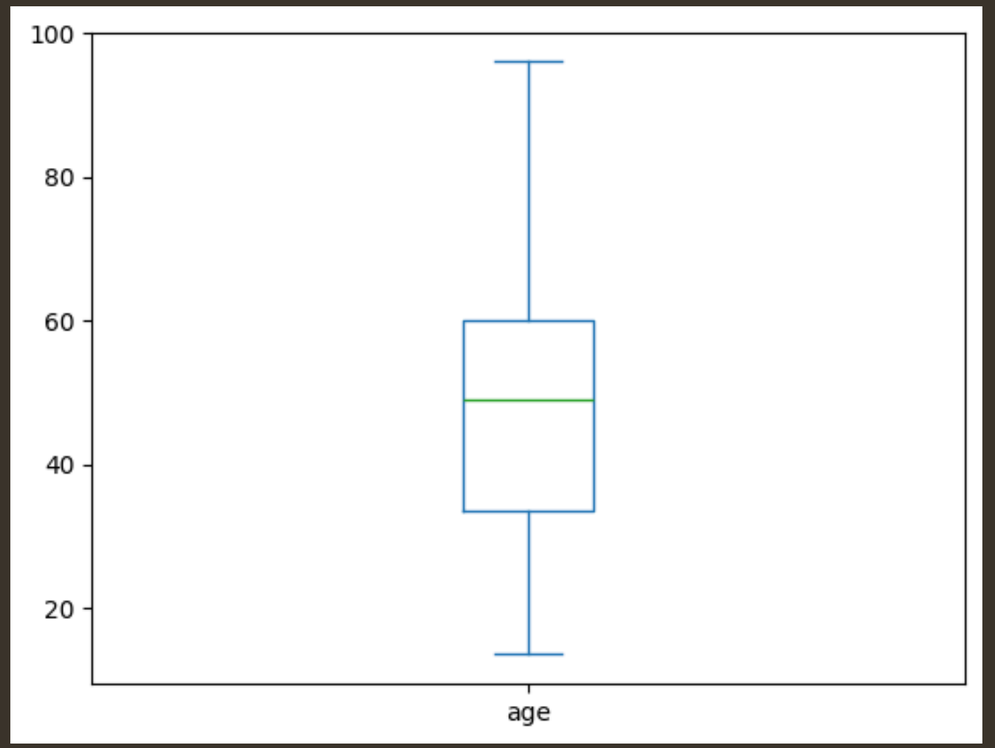
Exploratory Data Analysis (EDA)

- **Demographics:** Drop empty rows since they were not many
- **Gender:** Irrelevant to data since it was equally distributed
- **Variations:** Anything that wasn't **Test** was set to **Control**

- A**ge groups:** Mostly people between 40 and 60
- **Active users:** Also between 40 and 60

	age_group	total_visits
0	Middle-aged (40-60)	184232
1	Younger (Under 40)	154870
2	Older (60+)	110602

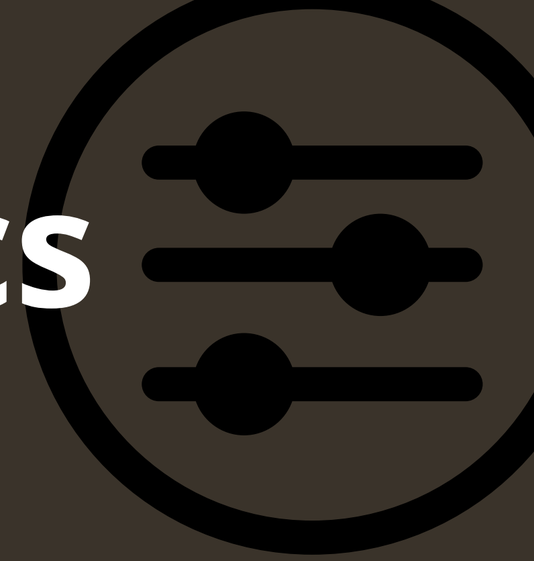
	tenure_group	total_visits
0	Long-standing (5+ years)	417224
1	Moderately long (3-4 years)	31977
2	New (1-2 year)	503



Exploratory Data Analysis (EDA)

The digital footprints Dataframe contained 755401 rows and 5 columns, tracking client interactions across steps in a digital process. The cleaning process started by dropping the duplicates and checking for missing values. Then the variation dataframe was merged , attributing the variation type to each client. This step was crucial for conducting the KPI analysis and reduced the dataframe to 443897 rows.

Performance metrics



Completion rate:

- Completion rates provide insight into how effectively users progress through the process.
- When calculated separately for the Control and Test groups, these rates help us understand the impact of the new UI design. We can compare the progression of clients in the Test group (with the new UI) against the Control group (with the old UI).

Key findings:

- Test group has higher completion rates, suggesting the new UI improves engagement.

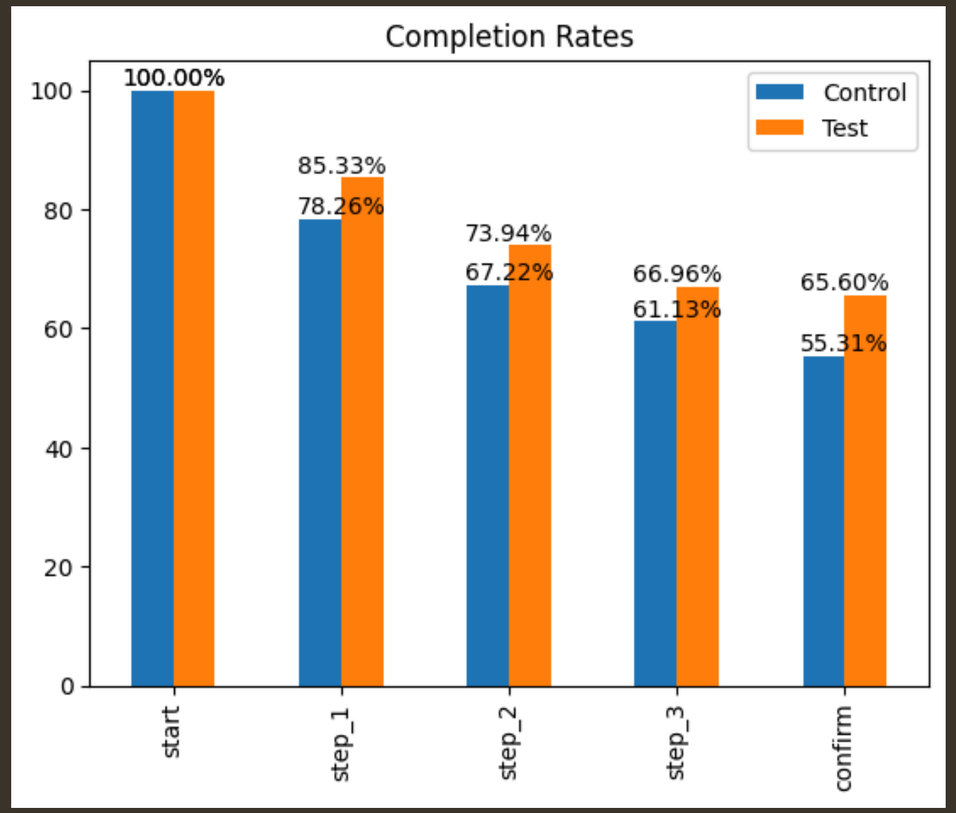
Performance metrics

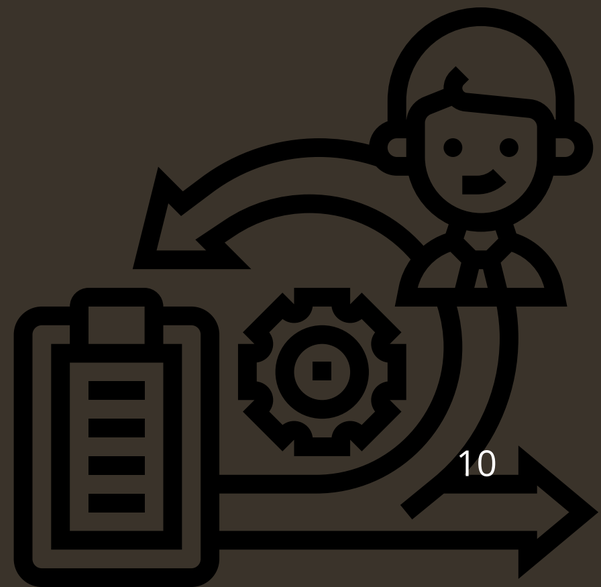
Completion rate:

	variation	completed_clients	total_clients	percentage
0	Control	29105	43633	66.7000
1	Test	18682	26961	69.2900

Performance metrics

Completion rate per step:





Performance metrics

Time spent on each step:

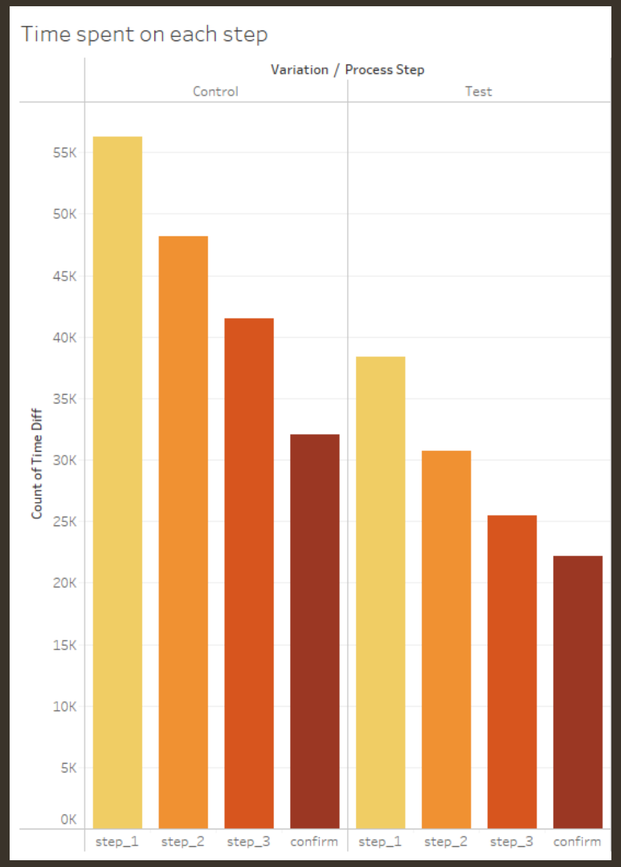
- Measures average time clients spend on each step of the process.
- Separates Control (old UI) and Test (new UI) to assess differences.

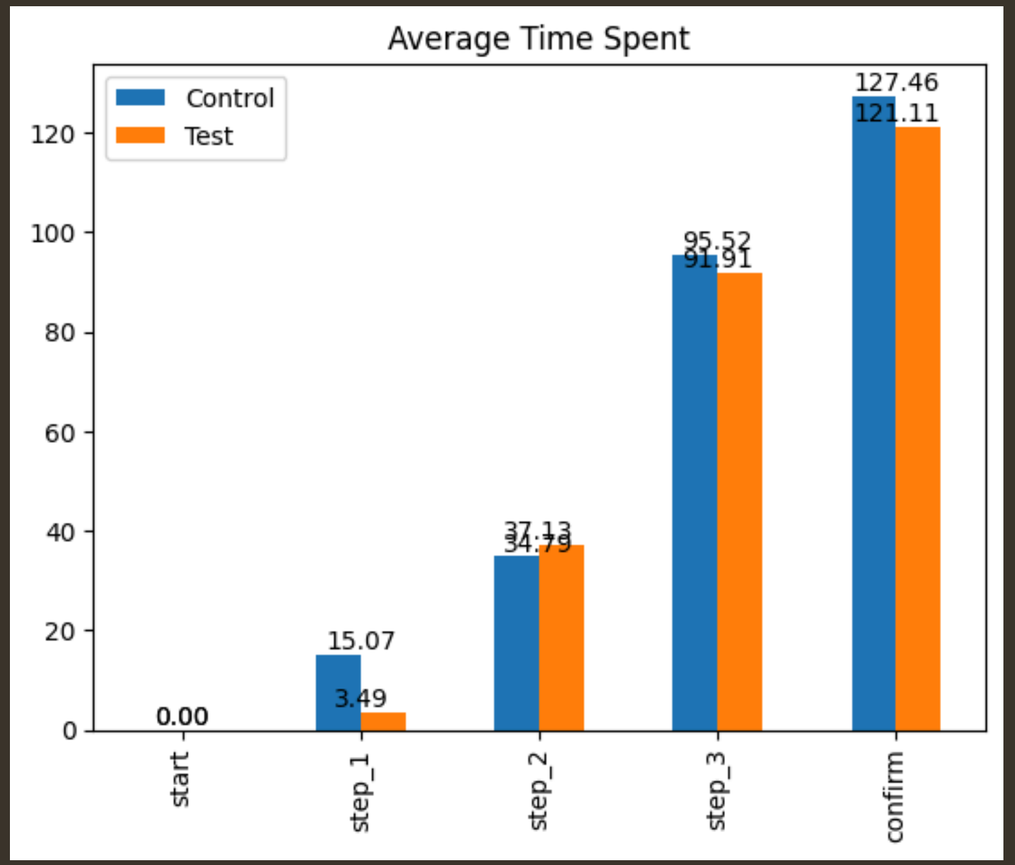
Key findings:

- The Test group shows shorter times for most steps, indicating the new UI streamlines navigation.
- Steps with longer durations highlight potential friction points requiring improvement.
- Faster time in Test at confirm step suggests improved clarity and ease in completing the process.

Performance metrics

Time spent on each step:





Performance metrics

Error rates:

- Error rates refer to the proportion of clients who failed to move from one step to the next.

Key findings:

- Higher Errors in Control Group.
- Indicating that the new UI introduced better acessibility for the users.

Performance metrics

Streamlit

https://vanguard-cx.streamlit.app/

Hypothesis testing

We observed increase in completion rate between the test group and the control group is 0.0259, which is less than the 5% threshold (0.05), we conclude that the observed increase is minor and may not be statistically significant. This indicates that while the test group shows slightly better performance, the difference might not provide strong evidence to confidently favor the new UI without further analysis.

	variation	completed_clients	total_clients	percentage
0	Control	29105	43633	66.7000
1	Test	18682	26961	69.2900

Hypothesis testing

Binomial test p-value result is of 5.6838514065e-24 which is an extremely small value.
Since the p-value is far below the common threshold (0.05), we reject the null hypothesis. This means the observed increase in completion rates in the test group is statistically significant.
Even though the increase may appear small, the statistical significance highlights that this change is unlikely to be due to chance, reinforcing the effectiveness of the new UI.

```
# Binomial test
successes = test_completed
total = test_started
p_null = control_completion_rate

binom_result = binomtest(successes, total, p=p_null, alternative='greater')
print(f"Binomial Test P-value : {binom_result.pvalue:.10e}")
```

```
Binomial Test P-value : 5.6838514065e-24
```

Hypothesis testing

Two Sample t-test

```
# Create completion arrays for Control and Test groups
control_completion = control_group['process_step'].apply(lambda x: 1 if x == 'confirm' else 0)
test_completion = test_group['process_step'].apply(lambda x: 1 if x == 'confirm' else 0)
```

```
t_stat, p_value = ttest_ind(control_completion, test_completion, equal_var=False)
print(f"T-statistic: {t_stat:.4f}, P-value: {p_value:.10e}")
```

```
T-statistic: -14.8044, P-value: 1.4182407520e-49
```

```
# Interpret the result
alpha = 0.05
if p_value < alpha:
    print("The difference in completion rates between Control and Test groups is statistically significant.")
else:
    print("The difference in completion rates between Control and Test groups is not statistically significant.")
```

```
The difference in completion rates between Control and Test groups is statistically significant.
```

Experiment Evaluation

Randomization:

- The experiment appears well-randomized as clients were assigned to either the control or test group.
- Random assignment reduces the influence of external factors, making the results more attributable to the new UI.

Duration:

- The experiment duration is sufficient to account for natural variations.
- A longer duration might provide even more robust data, but the observed statistical significance indicates the timeframe was adequate.

Potential Biases:

- If certain demographics (e.g., age, tenure, or account type) were overrepresented in one group, it could skew results.
- Users may behave differently simply because they are aware they are part of an experiment.
- Changes in marketing, economic conditions, or other external variables during the test period could have influenced user behavior.

Experiment Evaluation

The experiment demonstrates a well-designed and statistically validated improvement in completion rates, error rates, and time spent per step. However, incorporating additional data like detailed user feedback could further enhance the understanding of the results and guide future optimizations.

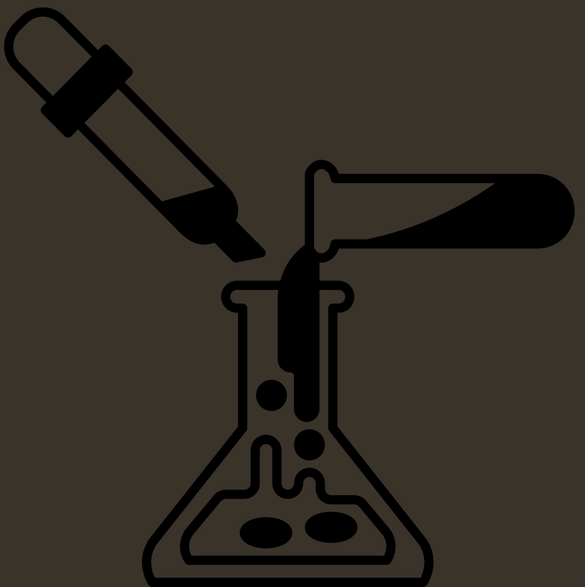
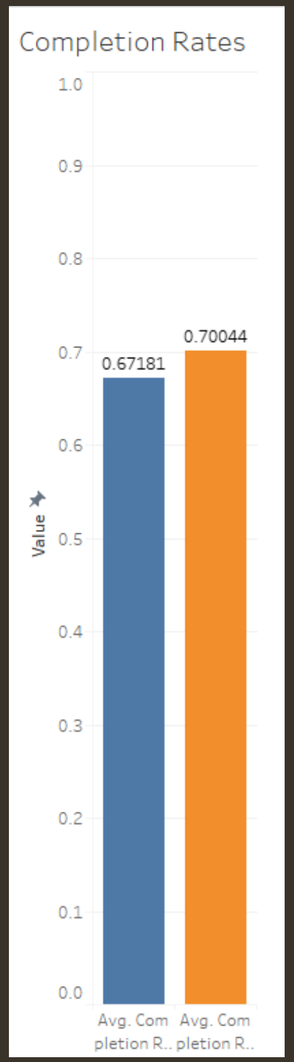


Tableau Visualizations



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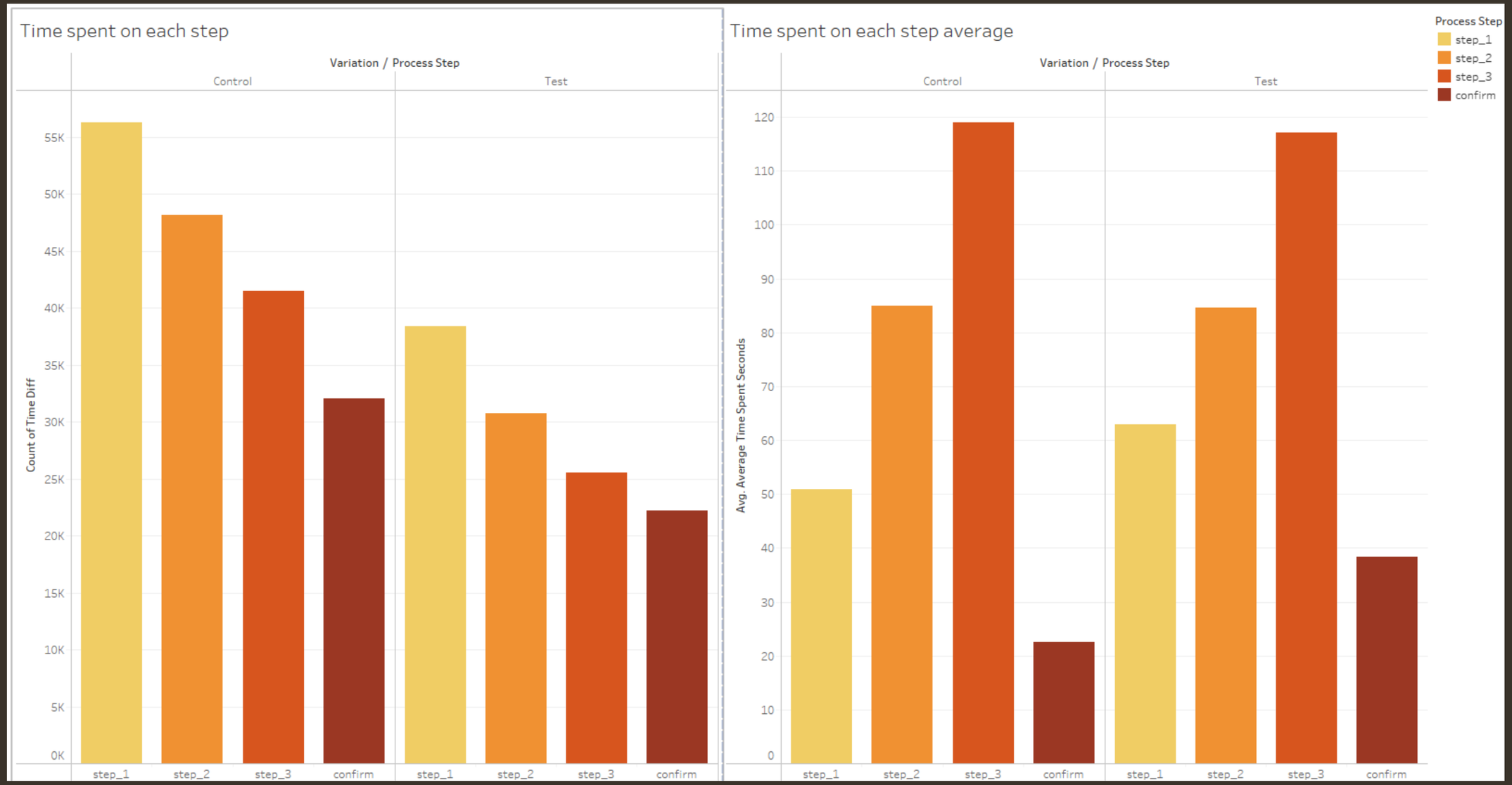


Teamwork & Project Management

Mark

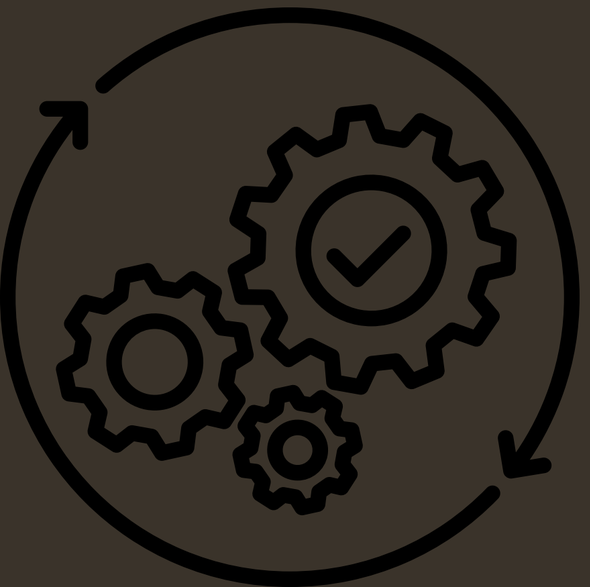
- Analysed client demographics and experiment roster
- Streamlit
- SQL

Vasco

- Analysed digital footprints dataframe
- Jupyter Notebook
- Tableau visualizations

Challenges & Learnings

Inconsistents values depending on different formulas and platforms
Some struggle inserting all the data correctly in Tableau
Finding which formulas were better to accurately represent the data.



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