

Vanguard®

Current Objective and Situation

- working as a data analyst for Vanguard
- **goal:** improve completion rates of Vanguard's digital online business processes
- evaluate the results of a previously conducted A/B test
- **aim of this presentation:** draw a conclusion for the management team (you, the audience) whether to, or not to implement the new UI



Data Overview

Client profiles → Dataset containing general info about our clients

Digital footprints → Dataset tracking the digital movements of our clients while navigating through our online business process

Experiment roster → classification of our clients into “test” and “control” groups



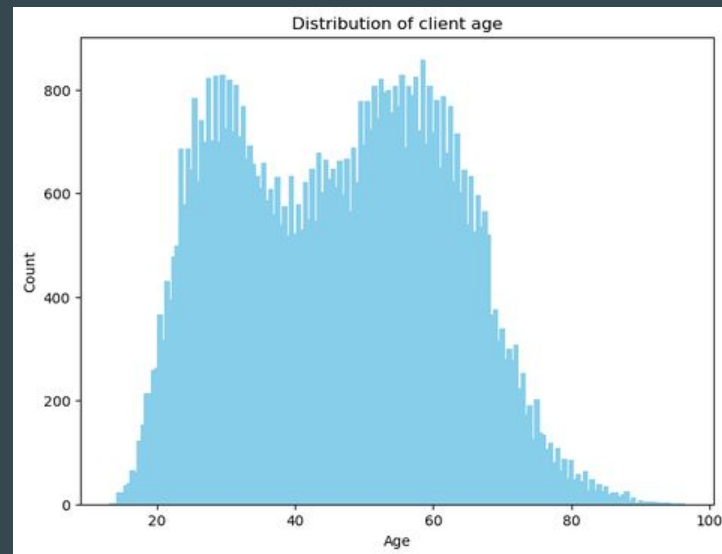
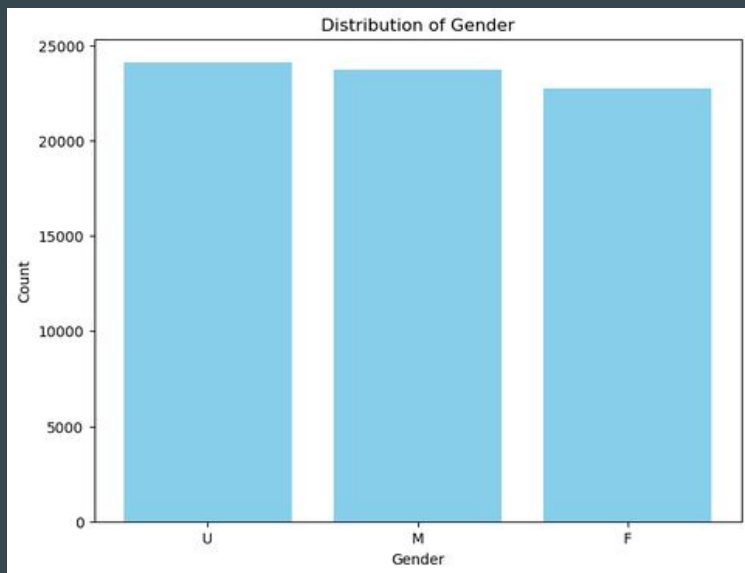
Data cleaning

- checking for and dropping NaN-values
- concatenated the digital footprints tables vertically
- cleaned messy columns and replaced misleading values with fitting ones



Data Demographics

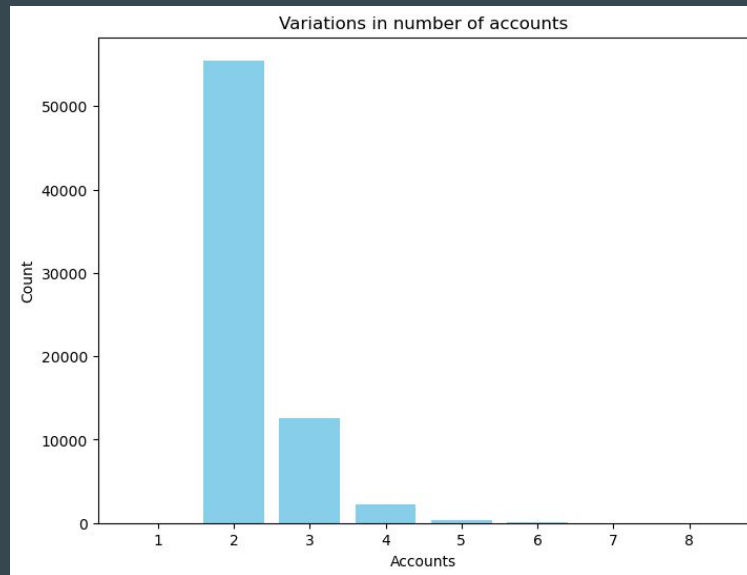
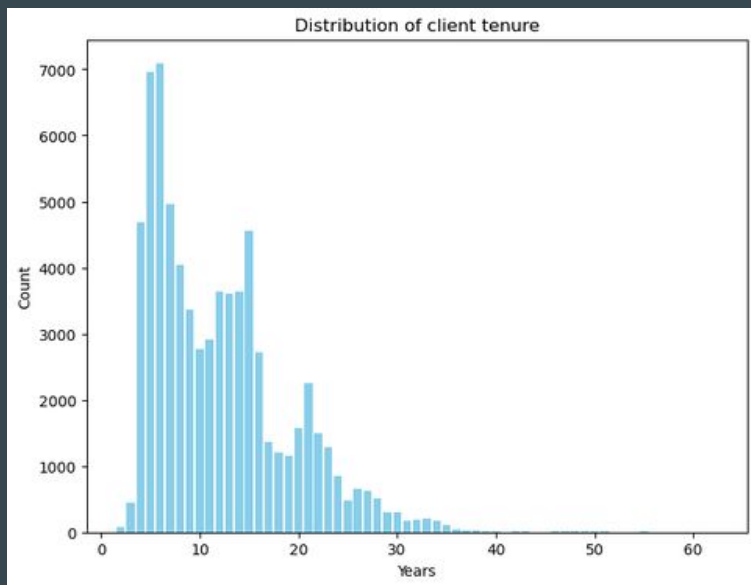
Who are our primary clients?



- total of appr. 70k clients
- relatively equally distributed regarding gender
- peak number of clients around the age of 30 and late 50s/60

Data Demographics

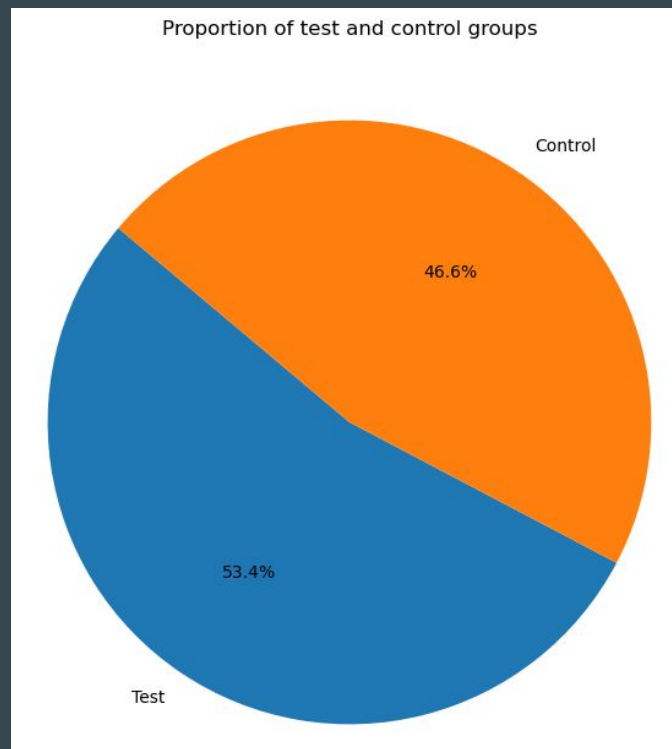
Who are our primary clients?



- most clients with Vanguard since 4-15 years with a peak at around 6 years
- most clients hold two accounts with Vanguard

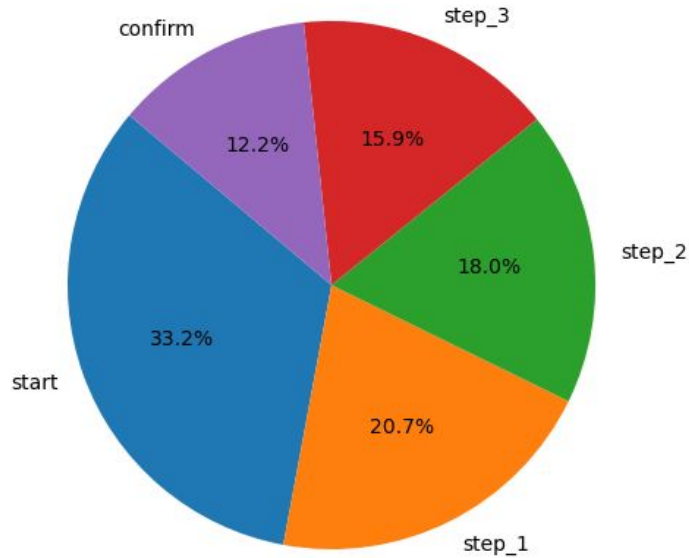
Context of the A/B testing

- in order to draw well-founded conclusions a experimental study using A/B testing was conducted
- population split up into “test” and “control” groups in order to make a direct comparison
- controlled test environment basis for hypothesis testing

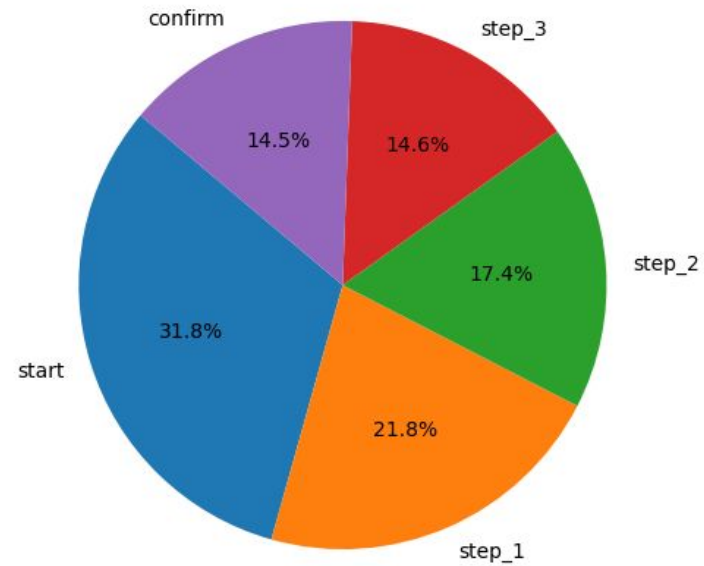


KPIs Test vs Control

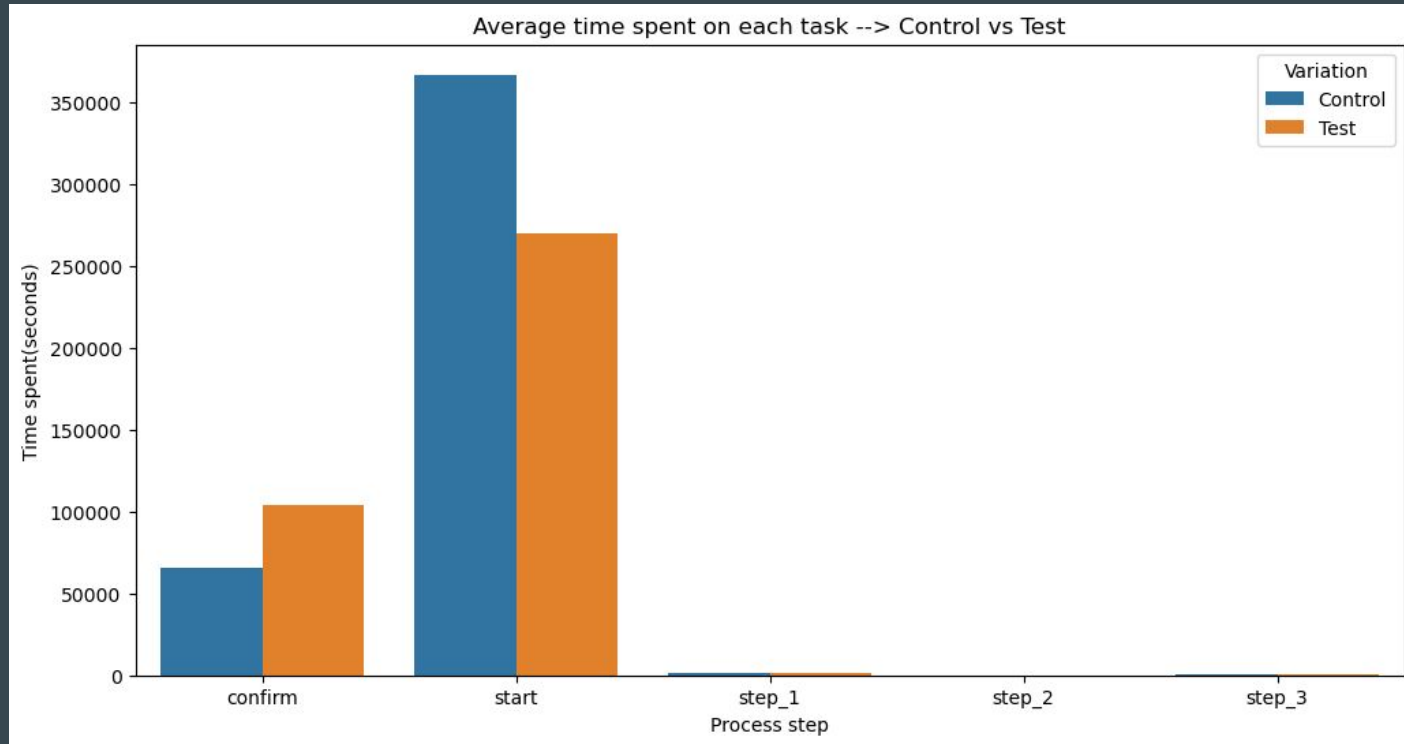
Control Group - Distribution of process steps



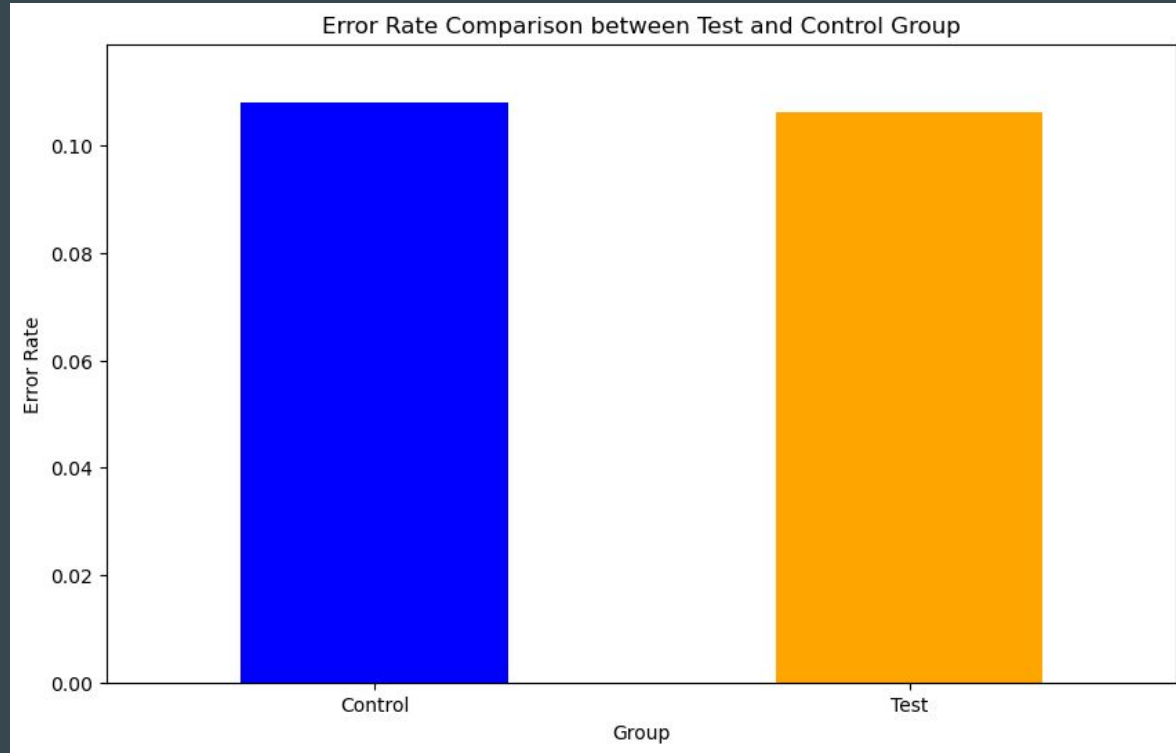
Test Group - Distribution of process steps



KPIs Test vs Control



KPIs Test vs Control



Hypothesis Testing

- **1st Hypothesis:**
 - H0: there **is no** significant difference in completion rates between the control and the test group
 - H1: there **is a** significant difference in completion rates between the control and the test group
- alpha-significance-level: **5%**
- ran a two-sided z-test in python
- **We reject the null hypothesis** → we can say with a 95% certainty that there is a significant difference in completion rates between the “test” and “control” group!

Hypothesis Testing

- 2nd Hypothesis

→H0: the increase in users does not meet/exceed the 5% mark

→H1: the increase in users does meet/exceed the 5% mark

- alpha-significance-level: 5%
- ran a one-sided z-test in python
- **We fail to reject the null hypothesis** → There was no sufficient statistical evidence for us to disprove the null hypothesis

Hypothesis Testing

- 3rd Hypothesis

→H0: There is **no difference** between the average age of clients engaging with the old or the new UI

→H1: There is **a difference** between the average age of clients engaging with the old or the new UI

- alpha-significance-level: **5%**
- ran two-sided t-test in python
- **We reject the null Hypothesis** → we can say with a 95% certainty that there is a significant difference between the average ages of the “test” and “control” group!

Experiment Evaluation

- ensure that population samples for “test” and “control” are a proper representation of the population
- potential biases could occur due to a misleading representation of the population, thereby falsifying test results and conclusions
- interesting additional data could be what kind of errors occur, thus perhaps giving insights for improvements to reach the 5% threshold



Tableau Visualizations

[https://public.tableau.com/views/Project2_17260736861020/Project2?:language=fr-FR&publ\[...\]sid=&:redirect=auth&:display_count=n&:origin=viz_share_link](https://public.tableau.com/views/Project2_17260736861020/Project2?:language=fr-FR&publ[...]sid=&:redirect=auth&:display_count=n&:origin=viz_share_link)

Teamwork & Project Management

- Used a Trello kanban and a Google-Doc to organize and breakdown the to-do's
- Split up the tasks at hand and made sure to check up on each other
- Communication between team members is crucial for a structured approach of the project



Challenges & Learnings

- Tableau Visualizations
- Hypothesis-testing
 - clearly defining hypothesis
 - thinking about what you want to achieve in the business context
- setting up the repository

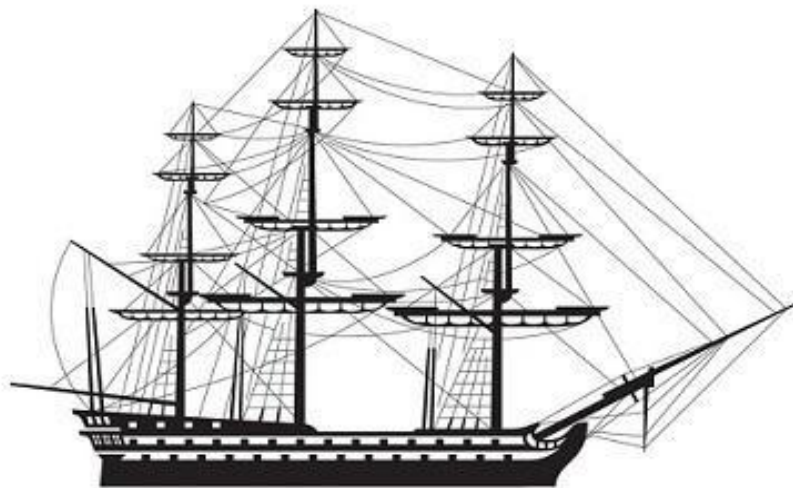


Conclusions

- new UI did show a **significant increase of completion rates**
- even though significant it did **not** meet the threshold for the implementation to be **financially viable**
- we found evidence for a significant difference between the average ages of the “test” and the “control” group

Ideas:

- rerun the A/B-testing while making sure that every group represents the population
- if we still come to the same conclusions it would be unwise to implement the new UI



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