A Decision Memo: Maximising Conversion Rates of Subscriptions for an

AI Chatbot

Minerva University

CS130: Statistical Modeling: Prediction and Causal Inference

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March 2023

To: Tharun at Findhope

Subject: Using causal inference techniques to adjust pricing to maximise conversion rate of subscriptions to Findhope's AI chatbot in countries outside of India.

Executive Summary:

This decision memo proposes using causal inference techniques to adjust pricing and maximise the conversion rate of Findhope's AI chatbot in countries outside of India. **The proposal recommends conducting A/B testing for each country, randomly choosing individuals to roll out two different prices based on the pricing of other similar chatbots in that specific country.** The A/B testing will help determine the optimal pricing for each country, and the results will be analysed to adjust the pricing strategy based on the results. The memo concludes that Findhope can make mental health services accessible to a wider audience and maximise the conversion rate of its AI chatbot.

Introduction:

Findhope aims to make mental health services accessible to a wider audience through an AI chatbot available 24/7 for individuals to text. This proposal aims to determine how Findhope can adjust pricing to maximise the conversion rate in countries outside India by using causal inference techniques. Specifically, we want to focus on the initial pricing strategy to attract the maximum number of customers to buy a monthly subscription.

This problem is causal because it seeks to understand the causal relationship between the price of the AI chatbot and the proportion of people who purchase it. By changing the price, we will manipulate the independent variable (the price) to observe how it affects the dependent variable

(the number of purchases). We want to know the cause-and-effect relationship between the two variables.

Background:

Currently, Findhope is only operating in India, and we do not have access to pricing data for other countries. Therefore, we propose conducting an A/B test to determine optimal pricing for each country. While similar chatbots are available in other countries, such as [Fingerprint for Success](#) in Australia and the US, and [Wysa](#) in India, the UK, and the US, we cannot use their conversion rates for our analysis (Fingerprint for Success, 2023; Wysa, 2023). Hence, we propose conducting new experiments and collecting data for Findhope specifically.

Proposal:

We recommend conducting A/B testing for each country to roll out two different prices to random individuals. The A and B prices will be based on the pricing of other similar chatbots in that specific country. For example, we can use prices of $10 and $5 per month to test the difference in conversion rates (paying for the chatbot). We can adjust these values based on more research into the pricing of similar chatbots.

To conduct the A/B test, we will randomly choose x number of individuals based on the desired conversion rate change we want to detect. We will run the experiments on individuals first and later conduct similar experiments for companies. We will need a baseline conversion rate to calculate the sample size required for the test. We can calculate the baseline by allowing the website to run in the country with the control pricing (e.g. $10 per month). We will calculate the number of individuals who purchase subscriptions divided by the number of individuals who enter the website to determine the baseline conversion rate.

To calculate the sample size required, we can use online calculators such as [Evan Miller's A/B test sample size calculator](#) (Miller, 2023). For example, if the initial conversion rate is 1%, we will need 1767 visitors per group, which means a total of 3534 visitors to the website to detect a 100% relative change or 1% absolute change. We can also calculate the duration of the experiment by dividing the sample size by the average weekly customers.

We will randomise whether an individual gets the A or B pricing when they enter the website. The price will be the same every time they visit the site to limit the possibility of individuals reloading the website and seeing a different price. We will consider each individual as a single visitor, regardless of the number of times they visit the site.

Randomisation in A/B testing is a crucial factor in reducing bias and ensuring the accuracy of the results. By randomly assigning participants to either the A or B group, we can ensure that the groups' characteristics and demographics are similar. This means that any differences in the conversion rates between the two groups can be attributed to the pricing strategy and not to any inherent differences between the groups. Randomisation also reduces the risk of selection bias, where specific individuals are likelier to be assigned to one group or the other, which could skew the results. Overall, randomisation is a critical step in the A/B testing process that helps to reduce bias and ensure the validity of the results.

After completing the A/B test, we will analyse the results to determine if the difference between the A and B groups is significant or was due to chance. We will adjust the pricing strategy based on the results and repeat the A/B testing process if necessary.

This process can be repeated in all target countries where FindHope wishes to make the chatbot available. Comparing A and B groups within countries controls for economic differences

between different countries. For example, $10 per month might be reasonable in America, where the median wealth per adult was 93,271 in 2022, but unreasonable in Argentina, where the median wealth per adult was 3,263 in 2022 (Credit Suisse, 2022).

Conclusion:

We recommend conducting A/B testing for each country to adjust pricing and maximise the conversion rate for Findhope's AI chatbot. Using causal inference techniques, we can determine optimal pricing for each country and make mental health services accessible to a wider audience.

Words: 962

References

Credit Suisse. (2023). Global Wealth Report. Credit Suisse.

        https://www.credit-suisse.com/about-us/en/reports-research/global-wealth-report.html

Fingerprint for Success. (2023). Fingerprint for Success. Fingerprintforsuccess.com.

        https://www.fingerprintforsuccess.com/Health, M. (2022).

Wysa (2023) - Everyday Mental Health. Wysa - Everyday Mental Health. https://www.wysa.com/

Miller, E. (2023). Sample Size Calculator. Evanmiller.org.

        https://www.evanmiller.org/ab-testing/sample-size.html#!20;80;5;10;0

Appendix A: HC Applications

#biasmitigation: To ensure that the results of the A/B test are unbiased, I have proposed randomising the pricing strategy assigned to individuals and analysing the results to determine if the difference between the A and B groups is significant or due to chance. Using randomisation techniques, we can ensure that any differences in conversion rates between the two groups can be attributed to the pricing strategy and not to any in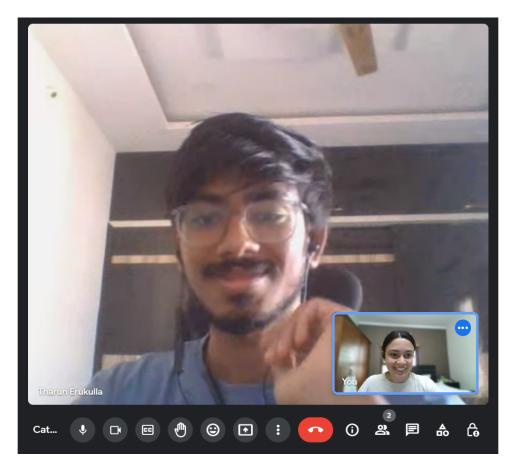herent differences between the groups. Overall, this assignment has demonstrated the importance of avoiding bias in pricing strategies and how to use causal inference techniques to achieve this goal.

#comparisongroups: This objective was achieved by proposing an A/B testing approach to determine optimal pricing for each country and maximise the conversion rate of Findhope's AI chatbot. The proposal recommended randomly choosing individuals to roll out two different prices based on the pricing of other similar chatbots in each specific country. By doing so, we can control for economic differences between different countries. The A/B testing approach was designed to use randomisation to reduce bias and ensure the accuracy of the results. After completing the A/B test, the results were analysed to adjust the pricing strategy based on the results, which can be repeated in all target countries where FindHope wishes to make the chatbot available. Overall, the use of control and alternative comparison groups in the empirical study was effectively evaluated and provided a detailed critique, suggesting a non-trivial improvement for determining the optimal pricing strategy for Findhope's AI chatbot in countries outside India.

#interventionalstudy: The memo recommends conducting A/B testing for each country and randomly choosing individuals to roll out two different prices based on the pricing of other similar chatbots in that specific country. The assignment also explains the importance of randomisation in A/B testing to reduce bias and ensure the accuracy of the results. The memo concludes that the proposed strategy will help Findhope make mental health services accessible to a wider audience and maximise the conversion rate of its AI chatbot.

#organization: In this assignment, I applied the objective of organising written communication using a sophisticated organisational structure to deliver a message in a highly effective way. The memo is structured clearly and concisely, with each section building on the previous one to support the proposal of using causal inference techniques to adjust pricing and maximise the conversion rate of Findhope's AI chatbot in countries outside of India. I used headings to break the assignment into logical sections, such as the executive summary, introduction, background, proposal, and conclusion. Within each section, I provided detailed information and justification for the proposal, including the methodology for conducting the A/B test and the importance of randomisation in reducing bias. This memo effectively communicates the proposal and provides a detailed justification for the recommended approach.

Appendix B: Image from Meeting with Tharun at Findhope

Appendix C: List of Questions Asked in the Interview

- What does your company do?

- What do you specifically work on within your company?

- What is the biggest challenge you face?

- What are some decision problems that you face?

- Where do you see the company going in the next few years?

- How do people interact with the chatbot AI?

- What kind of data are you able to collect/do you have access to?