E News Express

Project: *Determination Of the Effectiveness of New Landing Page*

Course Name: *Business Statistics*

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Executive Summary

In summary, It is seen from the overall business analysis using insights from the data science tools that

I. *Users spend more time on the new Landing page than the old landing page, as such focus should be on the new landing page.*

II. *The conversion rate (the proportion of users who visit the landing page and get converted) for the new page is greater than the conversion rate for the old page even as the engagement level as per time spent of users for the new page is also seen to be better.*

III. *It is also seen that the converted status does not depend on the preferred language and*

IV. *The time spent on the new page is pretty much on the average across the different language users.*

It is therefore a good investment to focus on driving the new landing page as that has shown from the analysis excercise that users are more engaged, spends more time and are converted more on the new landing page.

While focus is on this new Landing Page drive it is important that should be without focusing on any special attention on the different languages as the analysis has shown that the languages are not a factor being that the average time spent on the languages did not vary much in the new Landing Page.

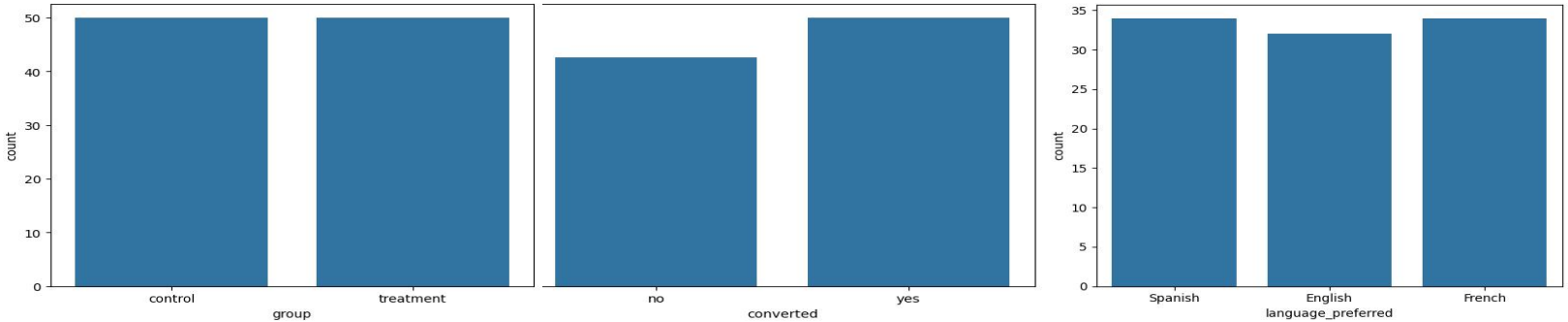
It was clear that the conversion status doent not depend on the langauge and the average time spent on the new landing page is almost the same across languages.

Business Problem Overview and Solution Approach

As a response to the fact of low user subscriptions, there is a development of a new landing page that is is expected to be more user engaging. Consequently, there is need to understand if the new Landing page commands more engagement with users than the old one. As such, the busines problem here is to know if the new landing page has the users spend more time and get more users converted as well as understanding if the preferrd laguages drives this conversions and time spent.

To solve this problem, we use statistical hypothesis testing by collecting samples from equal number of people on both the old (or Control group) and new (the treatmnent group) landing pages and study their interractions on each.

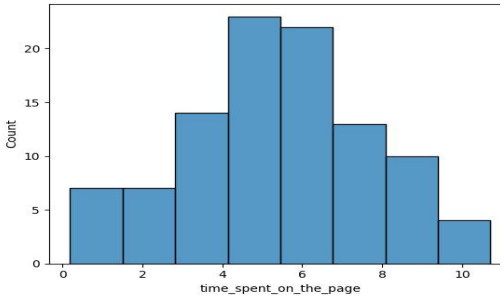
EDA Results

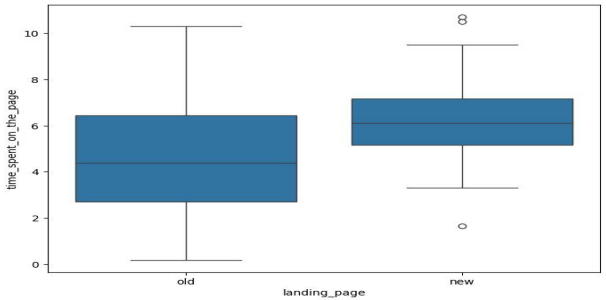


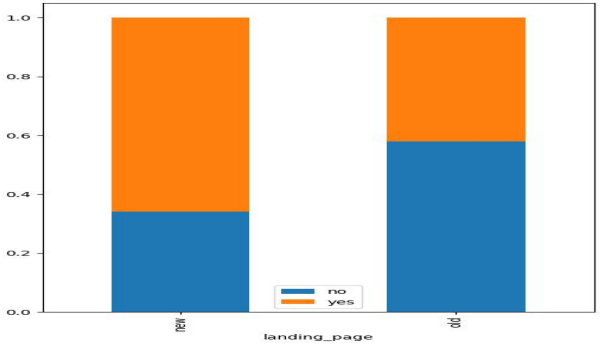
Importing the relevant python libraries and applying the required codes for exploratory Data analysis, we saw that the data contains 100 rows and 6 columns consisting of User ID, Group, Landing_page, Time Spent on the pages, Conversions as well as Preferred Languages. Prelimnary checks confirms that the Data has no missing items and no duplicate items. The data type consist of 64 floats, 64 integers and 4 objects.

The statistiscal summary shows that there are three languages - English, Spanish and French. two groups (Control and Treatment)of 50 each handling two diffenet landing pages. We also saw the average time spent is 5.3778 mins and that is also pretty close to what 50% of the people spend which is 5.415. The maximum time spent however is 10.71 while the minumum time time spent is less than a minute ayt 0.19 seconds.

EDA Results







Univariate:

Further analysis shows that most people spent between 4 and 8 minutes on the pages with the median time spent being 5. 415 minutes. There are no vissible outliers on the time spent. The two groups (Control and treatment groups has equal number of samples which is 50 each.

A total of 54 people were converted while 46 were not. The language preference were pretty much similar with each of Spanish and French being 34 and English being 32.

Bivariate

Analysis of the landing page and Time spent shows that though we have a few outliers in the new landing page, people spent more time on the new landing page than they do on the old, with the median of the new landing page being around 6 minutes while that of the old is just above 4.

We also saw that the more time that is spent on the landing page, the more likely te conversion as more people were converted that spent mopre time on the landing pages. We also saw that the distribution of the time spent on the landing pages has not much variation across the languages though French shew a bit lower time spent in the median.

Hypotheses Tested and Results

Business Question/Problem: Do the users spend more time on the new landing page than the existing landing page

1. The Null Hypothesis H Null : Users do not spent more time on the new landing Page

2. Alternate Hypothesis H Alt: Users spend more time on the landing page

Considering that this is one tailed test of two population means from two independent populations where the population standard deviation is know, the appropriate test will be Two-sample independent z-test

From the problem, the given significance level is 0.05.

The Two standard deviations are 1.82 and 2.58 which means they are not equal.

Using the appropriate python codes from the applicable libraries, the p value is calculated to be 0.000263 which is much smaller than the significance level and therefore the Null Hypothesis is rejected.

Link to Appendix slide on details of the test performed

Results

From the results, since the p-value is quite less than the significamce level, the null hypothesis is recejected, therefore we have enough evidence to conslude that the the new landing page commands more user engagement as users spend more time on the new landing page.

Link to Appendix slide on details of the test performed

Hypotheses Tested and Results - *Continued*

Business Question/Problem: Is the conversion rate for the new landing page greater than that of the old page.

1. The Null Hypothesis H Null : is that the conversion rate for the New Landing page is Not greater than that of the old page.

2. Alternate Hypothesis H Alt: is that the conversion rate for the New Landing page is greater than that of the old page.

Considering that this is a one-tailed test concerning two population proportions from two independent populations. Based on this information, the appropriate test will be Two-Sample Proportions Z-Test

The significance level as given in the problem is 0.05

*A*pplying the required python codes from the appropriate libraries; the number of users served were the same at 50 each for the control and converted groups.

The p-value was gotten to be 0.016053 and this way less than the given signicance level in the problem which means that we have grounds to reject the null hypothesis.

Link to Appendix slide on details of the test performed

Results

As such, we have enough evidence to say that the conversion rate for the New Landing Page is greater than the conversion rate for the old landing page.

Link to Appendix slide on details of the test performed

Hypotheses Tested and Results

Business Question; Does that Converted Status depend on the preferred Language

1. The Null Hypothesis H Null :Converted Status Does not depend on the preferred Language

2. Alternate Hypothesis H Alt: Converted Status Depends on the preferred Language

Considering that this is a problem of the test of independence, concerning two categorical variables - converted status and preferred language. Based on this information,, the appropriate test will be Chi-Square Test of Independence

Singinificance level is 0.05 as given in the proble statement.

Applying a required Python code, a contingency table was created and this show that 21, 15 and 18 users was converted for English, French and Spanish repectively while, 11, 19 and 16 people were not accordingly also.

Importing the required python codes from the appropriate libraries, the p value was calculated to be 0.2129889 which is way higher than the 0.05 significance level and suggest by rule that the null hypothesis is NOT to be rejected.

Link to Appendix slide on details of the test performed

Results

From the above, we do not have enough evidence to reject the null hypothesis. As such, the converted status does not depend on the preferred language.

Link to Appendix slide on details of the test performed

Hypotheses Tested and Results

Business Question; Is the Time Spent on the New Page Same for difference Users

1. The Null Hypothesis H Null:The average time spent on the new page is the same for the different languages

2. The Alternate Hypothesis H Alt: The average time spent on the new page is NOT the same for the different languages

Considering that this is a problem concerning three population means. Based on this information, the appropriate test to compare the three population means will be ANOVA

Singinificance level is 0.05 as given in the proble statement.

Applying the required python codes from the appropriate applicable libraries, we created the subset data frames, and calculated the p-value thereafter to be 0.432041

This p value when compared to the significance level, we saw that this is way higher that the significance level and as such the Null Hypothesis can not be rejected as we do not have enough evidence to reject it

Link to Appendix slide on details of the test performed

Results

In conclusion therefore, the average time spent on the new page is the signiificantly the same across the languages.

Link to Appendix slide on details of the test performed

APPENDIX

Data Background and Contents

- Please update the data background and contents

Hypothesis Testing Details

- Null and alternative hypotheses
- Hypothesis Test selected
- p-value obtained
- Any other computational/mathematical details

***Note**: This template can be followed for all hypotheses tested*

Slide Header

- Please add any other pointers (if needed)

Great Learning