Capstone:
MuscleHub A/B Test

Codecademy: Introduction to Data Analysis

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Overview

Objective:

Assist MuscleHub, a premium gym, with answering the following question;

- Does taking a fitness test intimates some new members from becoming gym members?

Overview

The MuscleHub Process:

1. Take a fitness test with a personal trainer (**only Group A)**
2. Complete an application to become a member **(Group B skips the above test)**
3. Make a payment for the first month's membership

Overview

Method:

Conduct **A/B Tests** on randomly divided visitors in two groups;

- **Group A** who will be asked to take a fitness test with a personal trainer
- **Group B** will skip the fitness test and complete an application

Overview

Hypothesis:

MuscleHub believes that visitors assigned to Group B will be more likely to eventually purchase a membership.

Summary Dataset

Our data consist of a SQLite database with 4 tables;

1. **visits** - contains data about new gym customer who have visited MuscleHub
2. **fitness_tests** - contains data about potential customers in ‘Group A’ who had a fitness test
3. **applications** - contains data about potential customers (both ‘Group A & B’) who filled out an application
4. **purchases** - contains data about customers who purchased a membership with MuscleHub

Summary Dataset

To perform the A/B Test the 4 tables had to be combined, resulting in 5004 records;

	first_name	last_name	visit_date	gender	email	fitness_test_date	application_date	purchase_date	ab_test_group
0	Kim	Walter	7-1-17	female	KimWalter58@gmail.com	2017-07-03	None	None	A
1	Tom	Webster	7-1-17	male	TW3857@gmail.com	2017-07-02	None	None	A
2	Edward	Bowen	7-1-17	male	Edward.Bowen@gmail.com	None	2017-07-04	2017-07-04	B
3	Marcus	Bauer	7-1-17	male	Marcus.Bauer@gmail.com	2017-07-01	2017-07-03	2017-07-05	A
4	Roberta	Best	7-1-17	female	RB6305@hotmail.com	2017-07-02	None	None	A

Hypothesis Tests - Scenarios

Hypothesis Tests: 3 Scenarios

Hypothesis testing was performed to determine if there was a statistical difference between Group A and Group B members in the following 3 scenarios;

1. Those who picked up an application?
2. Those that were applicants and purchased a membership?
3. Those that were visitors and purchased a membership?

Hypothesis Tests - Chi Square Test

Method: Chi Square Test

The hypothesis test method selected for all 3 test scenarios was the **Chi Square Test.** This test was selected because;

1) we are analysing a **categorical** data set

2) we are testing **three or more** discrete categories of data per dataset

Hypothesis Test 1 - Picked up an application?

Test 1 data and results: (there is a statistical difference)

Test 1 data

is_application	ab_test_group	Application	No Application	Total	Percent with Application
0	A	250	2254	2504	0.09984
1	B	325	2175	2500	0.13000

P-value result (since our p-value is < 0.05 we can reject the null hypothesis since there appears to be a statistical difference between Group A and Group B who picked up an application)

```
from scipy.stats import chi2_contingency

contingency = [[250, 2254], [325, 2175]]
chi2, pval1, dof, expected = chi2_contingency(contingency)
pval1
```

```
0.0009647827600722304
```

Hypothesis Test 2 - Applicant and purchased a membership?

Test 2 data and results: (there is no statistical difference)

Test 2 data

is_member	ab_test_group	Member	Not Member	Total	Percent Purchase
0	A	200	50	250	0.800000
1	B	250	75	325	0.769231

P-value result (since our p-value is > 0.05 we can fail to reject the null hypothesis since there appears to be no statistical difference between those in Group A and Group B who purchased a membership)

```
from scipy.stats import chi2_contingency

contingency = [[200, 50], [250, 75]]
chi2, pval2, dof, expected = chi2_contingency(contingency)
pval2
```

```
0.43258646051083327
```

Hypothesis Test 3 - Visitor and purchased a membership?

Test 3 data and results: (there is a statistical difference)

Test 3 data

is_member	ab_test_group	Member	Not Member	Total	Percent Purchase
0	A	200	2304	2504	0.079872
1	B	250	2250	2500	0.100000

P-value result (since our p-value is < 0.05 we can reject the null hypothesis since there appears to be a statistical difference between Group A and Group B who visited MuscleHub)

```
from scipy.stats import chi2_contingency

contingency = [[200, 2304], [250, 2250]]
chi2, pval3, dof, expected = chi2_contingency(contingency)
pval3
```

```
0.014724114645783203
```

Summary - Qualitative Data

Based on a review of the below informal feedback from several MuscleHub visitors it appears that fitness tests might not be preferred.

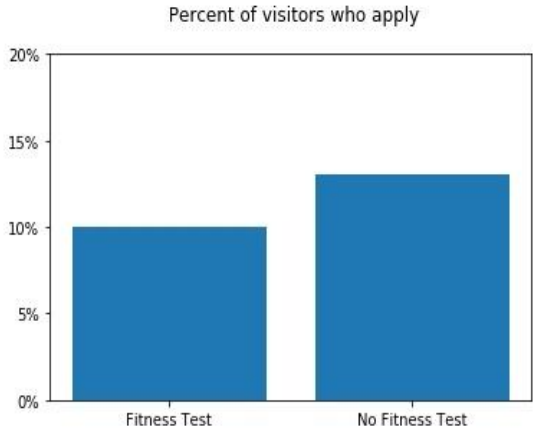
I always wanted to work out like all of the shredded people on the fitness accounts I see on Instagram, but I never really knew how to start. MuscleHub's introductory fitness test was super helpful for me! After taking the fitness test, I had to sign up and keep coming back so that I could impress my trainer Rachel with how much I was improving!
- Cora, 23, Hoboken

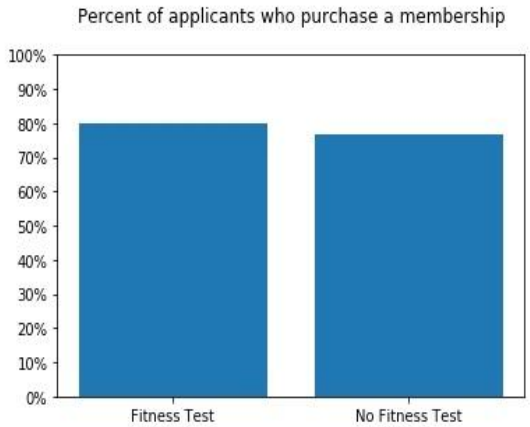
When I walked into MuscleHub I wasn't accosted by any personal trainers trying to sell me some mumbo jumbo, which I really appreciated. Down at LiftCity they had me doing burpees 30 seconds after I walked in the door and I was like "woah guys slow your roll, this is TOOOO much for Jesse!" I still ended up not signing up for a membership because the weight machines had all those sweat stains on them and you know, no thanks.
- Jesse, 35, Gowanes

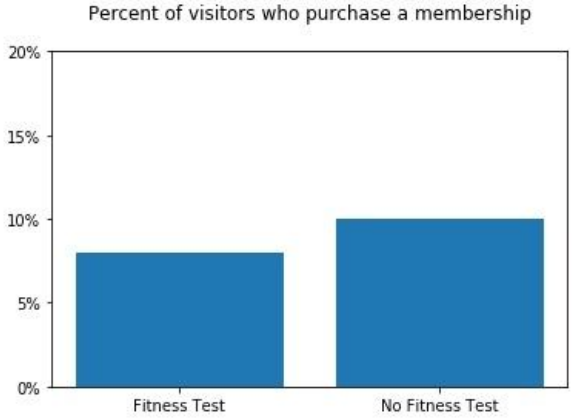
I took the MuscleHub fitness test because my coworker Laura recommended it. Regretted it.
- Sonny "Dad Bod", 26, Brooklyn

I saw an ad for MuscleHub on BookFace and thought I'd check it out! The people there were suuuuuper friendly and the whole sign-up process took a matter of minutes. I tried to sign up for LiftCity last year, but the fitness test was way too intense. This is my first gym membership EVER, and MuscleHub made me feel welcome.
- Shirley, 22, Williamsburg

Visualizations







Recommendation

Tests Summary

Test 1: Those who picked an application? **(there is a statistical difference)**

Test 2: Those who purchased a membership? **(there is no statistical difference)**

Test 3: Those who visited and purchased a membership? **(there is a statistical difference)**

Our recommendation is based on the above test results; statistical significance in visitors who took no fitness tests, no significance between those who purchased memberships and a statistical significance in those who visited and went on to purchase a membership.

Recommendation

Does taking a fitness test intimates some new members from becoming gym members?

Based on our test results and a review of qualitative evidence fitness test do not appear to add enough statistically significant value to increase gym membership rates.