NICO PURNOMO

CONTENTS

EDUCATION

Harvard University (Boston)
Data Mining for Business
Study abroad program 2019

St Joseph's Institution INTL (Singapore)
International Baccalaureate
High School 2015-2017

The University of Melbourne
Bachelor of Commerce
Finance & Economics
With breadth in Computer Science
Undergraduate 2017-2020

Loving Family Institution (Bogor)
Everything
1998-Now

PERSONAL PROJECTS

Exploring Unemployment Data with Covid-19

- **LINK** : https://github.com/Npurnomo/Unemployemt-Rates-and-Coronavirus

- I created this using Jupyter Notebook and Python and it is available in my Github. This little notebook is a product of my interest in what Coronavirus had done to the unemployment rates across different countries. In this notebook, I will focus on looking at data and trying to use different visualisation tools such as plotly and seaborn. I also provided some insights, thoughts, and ideas.

- Unemployment here refers to the share of the labor force that is without work but available for and seeking employment.

- Data is from International Labour Organization, ILOSTAT database. Data retrieved in September 20, 2020. https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS

I started with typical data cleaning steps and made sure that the data is clean and ready to be explored as well as looking at initial summary statistics.

```
# Drop rows without complete information, this is to make it cleaner.
df = df.dropna(0)
print(df.shape)
```

```
(233, 7)
```

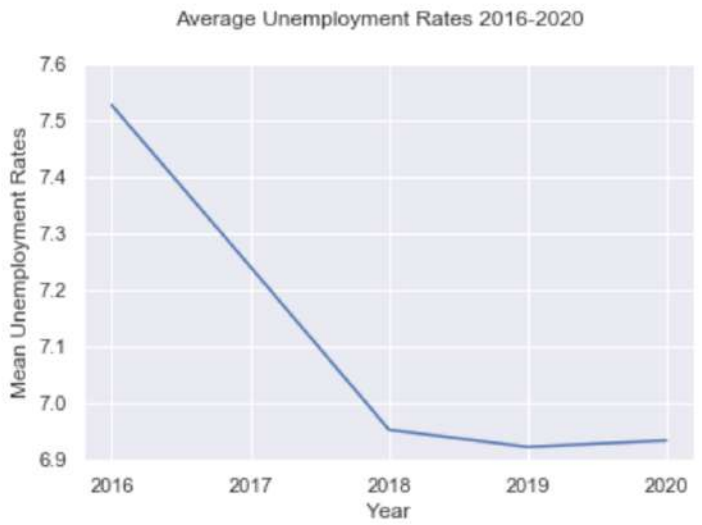
```
# Save country names
countries = df['Country Name'].unique()
df.describe()
```

	2016	2017	2018	2019	2020
count	233.000000	233.000000	233.000000	233.000000	233.000000
mean	7.526826	7.241588	6.953769	6.922998	6.934587
std	5.208816	5.030343	4.898098	4.864850	4.829946
min	0.150000	0.140000	0.110000	0.091000	0.082000
25%	4.242000	4.098000	3.852769	3.889744	3.897888
50%	6.140834	5.760000	5.520643	5.527787	5.552639
75%	9.720000	9.316000	9.027000	8.801000	8.934000
max	26.551001	27.070999	26.920000	28.181000	28.476999

We can see that the mean of unemployment rates across countries has been decreasing in trend until 2020, when the coronavirus made its appearance earlier in the year. The increase of the mean rate is marginal, but it is close to where we were in 2018. Unemployment rates is one measure to look at the country's standard of living.

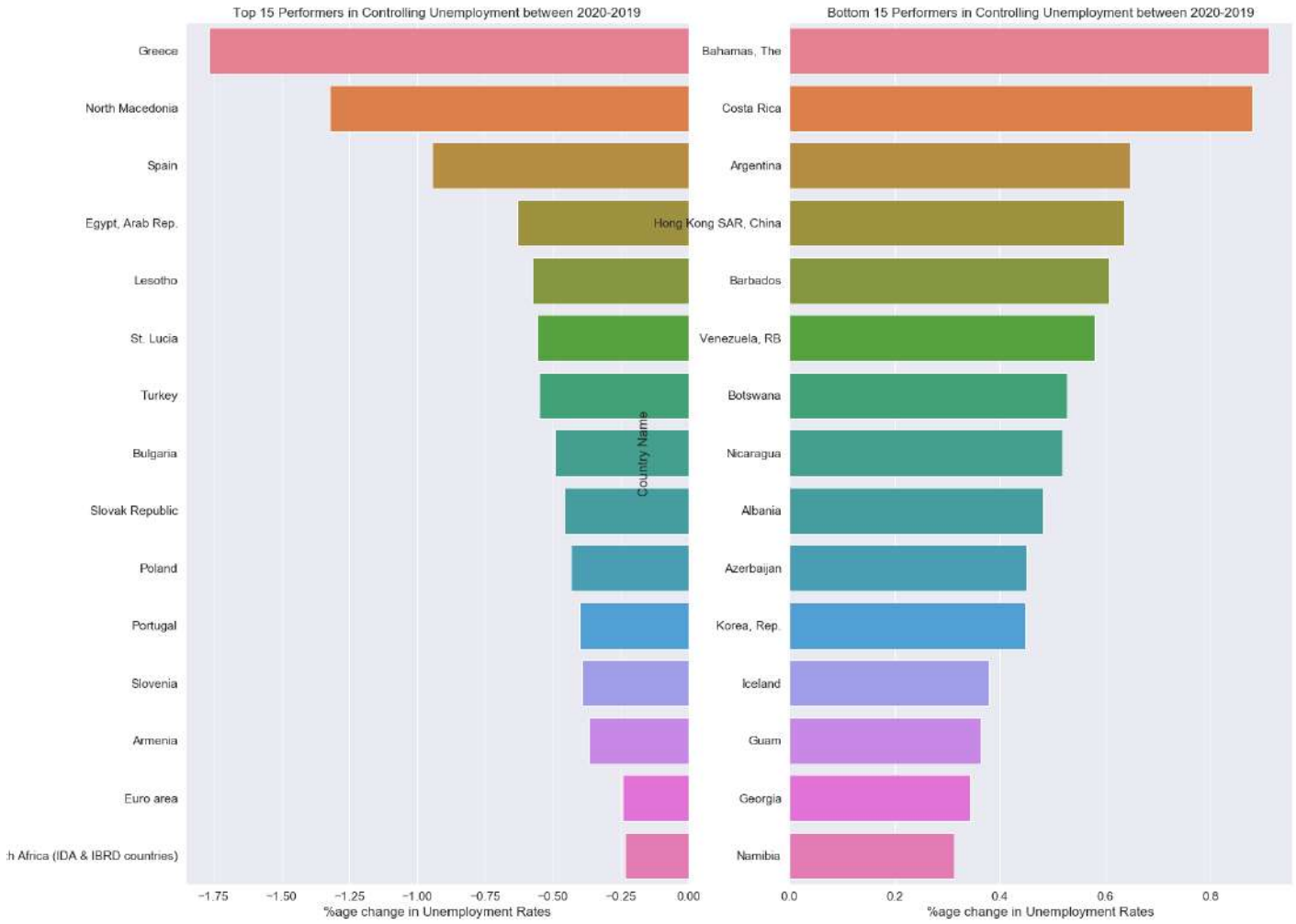
```
axes.set_ylim([6.9,7.6])
plt.suptitle('Average Unemployment Rates 2016-2020')
plt.ylabel('Mean Unemployment Rates')
plt.xlabel('Year')
```

```
Text(0.5, 0, 'Year')
```



I have also tried to create a visually engaging interactive diagram to show the unemployment levels in different regions and countries. The colour ranges from red, yellow, to green, with red being countries with higher unemployment rates to green being the opposite.

I created other visuals from scatterplot to boxplots and ended up with counting and comparing how many countries actually had increases in unemployment rates in 2020. From this, I created the diagram below to show the top and worst performers.



Insights

We can see from the plot that Greece, North Macedonia, and Spain have the most decrease in unemployment rates compared to other countries (-1.75%, -1.3%, & -0.9% respectively). They have somehow prevailed, and it seems that Covid-19 did not affect them that much in terms of unemployment. This can be linked to their governments' initiatives in keeping their economies open and more relaxed lockdown measures.

The 3 worst countries' unemployment rates affected by Covid-19 are The Bahamas, Costa Rica, and Argentina (+0.9%. +0.85%, & +0.63% respectively). These 3 countries are located in Latin America and share similar cultures and dependencies to exports. Falling prices of commodities exports has been the culprit as it has reduced the countries' fiscal capacity to ameliorate the virus' impacts. The government choices of lockdowns and other measures may have affected the rates as well.

"The LAC region's structural dependence on commodity exports, mainly originating from developed economies, has also reduced and severely impacted their recuperation cycle." (https://www.orfonline.org/expert-speak/covid19-lofty-economic-recovery-latin-America)

There are definitely other factors that may have caused this, but coronavirus remained as the number one reason.

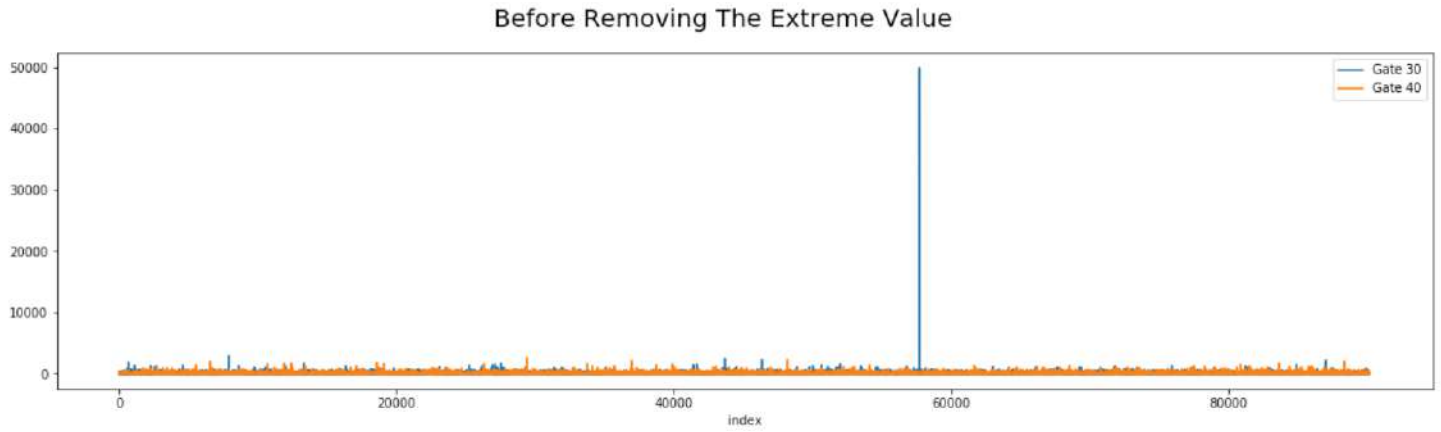
A/B Testing for Cookie Cats Mobile Game

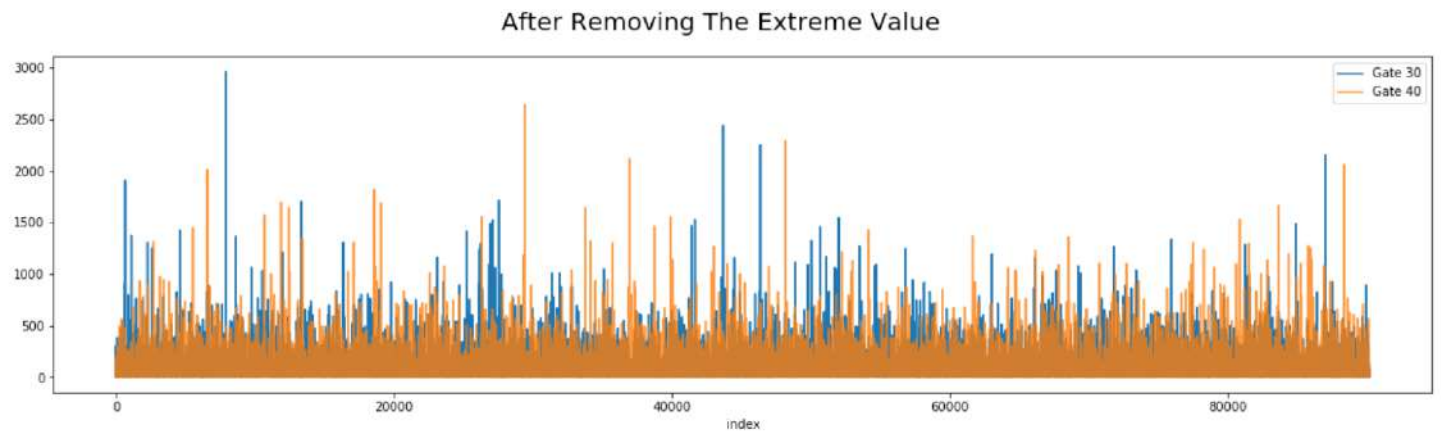
- **LINK** : https://github.com/Npurnomo/AB-Testing-for-Cookie-Cats-Mobile-Game
- Cookie Cats is a popular mobile puzzle game created by Tactile Entertainment. The game is based on the classic "Connect-three" style puzzles where the player has to connect tiles of the same colour to finally connect the board and win the level. The game has many different features to make it more interesting including animations of "singing cats".
- The game has its limits in terms of playing time. Players will have to wait for a period of time after finishing a series of different levels (They call this gates). A way to reduce the waiting time is to make an in-app purchase. Not only that the restrictions drive up revenue, but also it allows players to get an enforced "break" so that the excitement can be prolonged. It is a very interesting technique in which players are forced to wait to be able to play. It is the sense of relief when they can continue playing that the game is trying to achieve. Games can be addictive, and it is a way to make it more desirable in a way so that players do not get bored quickly.
- In this notebook, we are going to look at where to put such "gates" to increase player retention. The data has provided results on player retention and tests where they put the gates at level 30 and level 40.

I was relieved to see that the data is fairly clean and usable from the start.

```
# Data imported!
# ----------------------------------

# DIMENSIONS ------------------------
Observation: 90189 Column: 5

# DTYPES ----------------------------
Object Variables:
 # of Variables: 1
 ['version']

Integer Variables:
 # of Variables: 2
 ['userid', 'sum_gamerounds']

Bool Variables:
 # of Variables: 2
 ['retention_1', 'retention_7']

# MISSING VALUE ---------------------
Are there any missing values?
  No missing value!

# MEMORY USAGE ----------------------
 2.2+ MB
```

I had to remove an extreme value, but nothing else was concerning.





version	Retention	count	median	mean	std	max
gate_30	0	38023	12	28.0703	48.0175	1072
	1	6676	127	183.8863	189.6264	2961
gate_40	0	38983	12	28.1034	48.9278	2640
	1	6506	133	190.2824	194.2201	2294

From the above results, we cannot really tell the difference between both versions as they are similar. About 13,000 players who played the day after and continued playing 7 days after installing. That is about 14% of the total players in this dataset. This seems to be a lower-than-average number in the industry according to this.

Proper A/B Testing Steps

- First, split control and test group. This will be the 2 versions (gate_30 and gate_40)
- Check normality with Shapiro Test
- If Normal distribution, check homogeneity with Levene Test of Variances
- If Parametric and homogenous, use T-Test
- If Parametric and heterogenous, use Welch Test
- If Non-Parametric, use Mann Whitney U Test

Hypothesis for this test:

H0 = A/B groups are similar

H1 = A/B groups are not similar

Result:

	Test Type	AB Hypothesis	p-value	Comment
0	Non-Parametric	Reject H0	0.0254	A/B groups are not similar!

Conclusion

Players progress through the game and will encounter such gates that will make them wait or make in app-purchases. In this notebook, we have analysed the dataset and did an A/B test where the gates are changed to level 40 from level 30. This means that players can clear more rounds before they run into the gate that would stop them from playing.

After rejecting the normality test, we used the non-parametric test, Mann Whitney U, to compare the 2 groups (gate_30 and gate_40). The result has shown that we are able to reject the null hypothesis (H0) and say that A/B groups are different at 5% significance level. Therefore, we can say that there is a statistically significant difference between the two groups for the number of game rounds that the players play.

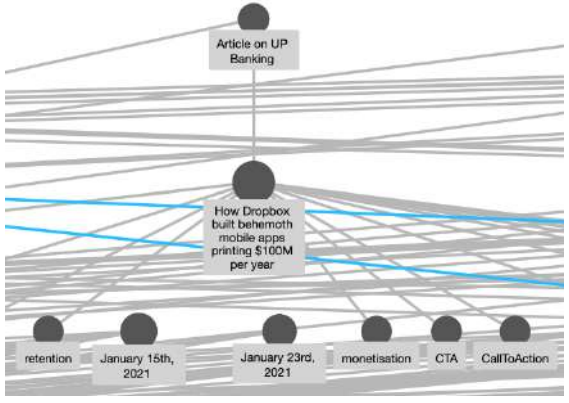
This makes sense as we have stated earlier that players are allowed to clear more rounds before the gate is introduced at level 40 for players with the test version. We would then suggest Tactile Entertainment to change the gate level to 40 for every user to let players go further into the game and feel more connected to it.

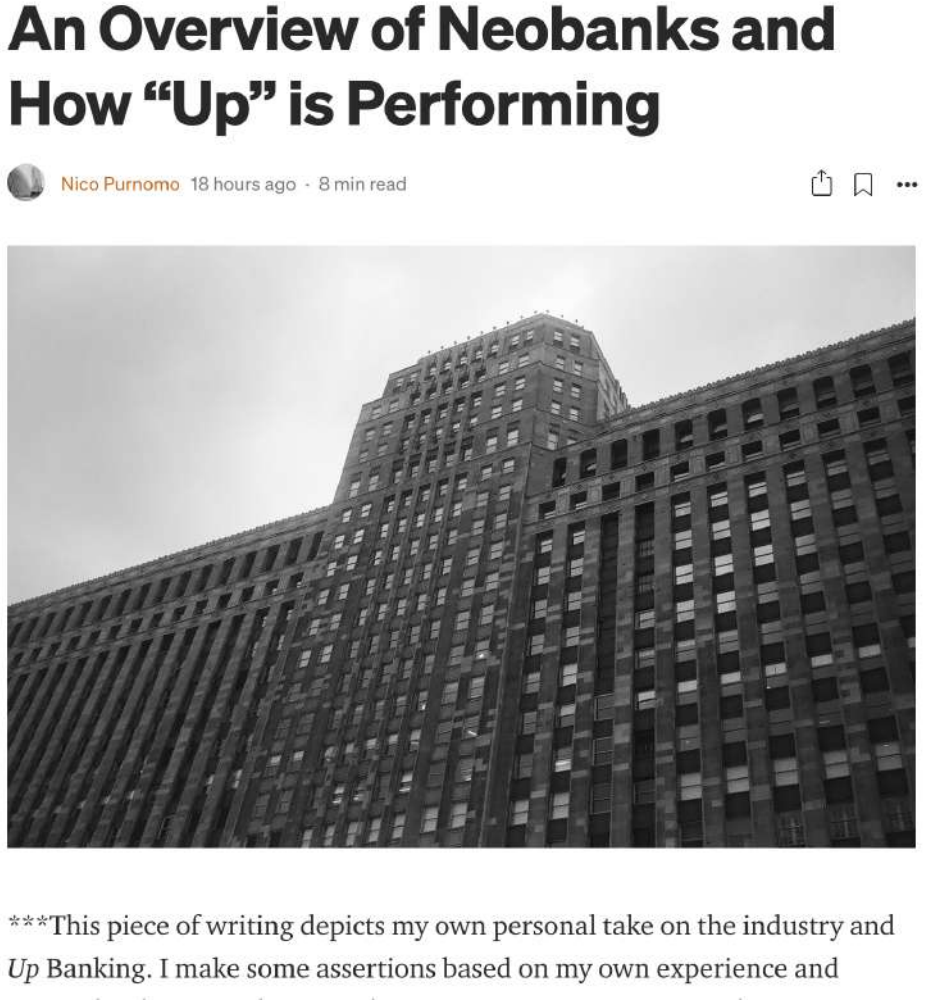
Next Steps

I think that it would be amazing if we can make use of more features to look deeper on the retention rate as it is really important and would also increase the number of rounds that the players play. Another aspect is the number of in app-purchases that players actually make as it is one of the revenue streams for the company. We can then analyse players who actually make the purchases and try to look for potential players and finally make use of targeted ads.

An Overview of Neobanks and How "*Up*" is Performing

- **LINK** : https://purnomonico.medium.com/an-overview-of-neobanks-and-how-up-is-performing-906390e14eab
- This is an article that I have published in Medium. I have made an analysis and overview of the Neobank industry and a brief product-like review of *Up*. *Up* is a Neobank based in Melbourne, Australia and is a subsidiary of Bendigo and Adelaide Bank Limited.
- I use Roam Research to help connect ideas and notes for the piece of writing I am about to craft. It is a note taking application with capabilities to link thoughts like a network.
- In this article, I started writing about the effects of the pandemic to the traditional banking industry and how tech firms like Neobanks can capitalize. Then I went over what went wrong with some Neobanks and ended up with how *Up* is advancing forward.





An Overview of Neobanks and How "Up" is Performing

Nico Purnomo 18 hours ago · 8 min read

***This piece of writing depicts my own personal take on the industry and *Up* Banking. I make some assertions based on my own experience and

SELECTED UNIVERSITY WORKS

Linear Optimization using SAS

Subject: Computational Economics & Business

Using SAS to solve a linear problem below. (Minimizing cost)

A) Objective function of this problem:

$$\min_{x_1, x_2} 8x_1 + 4x_2$$

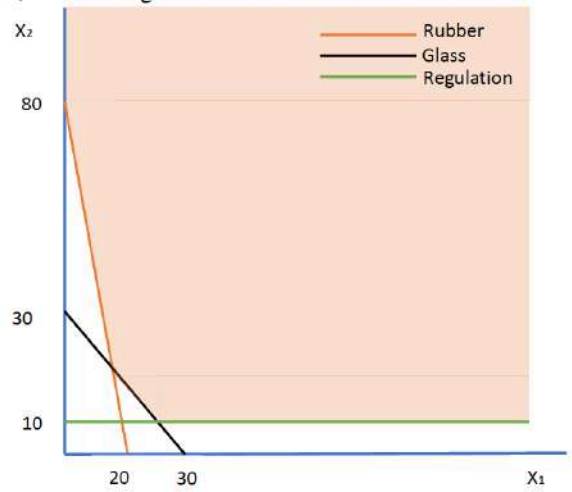
Subject to constraints:

$$Rubber: \ x_1 + \frac{1}{4}x_2 \geq 20$$

$$Glass: \ x_1 + x_2 \geq 30$$
$$Regulation: \ x_2 \geq 10$$
$$x_1 = High\ Skilled\ Workers \quad x_2 = Low\ Skilled\ Workers$$

The constraints are to produce at least 20 units of rubber & 30 units of glass, and to utilise at least 10 units of low skilled workers.

B) The diagram of the 3 constraints is shown below.



Results

Minimum Cost
186.66667

Number of Workers	30

Optimal Workers	
High Skilled	16.666667
Low Skilled	13.333333

Limits	Numbers	ops Direction	b Minimun
Glass	20	G	20
Rubber	30	G	30
Minimum Low Skillled Workers	13.333333	G	10

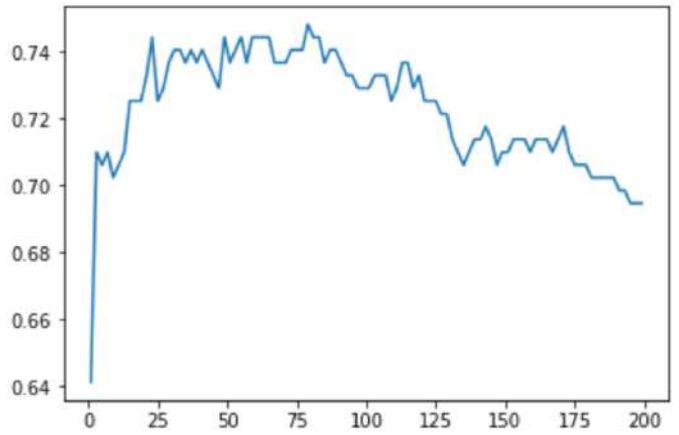
INSIGHT: The Proc IML routine for Linear Programming has shown that the optimal labour mix is to use 17 High Skilled Workers and 13 Low Skilled Workers for a minimum total cost of 188 dollars. From the results, we can see that the factory produces exactly at the minimum Glass (20) and Rubber (30) constraints but goes over the regulation constraint by 3 (from 3.33) units. This shows that the regulation is not a binding constraint.

K-NN & Decision Tree Classification using Python

Subject: Elements of Data Processing

Data used measured features of about several hundred patients and whether they tested positive for diabetes. The classification tries to predict whether a patient will test positive for diabetes, based on the various measurements.

```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
from sklearn import neighbors
from sklearn.cross_validation import train_test_split
from sklearn.metrics import accuracy_score
from sklearn import preprocessing

##load in the data
pima=pd.read_csv('pima-indians-diabetes.csv',encoding = 'ISO-8859-1')

##get just the features
data=pima[['numpregnant','plasma','blood pressure','sf-thickness','serum-insulin','BMI','pedigree-function','age']]


##get just the class labels
classlabel=pima['has_diabetes']

##randomly select 66% of the instances to be training and the rest to be testing
X_train, X_test, y_train, y_test = train_test_split(data,classlabel, train_size=0.66, random_state=42)

#normalise the data to have 0 mean and unit variance using the library functions.  This will help for later
#computation of distances between instances
scaler = preprocessing.StandardScaler().fit(X_train)
X_train=scaler.transform(X_train)
X_test=scaler.transform(X_test)


print(X_train.shape)
```



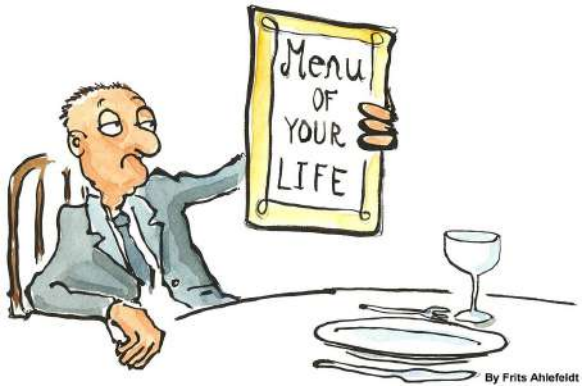
Plot above shows varying k versus the prediction accuracy achieved by k-NN on the test set.

INSIGHT: We learned that for this dataset, using k Nearest Neighbour for classification produces higher test accuracy when compared to using decision tree. This is due to K-NN's expensive real time execution. There is always that trade-off.

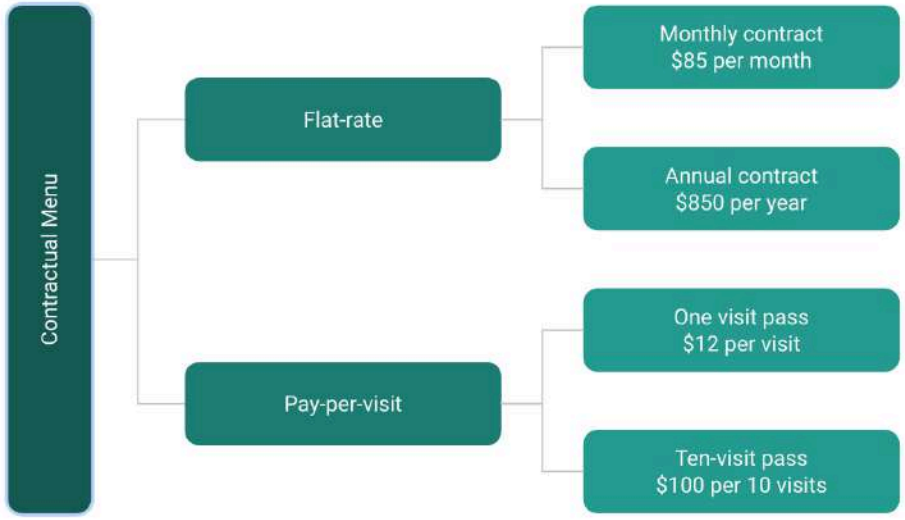
Understanding Why People Pay to Not Go to the GYM

Research Question: How do consumers choose from a menu of contract?

Standard Assumption: Customers have rational expectations about their future consumption frequency and choose the utility-maximising contract. **(Not true)**



Subject: Behavioural Economics



Above shows varying Gym Options.

Insights

- Overestimation of future attendance leads consumers to choose flat-rate contracts.
- Overestimation of future cancellation leads consumers to delay cancellation in the monthly contracts.
- Users are risk averse so that they prefer flat-rate contract to the pay-per-visit contract because the former contract minimises the variance of payments.

PROFESSIONAL EXPERIENCE

Citi @ Melbourne, Australia
Intern (Institutional Banking Virtual Internship Program) *August 2020 – August 2020*

• Gave advice on outperforming the market (13.21% p.a. returns) by identifying customer risk profiles and allocating funds into target sectors accordingly.

• Constructed company and industry overview for an M&A rationale of a gambling company wanting to increase its exposure to mobile gaming.

• Assisted in the preparation of key valuation methodologies including preparing a discounted cashflow model for a potential M&A transaction.

Melbourne Medical School (University of Melbourne) @ Melbourne, Australia
Finance Officer *August 2019 – July 2020*

• Assisted grants and contracts managers of Melbourne Medical School on dealing with research funding and Lead Investigators.

• Streamlined the process of preparing individual reports for each Lead Investigator in the department by utilizing computer shortcuts and thinking algorithmically; creating ~20% productivity improvement.

• Prepared budget models for Chief Investigators based on the agreed funds by large organizations such as the Gates Foundation.

PT. Agri Lestari Nusantara @ Lampung, Indonesia
Intern *November - December 2018*

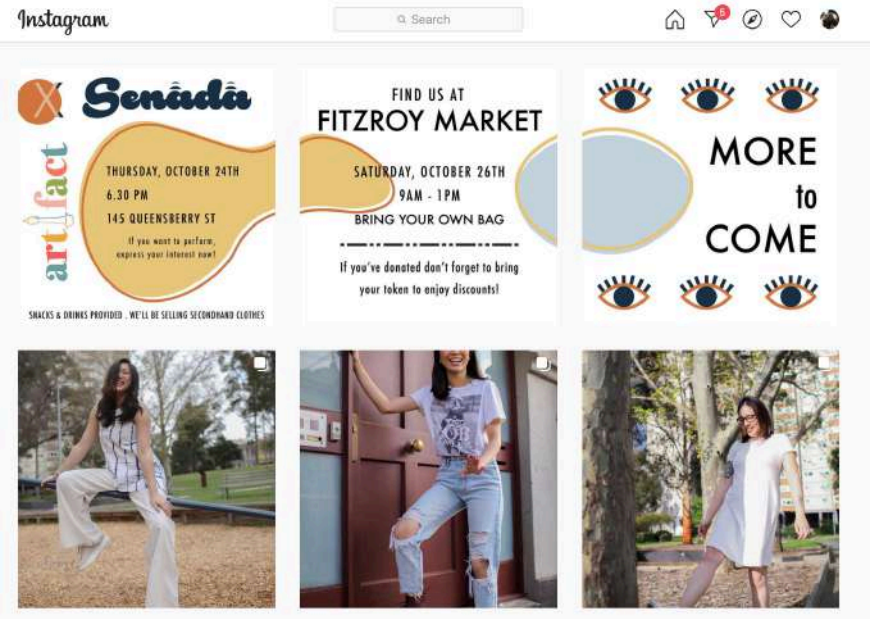
• Shadowed firm's day to day operation. Analyzed workflow and hiring process of low skilled workers, and gave recommendation that was estimated to reduce time to fill by ~7 days.

• Reduced rejection rate of final products from ~8% to ~3% by identifying the source of final product rejects.

OTHER EXPERIENCE

Selangkah

Background: 4 of my friends and I founded Selangkah in 2019 because we hated seeing unused clothes in our friends' accommodations. We were inspired by Marie Kondo and wanted to offer a similar free service (cleaning) in exchange for free clothes & accessories. We would then sell the items we have received to fundraise for NGOs. Selangkah partners with 2 NGOs in Indonesia (Barumun Nagari Wildlife Sanctuary in North Sumatera and Second Chance Initiative in Jakarta).



My role: Co-Founder, Strategist, Event Planner

Process:

- Improved systemised word of mouth marketing.
- Initiated Instagram Look book Campaign.
- Organized a stall for us in weekly Fitzroy Market.
- Planned 2 Open Mic sessions with used clothes / donation as entry fees.
- Utilised Facebook Marketplace to sell remaining inventory.

Indonesian Film Festival

Background: First established in 2002, the Indonesian Film Festival (IFF) is the most prominent celebration of Indonesian cinema in Australia. It was since 2006 that IFF became an annual celebration of cinema in its form. Held annually in Melbourne, IFF is managed by a non-profit organisation, Indonesian Film Festival (IFF) Inc., which aims to promote the appreciation of Indonesian culture in Australia, as well as raising international awareness of the burgeoning Indonesian film culture.

My role: Sponsorship Officer (2019), Program Officer (2018)

Process:

- *Sponsorship* : Sought third parties' sponsorships and funding opportunities, also persuaded, communicated, and drove agreements by demonstrating implicit values of given proposals.

- *Program* : Managed a screening of 3 award winning Short Films from scratch. Organizing films, moderators, panellists, venue, conversation topics, and marketing materials.

Temu Lawak

Background: Temu Lawak originates from a combination of 2 Indonesian words "Temu" and "Lawak" which mean "meet" and "joke" respectively, hence "Temu Lawak" translates to an event where everyone meets and jokes around. Temu Lawak is a Comedy-Themed Musical Drama that was first produced in 2016 to commemorate Indonesian Independence day in Melbourne. It is a tradition since its first production to create everything from scratch. Each performance started from zero. We had to create our own script, music, story, costume, props, etc. But our main assignment is to entertain all the 800 audience at our usual venue, the Athenaeum Theatre.

My role: Head of Planning (2018)

Process:

- My main job was to make sure that the production team has nothing to worry about except its own craft.
- Supervised the entirety of the planning team: program, sponsorship, fundraising, marketing, media, logistics, documentation, and creative divisions.
- Prioritised committee welfare by creating a bonding event ("Amazing Race" in Melbourne CBD).
- Used wrist tickets for the 1st time to reduce costs and prevent unwanted audience.

WHAT I LIKE

35 Things I Like

- **Amos Tversky**
- **Architecture**
- **Books**
- **Cooking**
- **Daniel Kahneman**
- **Diving**
- **Economics**
- **Eka Kurniawan**
- **Elon Musk**
- **Finance**
- **Food**
- **Football**
- **Game Theory**
- **Guitar**
- **Indonesia**
- **Learning**
- **Melbourne**
- **Meditation**
- **Michael Lewis**
- **Photography**
- **Physics**
- **Pink Floyd**
- **Pramoedya Ananta Toer**
- **Radiohead**
- **Spreadsheet**
- **Sustainability**
- **Technology**
- **Tennis**
- **Time**
- **Travelling**
- **Valuation**
- **Vinyl**
- **Walking**
- **Water**