Push notifications on 'Wusool' program

https://www.wusool.sa

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Introduction

- "Wusool" program, which aims to enable women to work in the private sector and raise their participation in the labor market by helping the female employee overcome transportation difficulties to and from the workplace, in order to support her job stability

- The program works with financial support from the Human Resources Development Fund and in cooperation with vehicle guidance applications to provide transportation service with high quality and at an appropriate cost

What is Push notifications?

- A push notification is a message that pops up on a mobile device. App publishers can send them at any time; users don't have to be in the app or using their devices to receive them.

- Users today have a hard time remembering what apps they even have on their device. Push notifications help these services deliver timely and relevant information to users, and in doing so, staying top of mind.
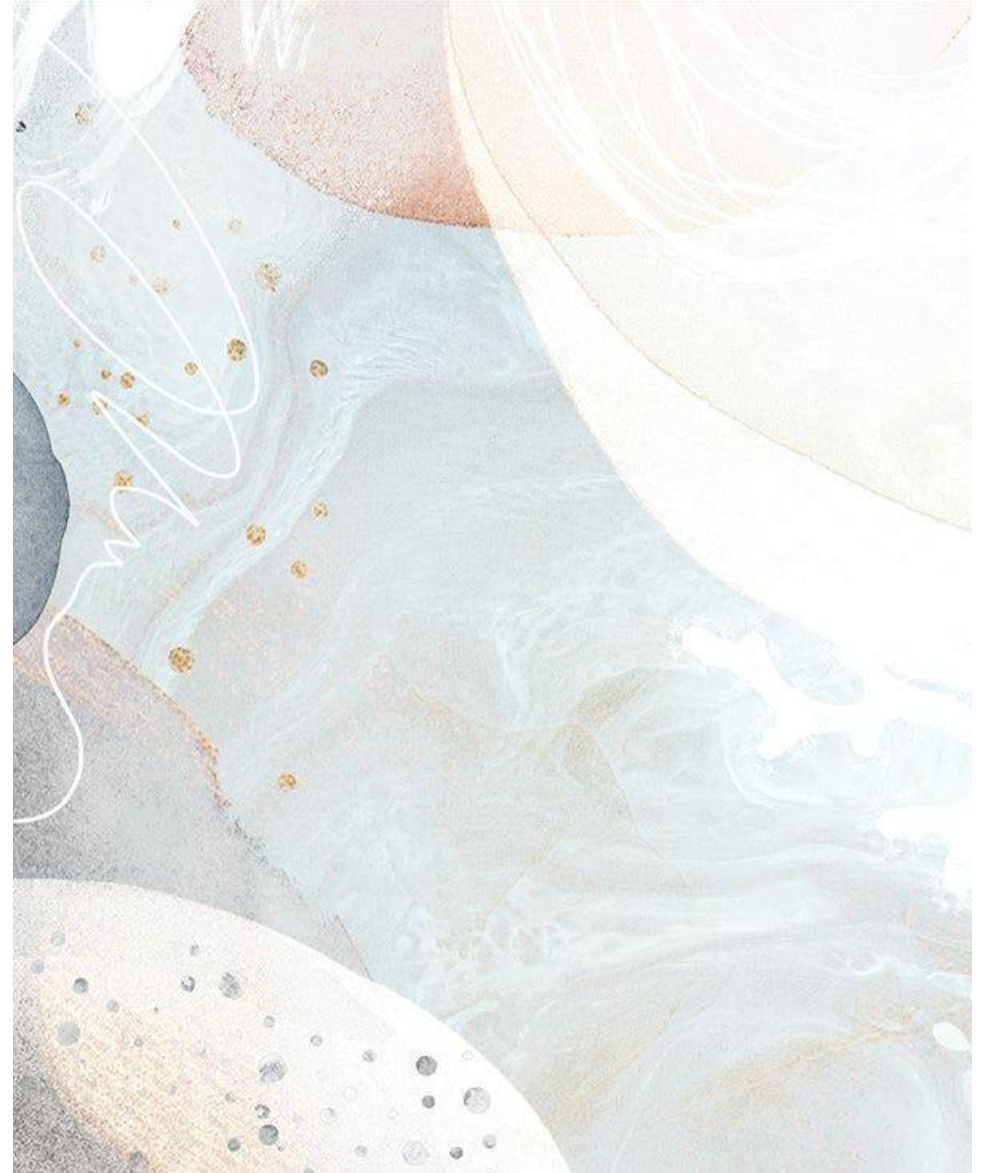
Data Structure

- This data is from 2018 to 2021.
- The data was downloaded from the Saudi National Open Data portal, the data owner is the Human Resources Development Fund.

Additional Info

Field	Value
Category	Labor Market, Social Services, Transport and Communications, Woman
Data Owner	Human Resources Development Fund
Last Updated	July 28, 2021, 11:13 (AST)
Created	April 21, 2021, 14:38 (AST)
Source Link	https:eservices.taqat.saeservices_individualhome.aspx
Time Period	2018 -2021
Publisher Email	ah.almalki-c@hrdf.org.sa
update frequency	Yearly

➤ The data contains 8 columns and 5000 rows.

	serial number	Status	Region	City	National Address City	The first flight date	Last flight	date of registration
0	1	Effective (has taken at least one trip in the ...	Makkah	Thoul	#VALUE!	2021/04/15	2021/04/16	2021/04/12
1	2	Effective (has taken at least one trip in the ...	Riyadh	Tarif	#VALUE!	2021/03/02	2021/04/20	2021/03/01
2	3	Excluded	Riyadh	#VALUE!	#VALUE!	#VALUE!	#VALUE!	2021/03/10
3	4	Qualified	Eastern Region	the news	#VALUE!	#VALUE!	#VALUE!	2021/03/01
4	5	Effective (has taken at least one trip in the ...	Riyadh	Al-Harut (Riyadh Emirate)	#VALUE!	2020/11/04	2021/04/20	2020/11/04
...	...	...	...	...	...	...	...	...
4995	4996	Effective (has taken at least one trip in the ...	Medina	Medina	Medina	2019/05/10	2019/07/23	2019/04/25
4996	4997	Effective (has taken at least one trip in the ...	Riyadh	Dawadmi	Riyadh	2021/03/21	2021/04/20	2021/03/20
4997	4998	Effective (has taken at least one trip in the ...	Riyadh	Dawadmi	Riyadh	2021/04/13	2021/04/16	2021/04/06
4998	4999	Effective (has taken at least one trip in the ...	Riyadh	Tarif	Riyadh	2019/07/03	2021/04/12	2021/01/21
4999	5000	Excluded	Riyadh	Riyadh	Riyadh	2019/07/03	2021/04/12	2019/06/08

5000 rows × 8 columns

Data Cleaning

❑ **Unnecessary data:**

➢ In the beginning, I removed the columns that I do not need and that are not necessary in this project, such as the "City" column and the "National Address City" column.

	serial number	Status	Region	City	National Address City	The first flight date	Last flight	date of registration
0	1	Effective (has taken at least one trip in the ...	Makkah	Thoul	#VALUE!	2021/04/15	2021/04/16	2021/04/12
1	2	Effective (has taken at least one trip in the ...	Riyadh	Tarif	#VALUE!	2021/03/02	2021/04/20	2021/03/01
2	3	Excluded	Riyadh	#VALUE!	#VALUE!	#VALUE!	#VALUE!	2021/03/10

❑ **Unnecessary data:**

➢ Then I removed all the rows with the "Excluded" status because they are not needed either.


```
In [155]:    1  df.drop(df[df['Status'] == 'Excluded'].index, inplace = True)
             2  df
```

Out[155]:

	ID	Status	Region	The first trip date	The last trip date	date of registration
0	1	Effective	Makkah	2021-04-15	2021-04-16	2021-04-12
1	2	Effective	Riyadh	2021-03-02	2021-04-20	2021-03-01
3	4	Qualified	Eastern Region	NaT	NaT	2021-03-01
4	5	Effective	Riyadh	2020-11-04	2021-04-20	2020-11-04
5	6	Qualified	Riyadh	NaT	NaT	2021-03-20
...	...	...	...	...	...	...
4994	4995	Effective	Riyadh	2020-11-23	2021-04-09	2020-11-22
4995	4996	Effective	Medina	2019-05-10	2019-07-23	2019-04-25
4996	4997	Effective	Riyadh	2021-03-21	2021-04-20	2021-03-20
4997	4998	Effective	Riyadh	2021-04-13	2021-04-16	2021-04-06
4998	4999	Effective	Riyadh	2019-07-03	2021-04-12	2021-01-21

❑ **Inconsistent text and typos:**

➢ Correcting translation errors from Arabic to English.

```
In [152]:   1 df = df.replace('#VALUE!', np.NaN)
            2 df = df.replace('15th', 15)
            3 df = df.replace('three hundred fifty', 350)
            4 df = df.replace('ten thirty', 1030)
            5 df = df.replace('Effective (has taken at least one trip in the program)', 'Effective')
            6 df = df.replace('Hollow', 'Al-Jouf')
            7 df = df.replace('difficult', 'Asir')
            8 df = df.replace('Patio', 'Al-Baha')
            9 df.head(30)
```

❑ **Data Analysis:**

➢ In data analysis , first, I need to know the regions that use the program most in order to try to spread the idea of the program to the large regions in Saudi Arabia and the least use of the program.

➢ After that, I send notifications to qualified status (registered and not yet started using the program), which is the main idea of this project

➢ Here is a graph showing the top three regions using the program:

➢ As we can see, Riyadh is the region that uses the program by a large margin than the rest of the regions. This means that other regions in Saudi Arabia do not know much about the program. I suggest that text messages be sent to the residents of these regions to increase users.



Top 3 regions that used the program
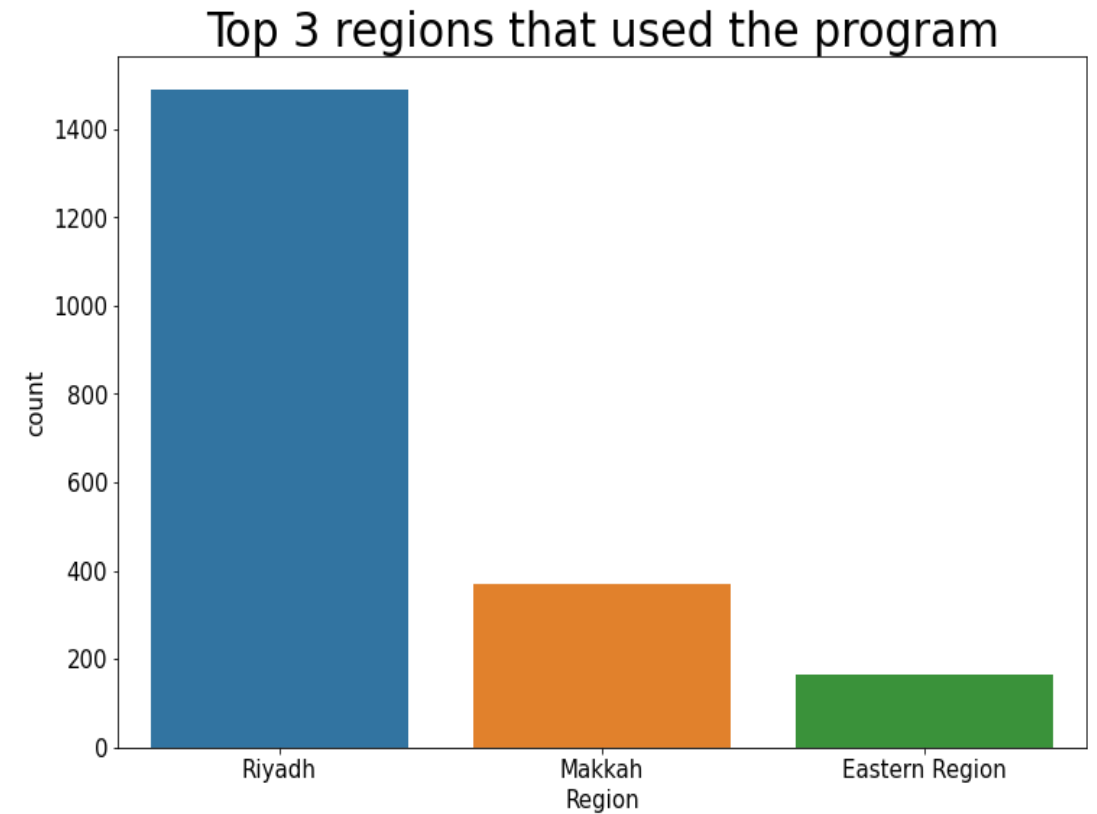
➤ Here is a graph showing the number of users in the rest of the regions in Saudi Arabia.



All regions that used the program
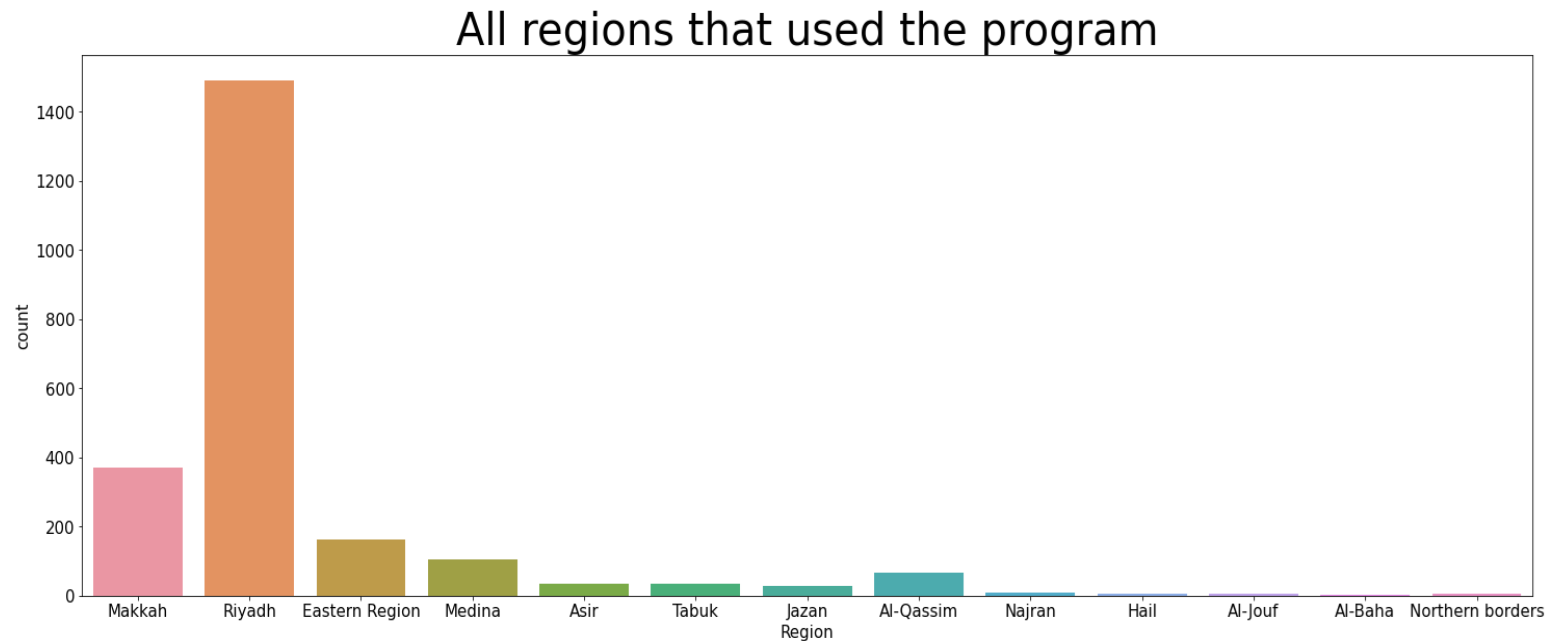
➤ Text messages is important for people to know about the program and register in it, but I have cases in the data that were registered but did not start using the program, in this project I will try to make qualified cases effective cases by using push notifications to remind them that they are registered in the program.

➤ This is a final graph showing the percentage of effective cases and qualified cases.
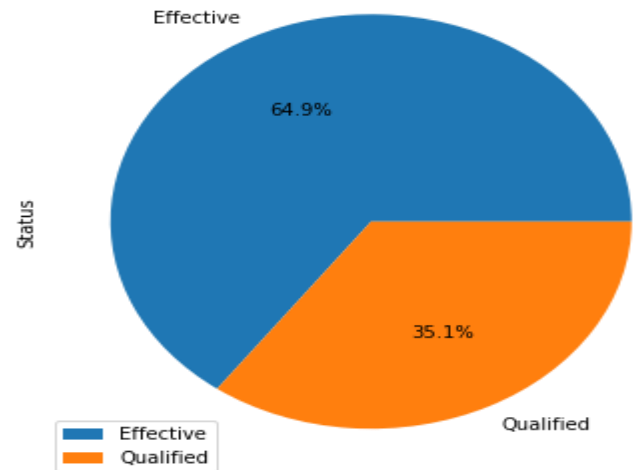


➤ We do not know the reasons for registering in the program and not using it, so it is possible, according to recent scientific studies, that push notifications helps a lot in maintaining customers and increasing their activity within the program.

# ❑ **Results:**

➢ Here I will show the results that I put to the qualified cases, which is a reminder text that they are registered with the program and should start using it:

Here I set a condition to send notifications to all qualified status to try to make it an effective status.

```
In [217]:   1  df.loc[df['Status'] == "Qualified", 'Notifications'] = 'Dear customer, you are registered in the "Wusool" program, start to
            2  df.head(20)
```

Out[226]:

ID	Status	Region	The first trip date	The last trip date	date of registration	Notifications
1	Effective	Makkah	2021-04-15	2021-04-16	2021-04-12	NaN
2	Effective	Riyadh	2021-03-02	2021-04-20	2021-03-01	NaN
3	Qualified	Eastern Region	NaT	NaT	2021-03-01	Dear customer, you are registered in the "Wuso...
4	Effective	Riyadh	2020-11-04	2021-04-20	2020-11-04	NaN
5	Qualified	Riyadh	NaT	NaT	2021-03-20	Dear customer, you are registered in the "Wuso...
6	Effective	nan	2020-12-30	2021-02-18	2020-12-21	NaN
7	Effective	Eastern Region	2020-12-01	2021-04-15	2020-11-30	NaN
8	Effective	Makkah	2021-01-19	2021-04-12	2021-01-14	NaN
9	Effective	Makkah	2021-01-17	2021-04-18	2021-01-17	NaN
10	Qualified	Riyadh	NaT	NaT	2021-04-08	Dear customer, you are registered in the "Wuso...
11	Qualified	Makkah	NaT	NaT	2020-08-18	Dear customer, you are registered in the "Wuso...
12	Effective	Riyadh	2020-11-23	2021-04-20	2020-10-22	NaN
13	Effective	Makkah	2021-02-09	2021-04-19	2021-02-08	NaN
14	Qualified	Riyadh	2020-08-21	2020-09-28	2020-10-15	Dear customer, you are registered in the "Wuso...
15	Qualified	Riyadh	NaT	NaT	2021-01-10	Dear customer, you are registered in the "Wuso...
16	Effective	Makkah	2020-02-11	2021-04-20	2020-02-08	NaN
17	Qualified	Riyadh	2020-02-03	2020-03-07	2020-10-10	Dear customer, you are registered in the "Wuso...
18	Qualified	Makkah	NaT	NaT	2021-04-17	Dear customer, you are registered in the "Wuso...
19	Effective	Riyadh	2021-03-02	2021-04-20	2021-02-21	NaN
20	Effective	Riyadh	2020-12-09	2021-04-14	2020-11-30	NaN

❑ Conclusion:

➢ Sometimes customers register in the program and forget it or not know how to start or benefit from the program. Push notifications with advanced methods help customers understand the program and start it correctly.

➢ Push notifications are very effective at helping users stay engaged with an app.

➢ There are techniques that help a lot in increasing the benefit of push notifications, which I will use in future work.

❑ future work:

➢ Send notifications to active cases when the registration expiry date approaches.

➢ Increasing the accuracy of the timing of sending notifications to qualified cases so that I compare the registration date with today's date and send notifications when a certain time has passed from not starting to use the program.

➢ Techniques that help increase the benefit of push notifications.