Utilizing Data Analytics to Help Home Buyers

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Executive summary

Motivation & goals

Deliverables
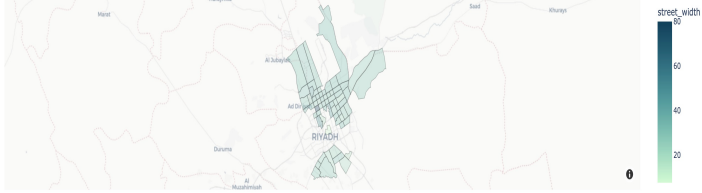Data set
Analytics Dashboard
Deal Fairness Indicator

Next steps
Challenges & limitations
Future improvements

Utilizing analytics tools and machine learning reduces search time by up to 50%

Goal

Gain insight into market

Narrow down option

Approach

Develop analytical dashboard

Price Fairness Meter

Example

Great deal! This apartment is listed at 10% lower than its fair value.

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We gathered data of the majority of apartments currently listed for sale in Riyadh, amounting to 7000+ apartments

Attributes

Floor Plan
- # of Bedrooms
- # of Bathrooms
- # of Living/Guest rooms
- Has Kintchen

Area
- Area (sqr. m)
- Dimensions
- Length:Width Ratio
- Shape Regularity

Location
- District
- Street Width
- Street Direction
- Latitude & Longitude

Features
- Installed Kitchen
- Furnished
- Installed AC

Building
- Age
- Apartment Floor

Online Post
- Post ID
- Advertisor ID
- Advertisor Type (owner)
- Advertisor Rating
- Time on Market
- Last Update

Conclusions

- 23+ gathered and engineered attributes for each apartment
- Some attributes suffer greater levels of inaccuracy
- Data was gathered by scraping **Aqar.com**

Aqar only offers filtering search results by price and location, which results in thousands of results; we enable our users to target their efforts by filtering for exactly what they want

Providing a district-level analytical dashboard enables home-buyers to quickly find the expected price of the apartment they are looking for

district=حي الندى
price_=823k
area=140.4167

price

1.6M

1.4M

1.2M

1M

0.8M

0.6M

0.4M
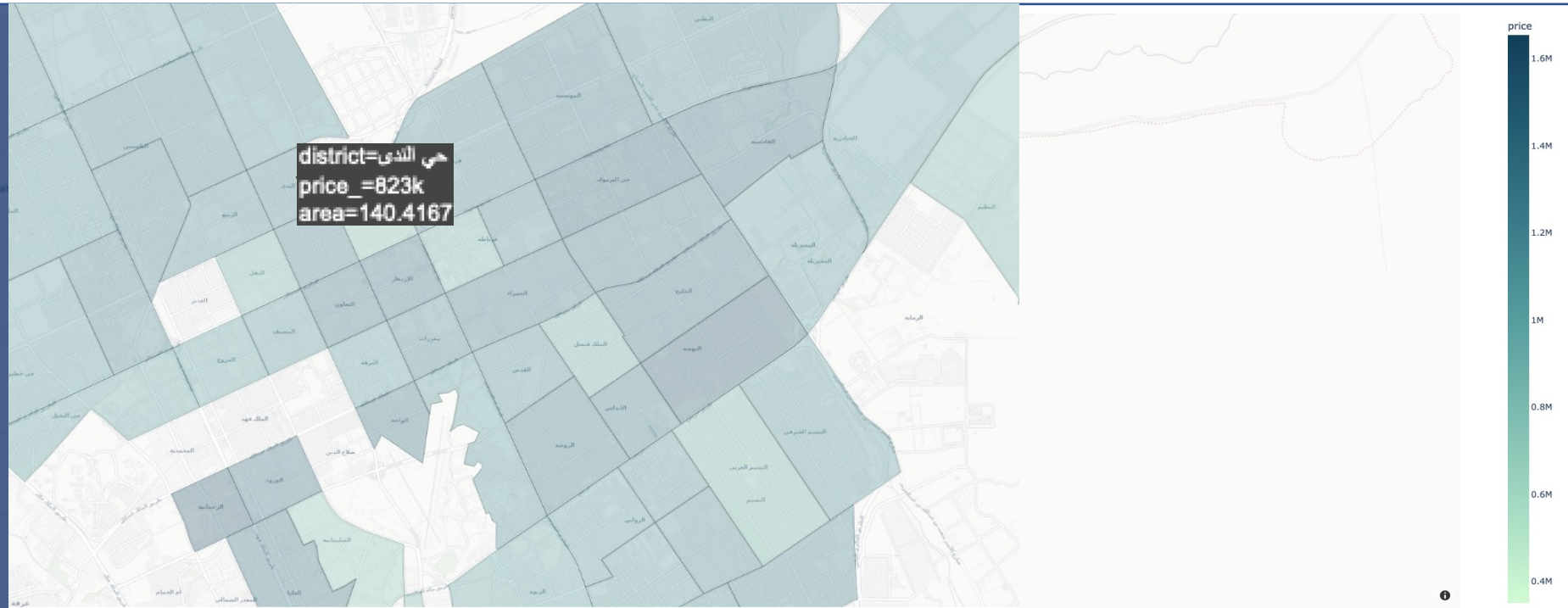
Select a feature to color the plot

○ price ☐ age ☐ area ☐ street width
☑ North ☑ South ☑ East ☑ West ☐ City center

Filters

Price

| 0 | 2M | 4M | 6M | 8M | 10M |

Age

| 0 | 8 | 16 | 24 | 35 |

Area

| 0 | 200 | 400 | 600 | 800 | 1,000 |

Number of bedrooms

We developed a Deal Fairness Meter to help users determine if an apartment they are interested in has a reasonable asking price

Get assessment for an apartment's price! Enter the apartment post ID:
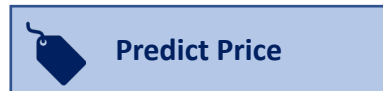
Post ID (Example: 4175521)

Submit

This is a FAIR DEAL. Actual asking price is 800k. Our estimate of a fair price for this apartment is: 788k

## Approach to generate Deal Fairness Score

Find Online Post
- Search Aqar.com to find the apartment with the given Post ID
- Collect the apartment data and prepare it to enter the machine learning model

Predict Price
- Use the data as input into the ML model
- Output is our estimate of a reasonable price

Compare Prices
- Compare our generated reasonable price with actual asking price
- Report: {Terrible Deal, Bad Deal, Fair Deal, Good Deal, Great Deal}
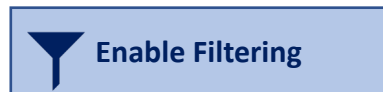
Enable Filtering
- Additional step: run all apartments in the database through the Deal Fairness Meter
- Allow users to filter for only Good and Great Deals

Notes

- Our estimate for a "reasonable price" is based on the 23+ attributes of each apartment
- 7000+ apartments were used to train the machine learning model
- The model's predictions are accurate, with an average prediction error of ~20k SAR
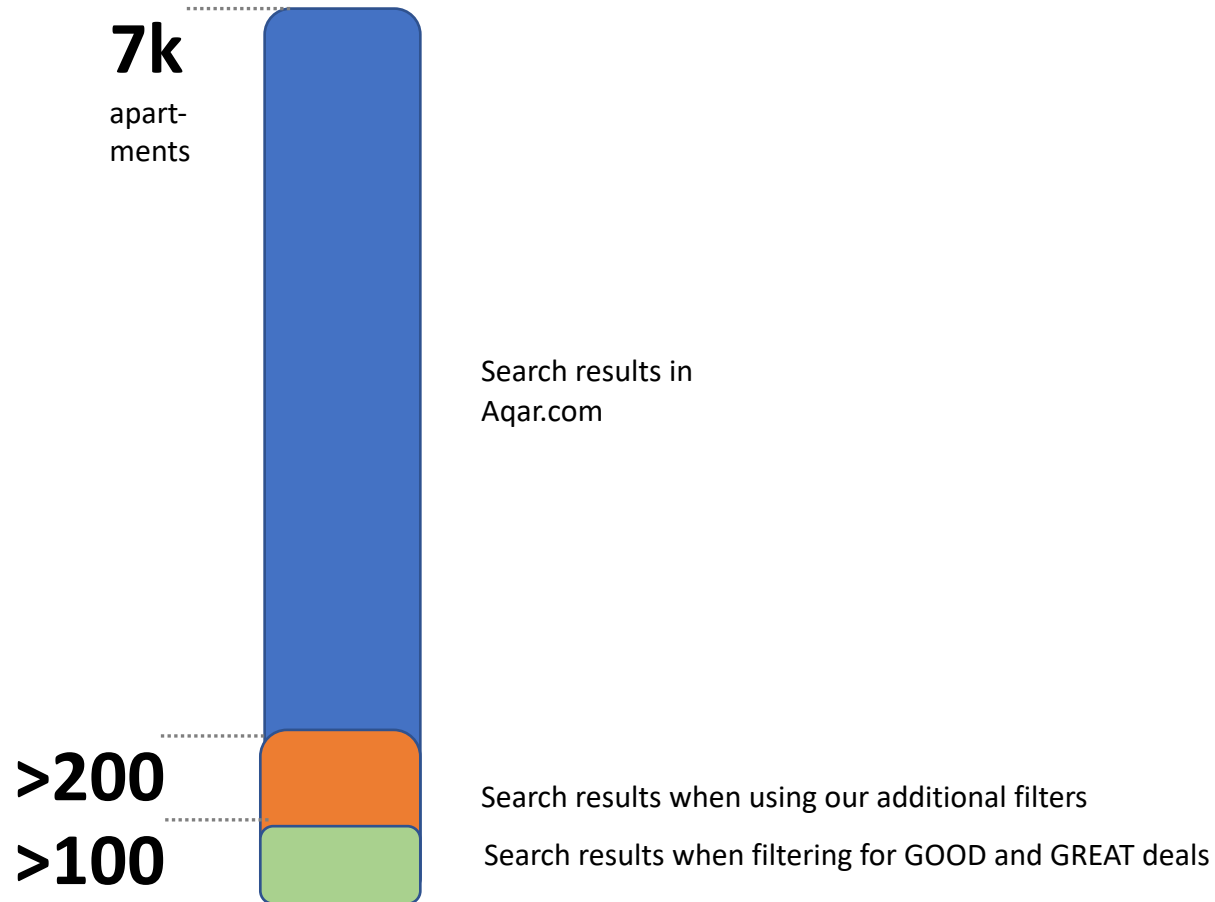- The tool is currently limited to searching for listings on Aqar.com

The Deal Fairness Meter is used for two tasks:
- Enable users to access outside advice for an apartment they found online which they are interested in
- Enable users to quickly filter our database for only the good deals, then download that list to find those listings on Aqar.com

After narrowing down the search results to a managable number, the user can download a list of candidate apartments for further analysis

	A	B	C	D	E	F	G	H	I	J	K	L
1	post_id	price	link	beds	livings	wc	area	street_width	age	street_direct	ketchen	furnished
2	3963975	850000	https://sa.aq	3	1	3	129	25	16	5	1	0
3	4430695	1400000	https://sa.aq	3	2	3	142	30	1	2	1	0
4	4420689	1200000	https://sa.aq	3	2	3	166	30	1	2	1	0
5	3483081	575000	https://sa.aq	3	3	4	170	30	0	3	0	0
6	4391509	890000	https://sa.aq	2	1	2	124	36	0	3	1	0
7	3595328	1150000	https://sa.aq	3	1	3	164	30	0	1	0	1
8	4438114	1300000	https://sa.aq	4	1	3	220	36	0	1	1	0
9	4190651	970000	https://sa.aq	4	1	3	182	20	0	3	0	0
10	4443656	1199000	https://sa.aq	3	1	4	145	30	0	5	0	0
11	4190548	920000	https://sa.aq	4	1	3	200	30	0	4	0	0
12	4359292	830000	https://sa.aq	4	1	3	137	30	0	3	0	0
13	3900139	1000000	https://sa.aq	5	1	2	132	18	9	6	1	1
14	4300375	1170000	https://sa.aq	3	2	3	176	36	0	8	1	0
15	4075233	1300000	https://sa.aq	3	1	3	129	36	0	1	0	0
16	4583365	950000	https://sa.aq	4	1	3	199		1	9	0	0
17	4369844	1149000	https://sa.aq	4	1	3	163	30	0	2	1	0
18	3766687	980000	https://sa.aq	3	2	3	135	36	0	4	0	0
19	4390778	1600000	https://sa.aq	3	1	3	130	32	0	4	1	0
20	4321372	1050000	https://sa.aq	3	1	3	172	30	0	4	1	0
21	3524161	1200000	https://sa.aq	3	1	3	148	36	0	4	1	0
22	4450332	929000	https://sa.aq	3	1	3	154	30	0	4	0	0
23	4127891	1200000	https://sa.aq	3	1	3	146	36	0	4	1	0
24	4352329	1300000	https://sa.aq	2	2	4	160	25	4	4	1	1
25	3331722	1950000	https://sa.aq	2	2	2	90	15		5	1	1

With our filteration system and Deal Fairness Scores, we can narrow down search results by more than 90%, saving users 50+ hours of search

7k

apart-
ments

Search results in
Aqar.com

>200

Search results when using our additional filters

>100

Search results when filtering for GOOD and GREAT deals

Value created

- On average, home-buyers spend 100 hours of search
- If our services saves 50% of that search time, then we are saving our users 50 hours of work
- Assuming an hour is worth 5 SAR (certainly an under-estimate), then we are creating 250 SAR of value for each customer!

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　　Deal Fairness Indicator

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　　Future improvements

We recognize the huge value generated by this tool, and we recognize its many aspects that need further development
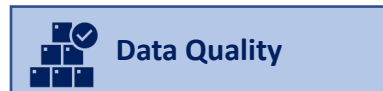
Limitations

Future developments

✖ **Accessability**	• Our database and Deal Fairness Meter tool are limited to apartments listed in Aqar.com

• Develop data-scraping scripts for other platforms

Data Quality	• Some listings contain false information about their properies, which hinders our ability to generate accurate predictions

• Develop machine learning models that can perform well desbite missing data
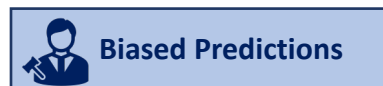
Biased Predictions	• Our prediction model performs particularly poorly on some types of apartments (e.g., high-end luxury apartments)

• Develop multiple machine learning models for the different price ranges

THANK YOU!

Presented by: Mohammed Alsalamah