



London Boroughs

Springboard Project 3
May 2020

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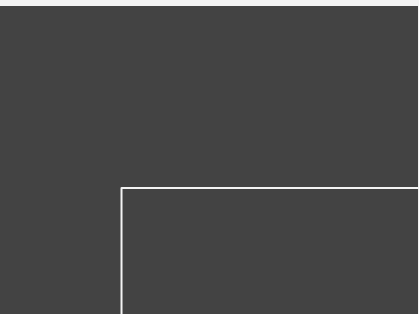
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A low-angle, black and white photograph of several tall skyscrapers reaching towards a dark, cloudy sky. The perspective creates a sense of height and scale. A white rectangular frame is superimposed over the center of the image, containing the text.

01

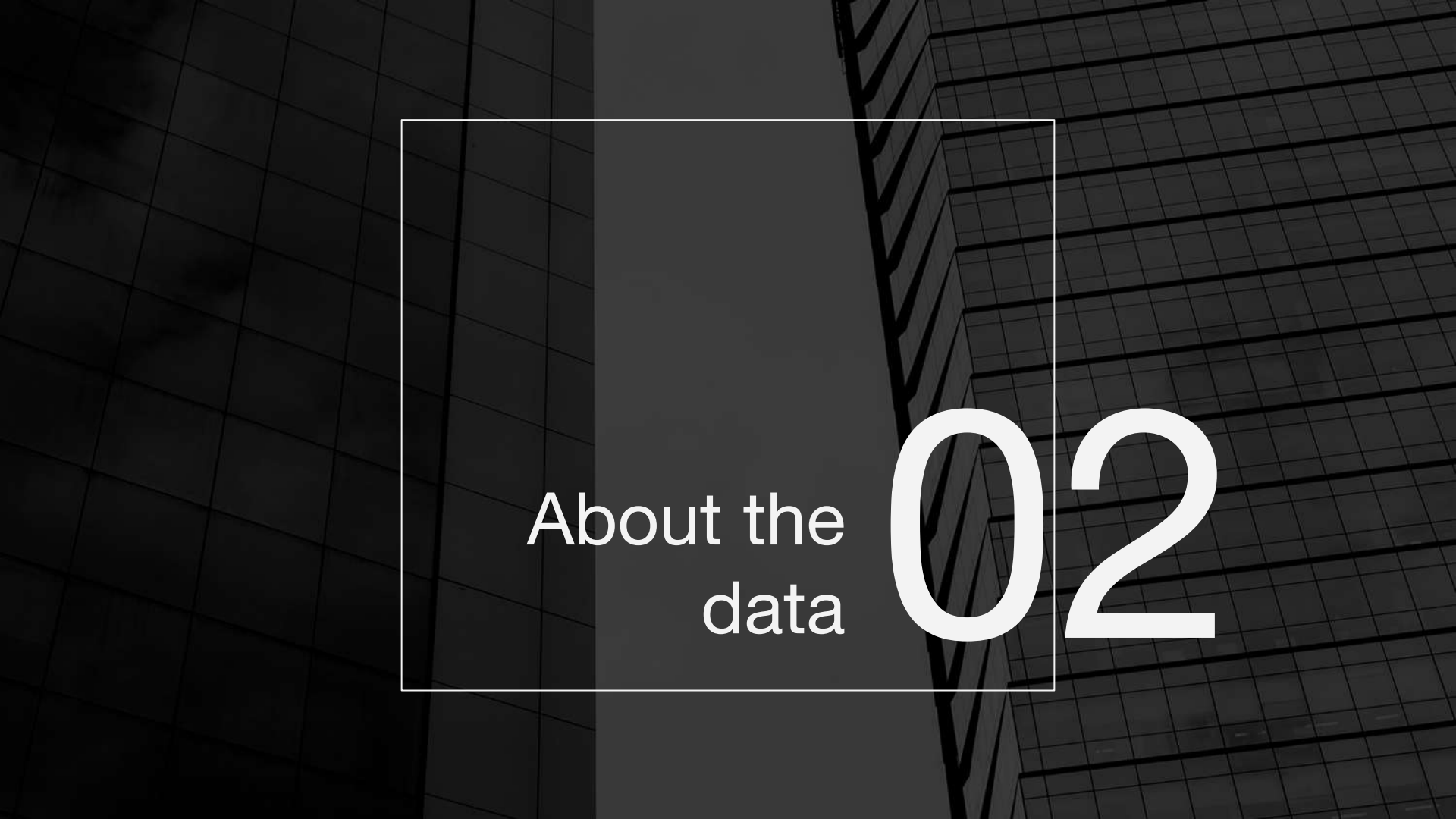
Goal of
the project



Determine which
boroughs of London
have seen the
greatest increase in
housing prices, on
average, over the last
two decades



Goal of the
project



About the
data

02

The Data



Data Source

[Website](#) - London Datastore

[Dataset](#) - UK House price index

[Guide](#) - UK Government guide on UK House Price Index

[GIS file](#) - Statistical GIS Boundary Files for London

Data Content

The data includes information about the average house prices across London Borough's from January 1995 to March 2020. The GIS file includes geographical boundaries for each borough.

Out of Scope

The data also includes information that is out of the scope of this analysis. This includes, information on the prices of different types of houses, sales volume, index prices, and information about the prices in the rest of the UK.



03

The London Boroughs

What are London Boroughs?

London has a total of 32 boroughs that make up “the Greater London”. They could be considered districts. 12 are considered inner London and 20 are considered outer London. Inner London Boroughs are smaller in population and area but they are more densely populated.

[Source](#)



Curiously, the “City of London” is not considered a London Borough.



Boroughs

Note: "City of London" is not considered a London Borough but was left for convenience



Hypothesis
Testing

04



Null Hypothesis

The closer you get to the City of London does not have any relationship with the average house price change



Alternative Hypothesis

The closer you get to the City of London has a relationship with the average house price change



Predictor Variable

Distance between center of “City of London”
and center of the borough

Note: I use GeoDataFrame function ”centroid” to
determine this. It is not the exact value but it will serve.

Response Variable

Average house price change between the
years 1995 and 2020



05

Details of
the analysis



Packages Used

NumPy

Pandas

Matplotlib

GeoPandas

adjustText

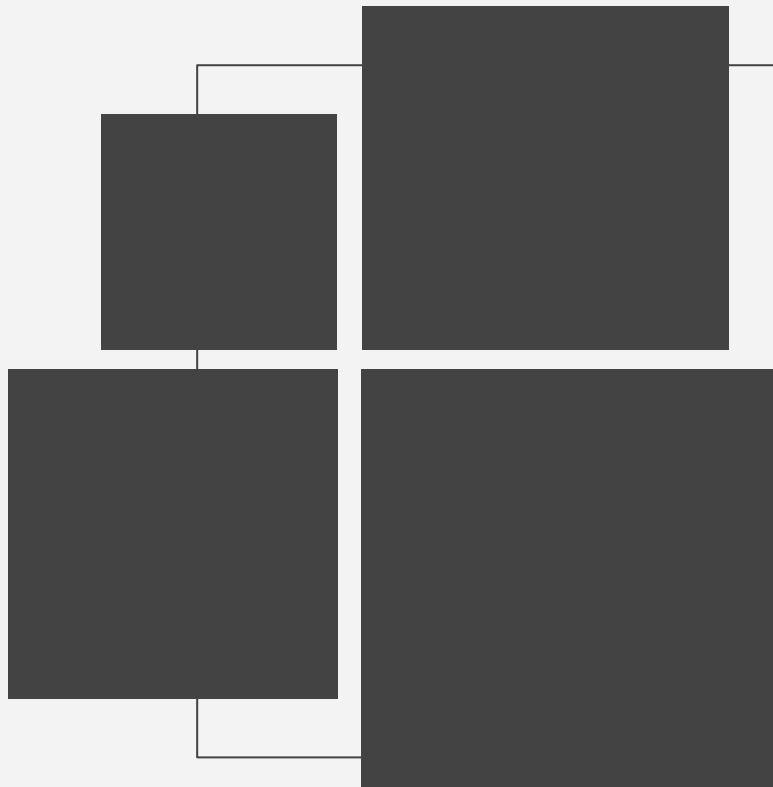
Math

Shapely

Seaborn

Scipy

Data Analysis



Exploring the data

The data shows columns and rows that are not relevant to us and some null values. In addition, the datatypes are objects instead of floats.

Structuring the Data

From the resulting data I used “melt” to end up with three columns: “Date”, “Borough” and “Avg. Price”. I later merged this dataframe with a geopandas dataframe of the boroughs of London

Calculations

With the final dataframe I decided to calculate three variables: 1) Percent change from first observation to last observation 2) absolute change on same observations and 3) distance from center.

Percent Change

	Percent Change	max_rank_pc
NAME		
Hackney	941.96	1.00
Westminster	715.64	2.00
Tower Hamlets	689.54	3.00
Lambeth	675.39	4.00
Kensington and Chelsea	664.17	5.00
Haringey	641.07	6.00
Camden	628.58	7.00
Newham	623.44	8.00
Southwark	619.76	9.00
Waltham Forest	612.91	10.00

Absolute Difference

	Abs Difference	max_rank_ad
NAME		
Kensington and Chelsea	1,213,407.40	1.00
Westminster	951,987.42	2.00
Camden	760,163.07	3.00
Hammersmith and Fulham	622,271.52	4.00
Hackney	577,386.61	5.00
Islington	539,753.06	6.00
Wandsworth	536,299.05	7.00
Richmond upon Thames	524,154.39	8.00
Haringey	489,054.95	9.00
Lambeth	457,716.11	10.00

Distance from Center

	distance_from_center	max_rank_distance
NAME		
Tower Hamlets	3,935.97	1.00
Islington	3,946.53	2.00
Hackney	4,619.06	3.00
Southwark	4,797.26	4.00
Westminster	4,798.99	5.00
Camden	5,727.79	6.00
Lambeth	7,106.04	7.00
Kensington and Chelsea	7,136.22	8.00
Haringey	8,468.70	9.00
Lewisham	8,950.12	10.00

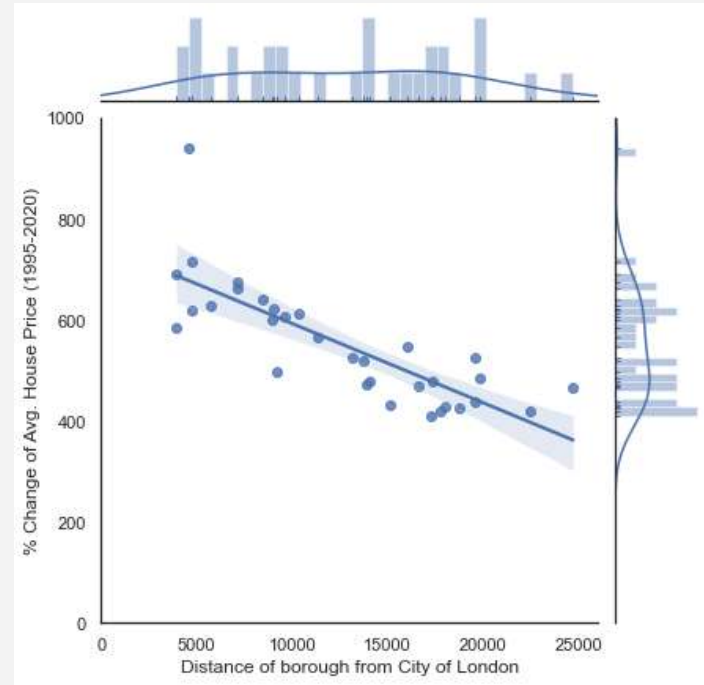
In general we can see there is a trend within the three variables, boroughs are generally present in the top 10 values for each ranking (for the rest of the ranking access the original notebook)

Average House Price % change vs.
Distance from center of London
(1995-2020)

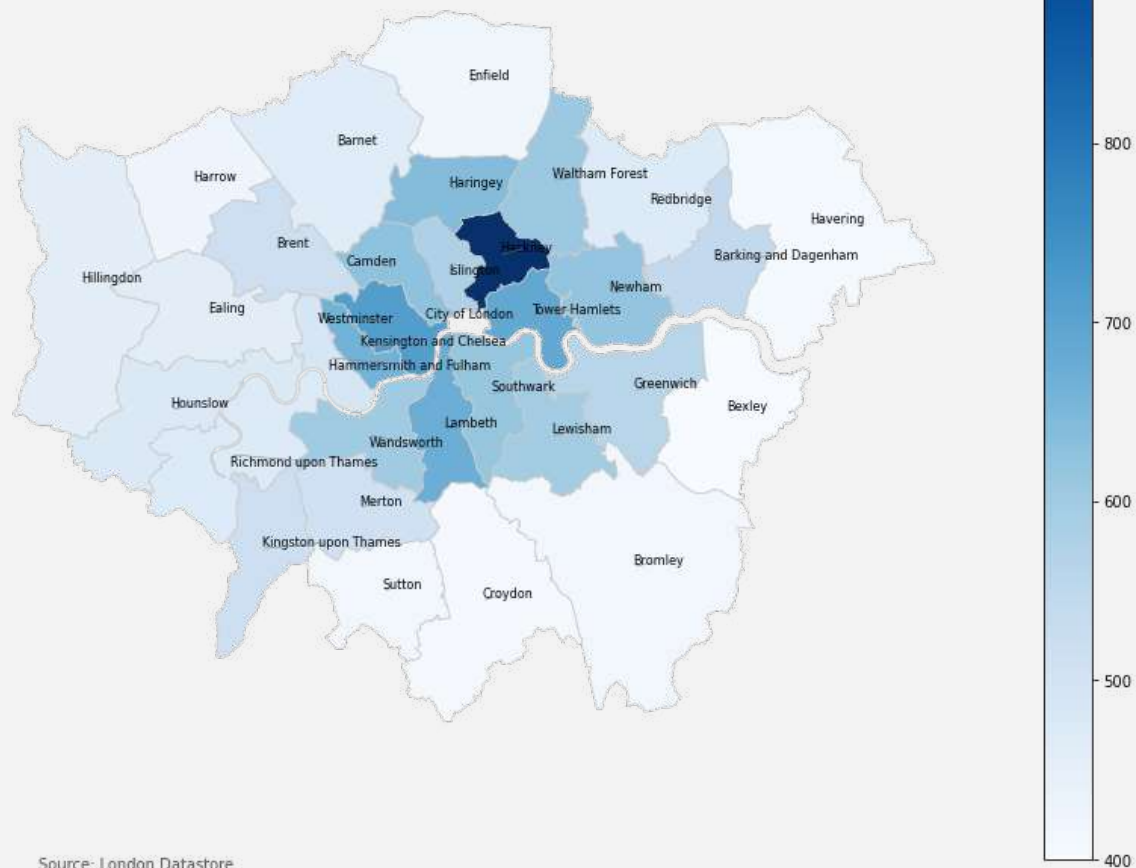
Pearson's correlation = -0.802

p-value = 3.35e-08

Slope = -0.016



Housing Price Index Percent Change 1995-2020

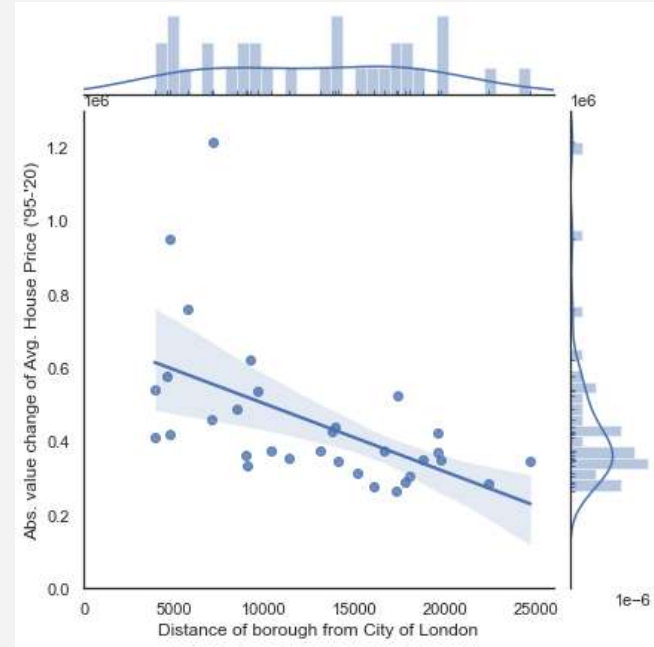


Avg. House Price absolute value vs.
Distance from center of London
(1995-2020)

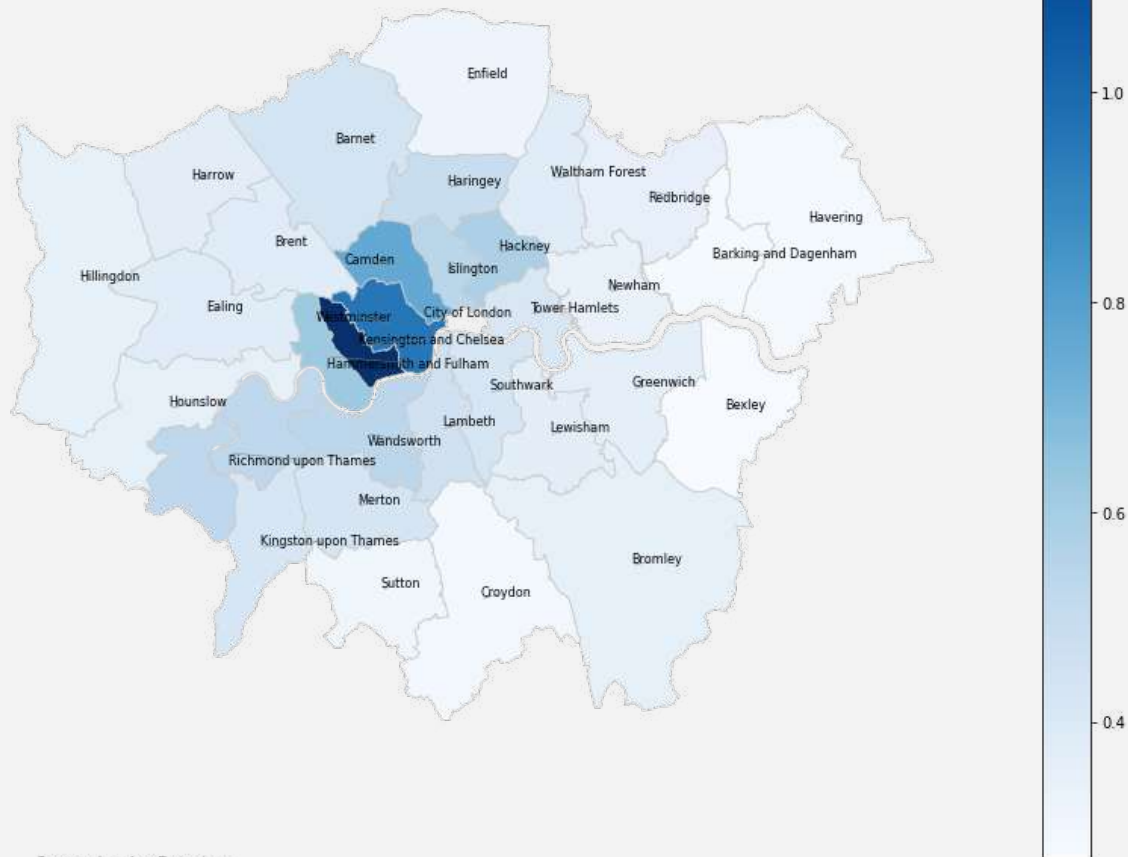
Pearson's correlation = -0.545

p-value = 0.00127

Slope = -18.55



Housing Price Index Absolute Difference 1995-2020



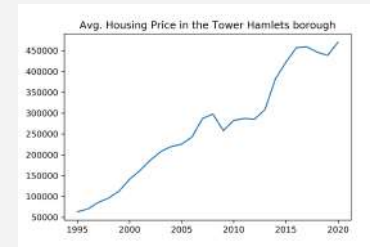
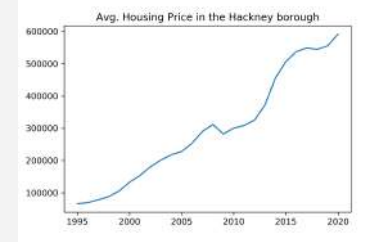
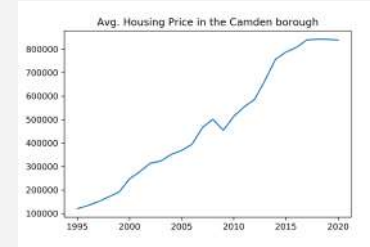
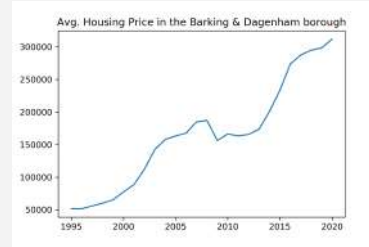
Source: London Datastore

Average House Price Evolution of boroughs from 1995-2020 (selection of boroughs)

Although some boroughs have seen a higher increase in the average price of houses compared to others, overall increase can be seen in every borough.

Without exception the 2008 financial crisis took a toll in each borough's average house price.

Interestingly, these last years only some boroughs have seen a drop in the average prices whilst others kept a stable or growing trend. Further analysis would be required to understand the underlying causes.






Final
Conclusions

06

Final Conclusions



1
Greatest
house
increase in
the last
decades

2
Evaluating
our initial
hypotheses

3
Further
Analysis

Relative Value:

1. Hackney
2. Westminster
3. Tower Hamlets

Absolute Value:

1. Kensington & Chelsea
2. Westminster
3. Canden

We can reject the null hypothesis

With this data we see a negative correlation between distance to London's city center and the relative increase in prices.

Some ideas include 1) analyze how each borough average house price changed in comparison with other parts of the UK 2) do a forecast of expected prices given historical information and 3) analyze if covid-19 crisis has a negative effect on housing prices in the city center



Thanks

The notebook for this project is
uploaded in GitHub at

[GitHub London Housing Project](#)



Credits

For this presentation I used the following resources:

- Data: London Datastore & UK Gov. Websites
- Presentation template by [Slidesgo](#)
- Icons by [Flaticon](#)
- Infographics by [Freepik](#)
- Images created by [Freepik](#)
- Author introduction slide photo created by Freepik
- Text & Image slide photo created by Freepik