

Predicting Car Listing Prices in the UK

Capstone | GA DSI 523
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Just like in the US, Car Prices in the UK have been crazy over the last 2 years

Bloomberg UK

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UK Used-Car Prices Ease After Covid Surge as Fuel Costs Spike

- Prices have fallen for five straight months in the UK
- Britons asking whether they really need a car, dealer says

Used car prices 2022: Why are they going up around the UK and when will they drop?

As second-hand car values continue to rise we look at the reasons behind the increase and ask the experts when prices might start to fall again

Used car prices soar to record highs: The typical second-hand motor is now £4,000 pricier than a year ago - with big family models most in-demand

- Huge delays on new cars caused by semiconductor shortages has seen record demand for used motors
- This has pushed prices to record highs, with vehicle values up 31.9% in a year
- The average used car now costs £18k, up from £14k just 10 months ago
- Experts say rising inflation and Russia-Ukraine conflict has slowed the price rise
- Yet Auto Trader says there is no sign of the used car market bubble bursting

By ROB HULL FOR THISISMONEY.CO.UK

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How much is your car worth? Prices of second hand vehicles soar in Kent

Gerry Warren gwarren@thekmgroupp.co.uk

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Value of UK's most popular used cars rose dramatically over past year

CarGurus says its most popular 20 models are now worth 26.3 percent more on average.

Cars are often family's 2nd largest assets after their homes

- Car related spending represents a meaningful part of people's income, between 10%-15% of post-tax income
- The immense financial commitment required to buy a car means families look at the purchase of a vehicle as an investment
- With car price volatility and predatory industry practices, it can be very difficult for buyers and sellers to price vehicles correctly



The Project

To create an application to provide car buyers and sellers insight into the British auto reselling market and predict vehicle listing prices



The Data

Cazoo is one of the UK's most popular and largest online car retailers

CAZOO

- 7000+ car listing on the platform
- The most data-rich platform in the UK
- The highest customer satisfaction in score the industry
- Comparable to Carvana in the US

A screenshot of the Cazoo website's 'Used cars' section. The page features a navigation bar with links for 'Buy', 'Finance', 'Sell', 'Value', 'Why Cazoo', and 'Car care'. A 'Filters' sidebar on the left lists categories like 'Make & Model', 'Price', 'Fuel & Efficiency', 'Year', 'Mileage', 'Gearbox & Engine', 'Colour', and 'Body Type'. The main content area is titled 'Used cars for sale or on finance' and includes a descriptive paragraph. Below this is a 'Finance representative example (PCP)' table with columns for various financial metrics. A section shows '1 - 47 of 7,207 results' with a 'Sort by' dropdown set to 'Lowest Price'. Three car listings are displayed: a red Dacia Sandero, a silver Toyota Aygo, and a red Suzuki Celerio. A sidebar on the right contains a text box about car finance eligibility.


Total cash price £18,725. Borrowing £18,725 with a £2,000 deposit at a representative APR of 8.9%.	Fixed rate of interest per annum 6.13%	48 monthly payments £267.97	Total amount payable £23,746.16	Cost of credit £5,041.36	Optional final payment £8,923	Annual mileage limit 10,000 miles	Excess mileage charge 4p/mile
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Make & Model	Price	Fuel & Efficiency	Year	Mileage	Gearbox & Engine	Colour	Body Type
Dacia Sandero	1.5L Ambiance dCI						
Toyota Aygo	1L x VVT-i						
Suzuki Celerio	1L S22						

Find out if you're eligible for car finance in minutes, with no impact on your credit score.

Key Statistics being Scraped from Cazoo

- Car Brand
- Car Model
- Listing Price
- Mileage
- Registration Date
- Trim Specs
- Engine Specs
- Car Body Type

**Toyota AYGO**
1L x VVT-i

2016
54,979 miles

£6,300
£77/month PCP

Get started

Summary

**Last service**
9 August 2022
54,979 miles

Reg date	Dec 2016	Drive type	Front wheel drive
Transmission	Manual	Registration number	WF66 GKA
Mileage	54,979 miles	Previous owners	2
Seats	4	Number of keys	2
Engine	1L	Emissions	95g/km (band A)
Body type	5 door Hatchback	ULEZ compliant 	Yes
Exterior colour	Silver		



The Model

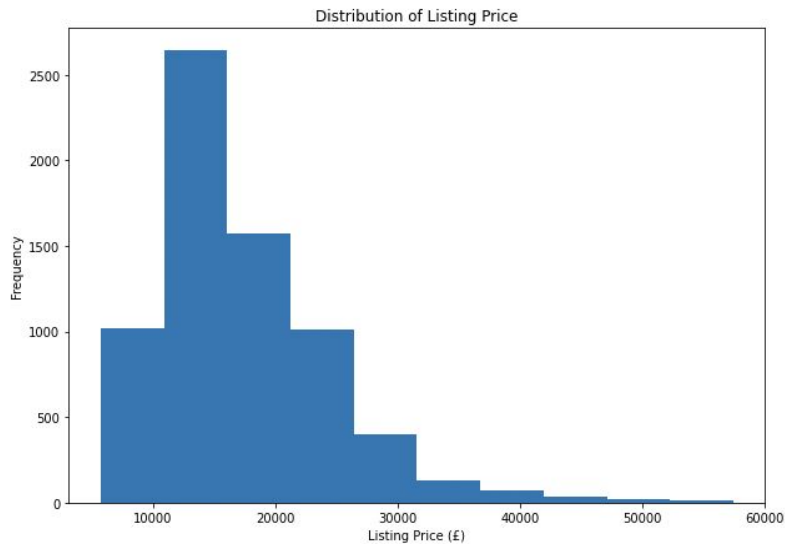
Linear Regression

Listing Price target variable shows a strong right skew

Listing Price Statistics

mean	17345
std	6968
min	5700
25%	12350
50%	15550
75%	21050
max	57500

Listing Price Histogram



The Multi Linear Regression Model showed very strong predictive capabilities

Predictive Model Metrics

- Model MSE: £1,853,225
- Model RMSE: £1,361
- Model MAE: £867

R2 Statistics

- Test R2 Statistic: 0.960
- Training R2 Statistic 0.986

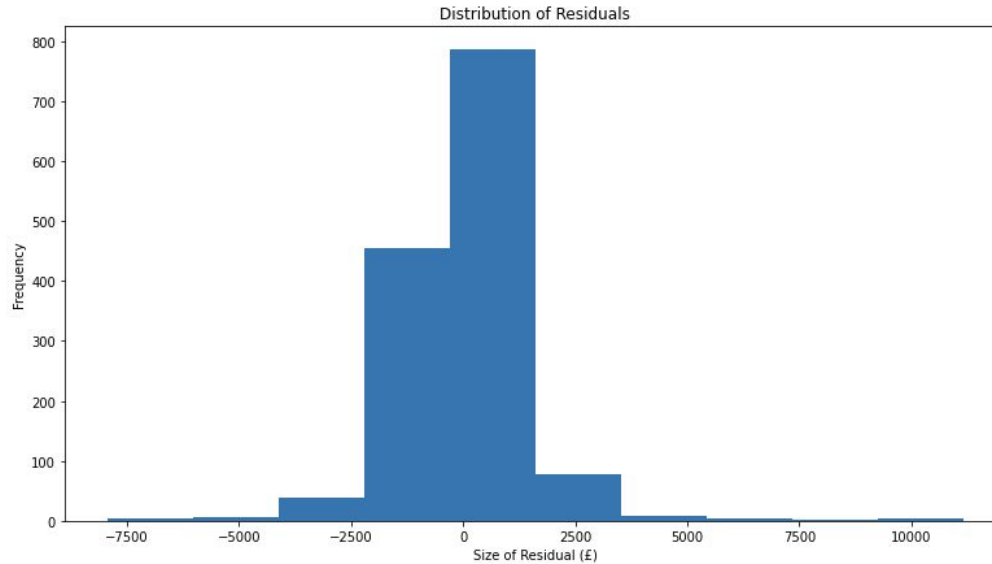
Null Model Metrics

- Null Model Mean Squared Error: £48,556,014
- Null Model Root Mean Squared Error: £6,968
- Null Model Mean Absolute Error: £5,368

The null model assigns all predictions to be the mean listing price of the sample of cars

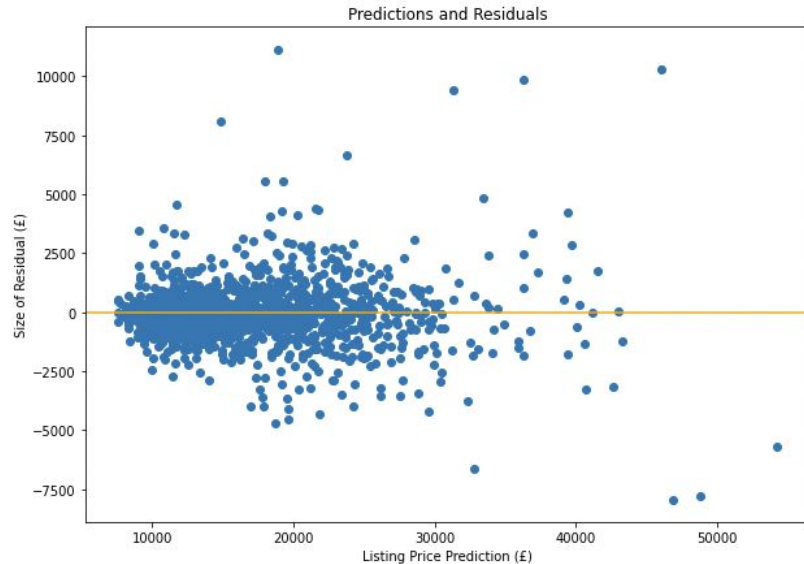
The Model tends to predict slightly higher car listing prices

Histogram of Residuals

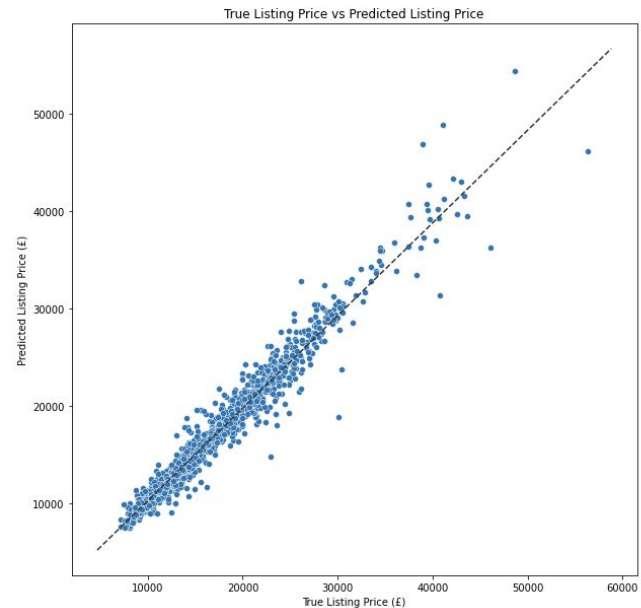


The Model excels at predicting listing prices of $< \text{£}30,000$

Plot of Residuals vs Listing Price Predictions



Predicted vs True Listing Price Plot





The Application



Conclusion & Next Steps

The Project is a strong predictor of car listing prices in the UK

- The project is able to predict car prices with a Mean Absolute Error of 1/8th of a Standard Deviation

Next Steps/Future Improvements

- Collect more data on cars with values of £30,000+, improving predictions
- Collect more data to increase the number of car models in the app
- Identify a source for actual transactional data rather than only listing price data



Thank You!
Questions?