

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 volatile 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 individual'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 listings 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 left-hand sidebar contains filter categories: '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 'Total cash price', 'Fixed rate of interest', '48 monthly payments', 'Total amount payable', 'Cost of credit', 'Optional final payment', 'Annual mileage limit', and 'Excess mileage charge'. The table provides specific values for a Dacia Sandero. Below the table, it shows '1 - 47 of 7,207 results' and 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: '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 |
| Transmission | Manual |
| Mileage | 54,979 miles |
| Seats | 4 |
| Engine | 1L |
| Body type | 5 door Hatchback |
| Exterior colour | Silver |

| | |
|--|-------------------|
| Drive type | Front wheel drive |
| Registration number | WF66 GKA |
| Previous owners | 2 |
| Number of keys | 2 |
| Emissions | 95g/km (band A) |
| ULEZ compliant  | Yes |



The Model

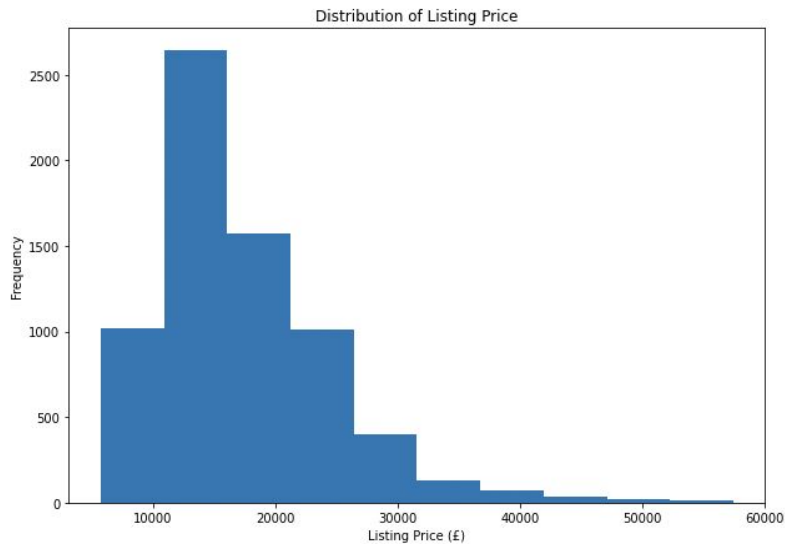
Linear Regression

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

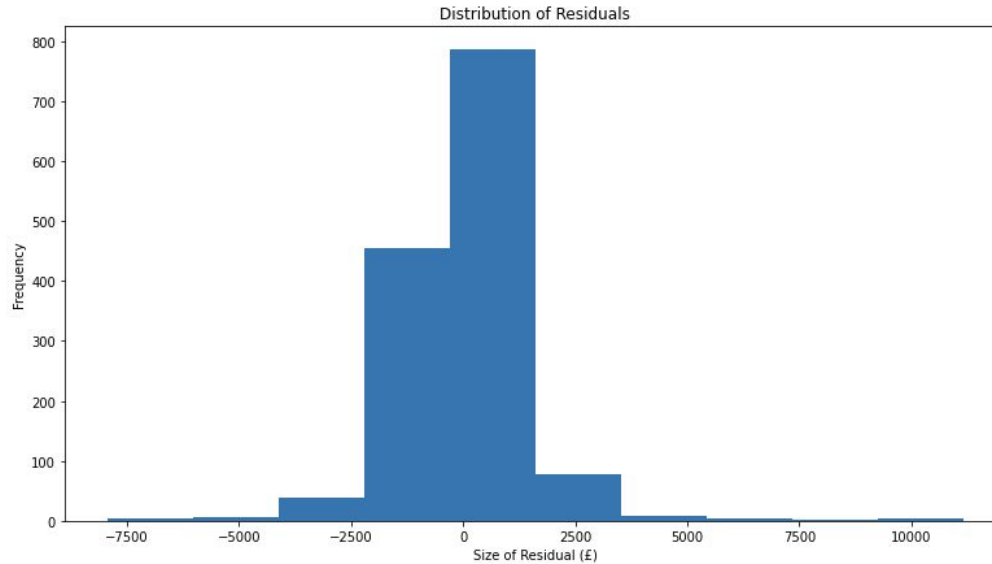
Null Model Metrics

- 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

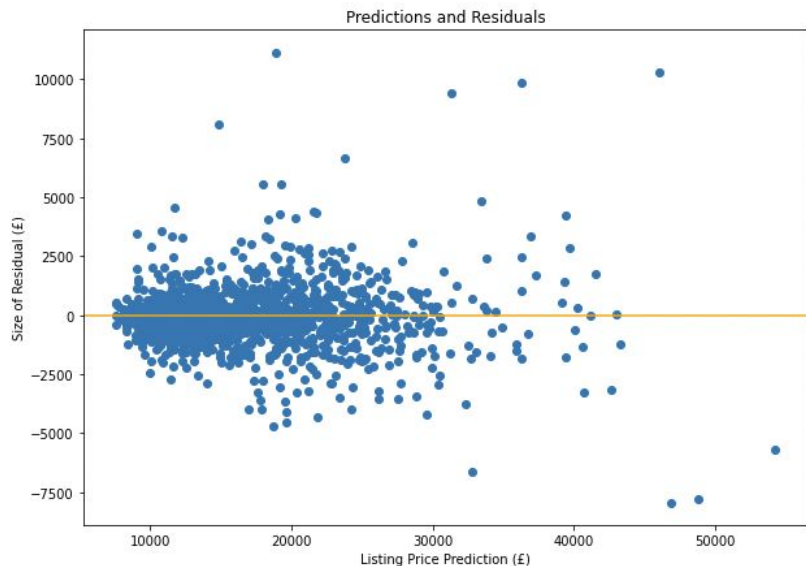
The Model tends to predict slightly higher car listing prices

Histogram of Residuals

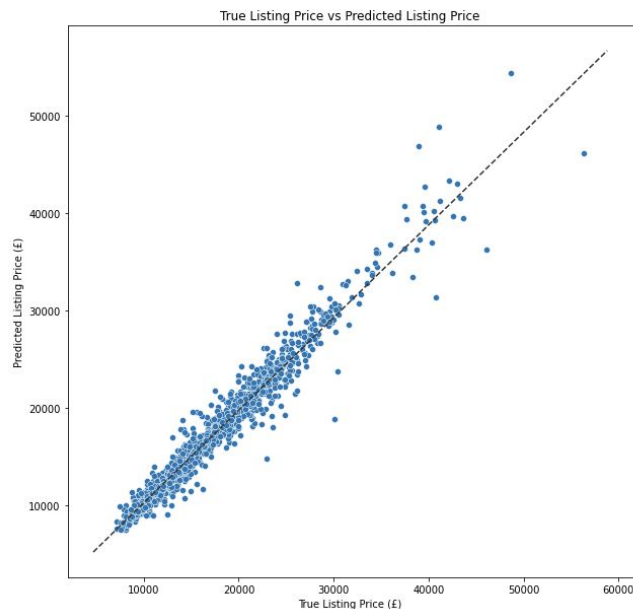


The Model excels at predicting listing prices of $< \text{£}30,000$

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?