ReCell Project
Business Presentation

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Business Problem Overview and Solution Approach

- ReCell is a startup aiming to tap the rising potential of the comparatively under-the-radar used phone market, which is predicted to be worth $52.7bn by 2023 by the International Data Corporation.

- Refurbished and used devices provide cost-effective alternatives to both consumers and businesses that are looking to save money when purchasing a smartphone. They can be sold with warranties and can also be insured with proof of purchase. Maximizing the longevity of mobile phones through second-hand trade also reduces their environmental impact and helps in recycling and reducing waste.

- With third-party vendors/platforms, such as Verizon, Amazon, etc., providing attractive offers for refurbished smartphones, along with the impact of the COVID-19 outbreak, the used and refurbished phone market has a good chance of getting a significant boost.

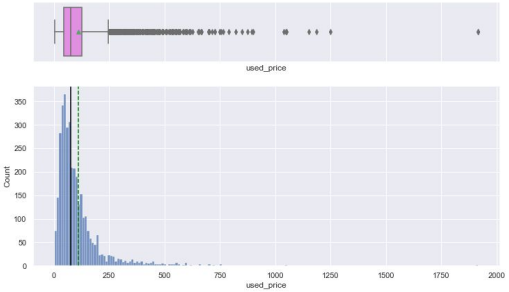
- The task at hand is to analyze the data provided and develop a dynamic pricing strategy for used and refurbished smartphones using a linear regression model and identify factors that significantly influence the price of a used phone.

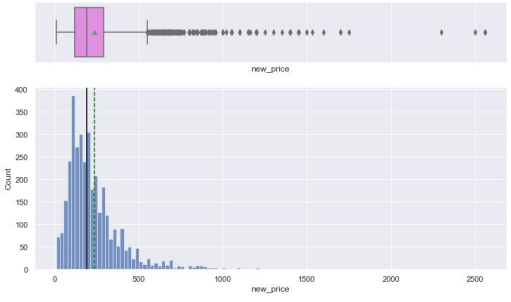
Data Overview

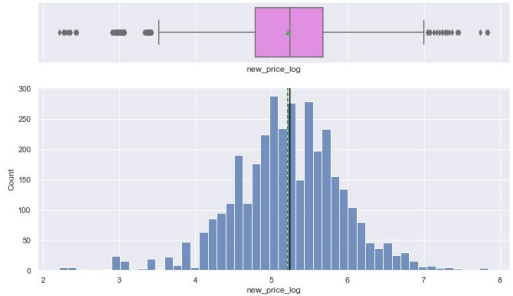
- The data contains information about 3571 phones and their characteristics.
- The characteristics include phone brand, availability of 4G and 5G, screen size, weight, storage capacity, amount of RAM, used model price, new model price, and more.
- Some columns (like weight and screen size) have some extreme and irregular values, which warrants an anomaly check.
- We will determine price segments based on the price of a new model of the used phone being sold.
- We will also apply a log transform to our target variable (used_price) to deal with skewness and ensure that the assumptions of linear regression are satisfied.

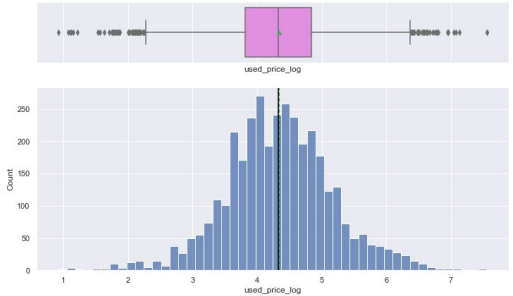
Exploratory Data Analysis

- The prices of used phones and their new models are heavily skewed.
- Log transform has been applied to both to reduce the extreme skewness.



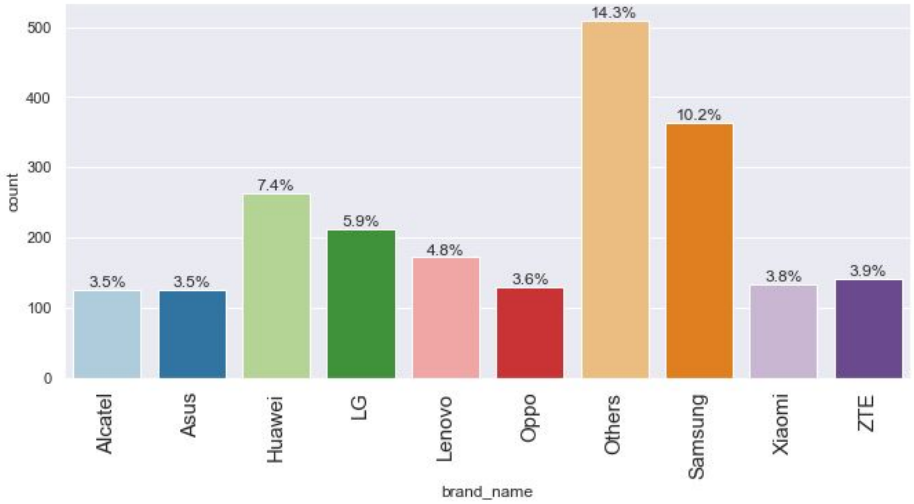


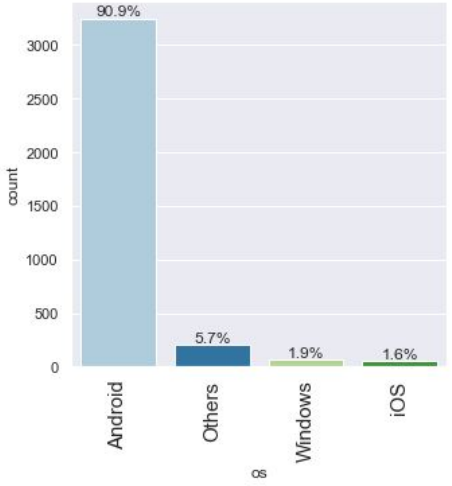


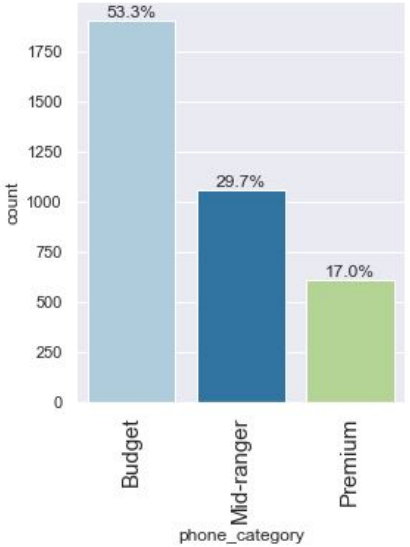


Exploratory Data Analysis

- Samsung has the most number of phones in the data, followed by Huawei and LG.
- Android phones dominate more than 90% of the market.
- More than 50% of the phones in the data are budget phones.

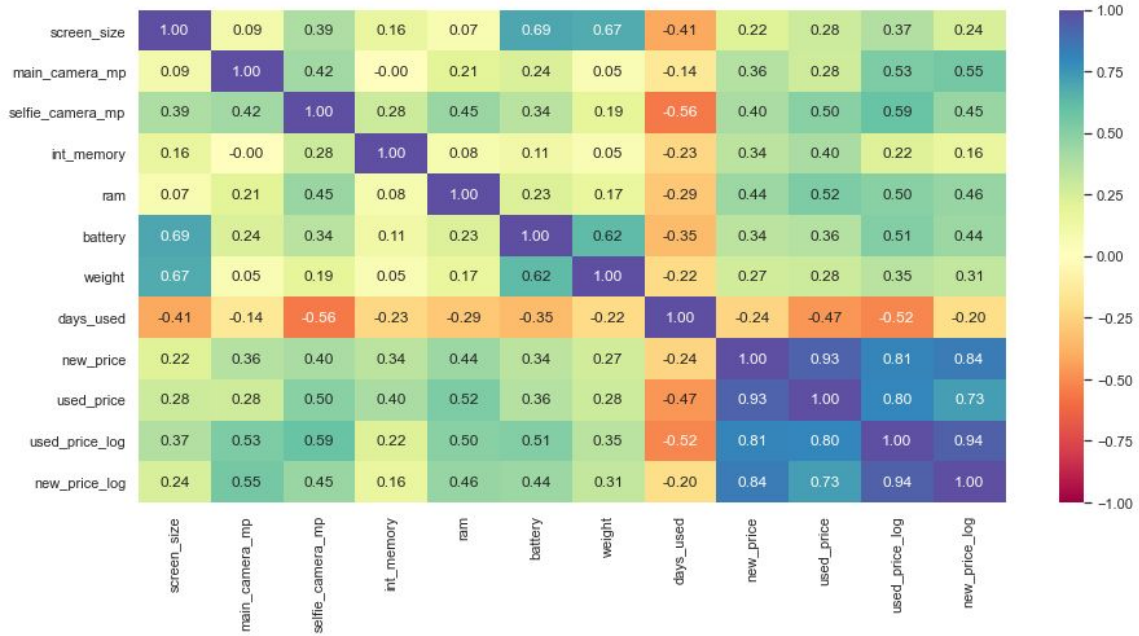






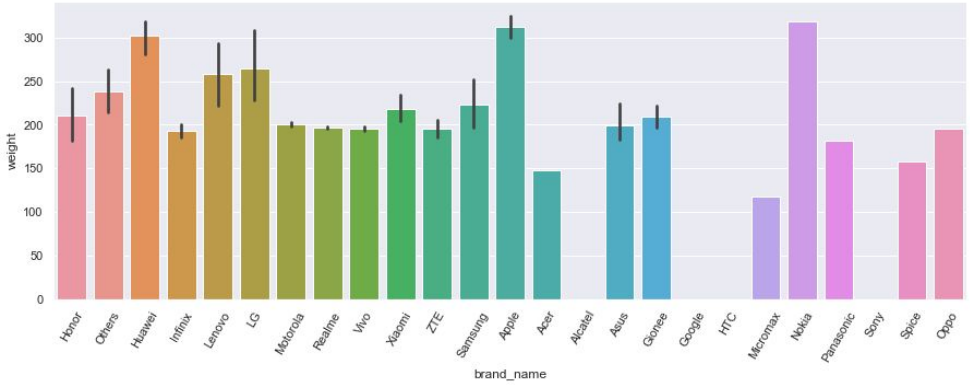
Exploratory Data Analysis

- The used phone price is highly correlated with the price of a new phone model, which makes sense as the price of a new phone model is likely to affect the used phone price.
- Weight, screen size, and battery capacity of a phone show a good amount of correlation. This makes sense as larger battery capacity requires bigger space, thereby increasing phone screen size and phone weight.
- The release year of the phones and the number of days it was used are negatively correlated.

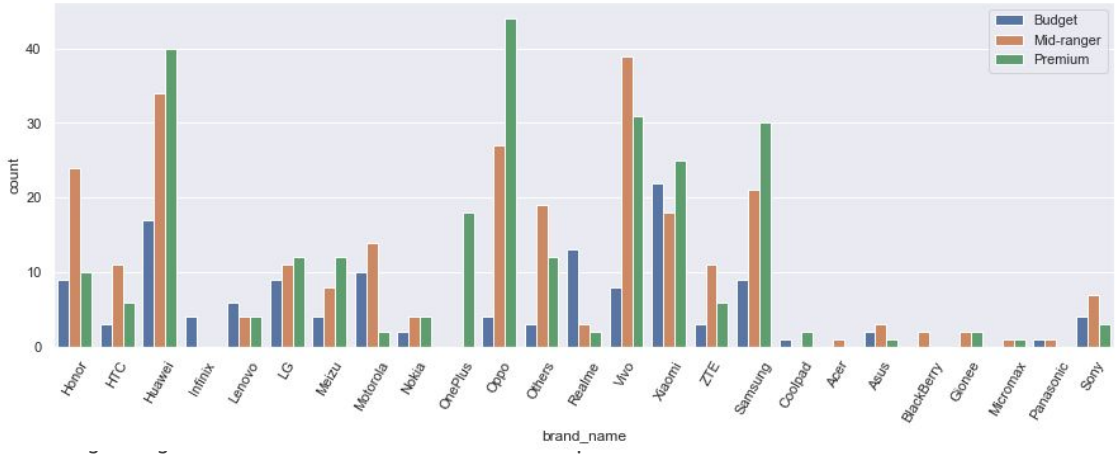


Exploratory Data Analysis

- A lot of brands offer phones which are not very heavy but have a large battery capacity. Phones from Vivo, Realme, Motorola, etc. weigh just about 200g but offer great batteries. They will be suitable for people who travel frequently

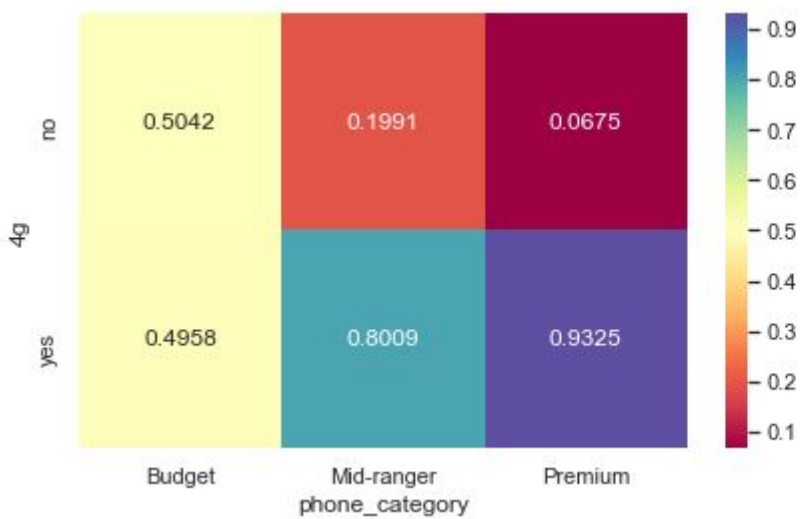


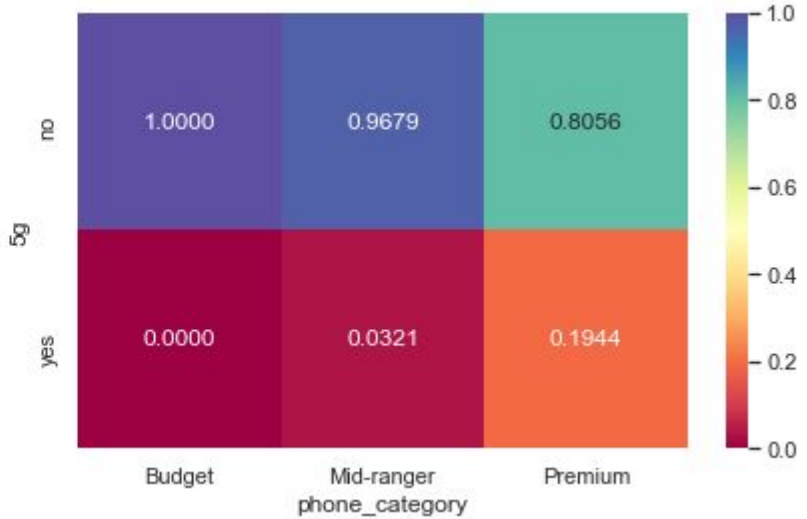
- Customers specifically look for good front cameras to click cool selfies can consider Huawei as the go-to brand as they offer many phones across different price ranges with powerful front cameras.



Exploratory Data Analysis

- While the distribution of 4G and non-4G budget phones is almost equal, there are no budget phones offering 5G network.
- Most of the mid-rangers and premium phones offer 4G network.
- Very few mid-rangers (~3%) and around 20% of the premium phones offer 5G mobile network.





Model Performance Summary

- We want to predict the price of a used phone based on the characteristics provided to us.
- We have used the normalized version 'used_price_log' for building a robust Linear Regression model using the train data and check the performance on test data to understand the predictive power of our model.
- The model indicates that the most significant predictors of the used phone price are:
  - Price of a new phone of the same model
  - Release year of the phone
  - Number of days it was used
  - Availability of 5G network

Model Performance Summary

- We have got an R-squared and adjusted R-squared of ~0.99, which is a clear indication that we have been able to create a very good model that is able to explain variance in the price of used phones up to 99%.

Data	RMSE	MAE	MAPE
Train	11.45	7.09	7.04
Test	11.36	7.22	7.03

- Mean Absolute Error indicates that our current model is able to predict used phone prices within a mean error of 7.22 euros on the test data.
- MAPE is around 7% on the test data, which means that we are able to predict within 7% of the price value.

Business Insights and Recommendations

- The model explains 99% of the variation in the data and can predict within 7.2 euros of the used phone price.
- The most significant predictors of the used phone price are the price of a new phone of the same model, the release year of the phone, and the number of days it was used.
- One percent increase in new phone price will result in a one percent increase in the used phone price.
- A unit increase in the number of days used decreases the used phone price by 0.11%.

Business Insights and Recommendations

- The model can be used for predictive purposes as it can make predictions within ~7% of the actual price.
- ReCell should look to attract people who want to sell used phones which have been released in recent years and have not been used for many days.
- They should also try to gather and put up phones having a high price for new models to try and increase revenue.
    - They can focus on volume for the budget phones and offer discounts during festive sales on premium phones.
- Additional data regarding customer demographics (age, gender, income, etc.) can be collected and analyzed to gain better insights into the preferences of customers across different segments.

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