Cell Phone Price Analysis and Prediction

Cell Phones and mobile phones are one of the most used electronic gadgets now these days. All through the year, there are several promotional offers that attract the customers to buy new phones or update their mobile phones as per their choice. I am planning to do some analysis on mobile phone data.

Business Problem: Guessing mobile phone prices is not easy, now these days there are several features in the cell phones and prices vary through a wide range. The prices of cell phone also change quickly, I am planning to do some analysis of the cell phone data and trying to fit a model on the dataset that can predict the phone price range on the basis of different features it has.

Dataset: The dataset have different attributes and features of cell phones, below are the dataset link along with the column description.

https://www.kaggle.com/datasets/atefehmirnaseri/cell-phone-price/data

battery_power : Total energy of the battery can be stored(mAh)

blue : the device has blutooth or not, yes/no (1/0)

clock_speed : the speed of execution of instructions by microprocessor

dual_sim : the device has two SIM card at the same time or not

fc : the quality of front camera in MegaPixel

four_g : the device has 4G network or not

int_memory : internal memory in GigaByte

m_dep : the device depth in CM

mobile_wt : the weight of device

n_cores : the number of processor cores

pc : the quality of primary camera in MegePixel

px_height : the height of pixel resolution

px_width : the width of pixel resolution

ram : random access memory in MegaByte

sc_h : the height of device screen in CM

sc_w : the width of device screen in CM

talk_time : the maximum talk time that the full charge battery of the device can support

three_g : the device has 3G network or not

touch_screen : the device has touch screen or not

wifi : the device has wifi or not

price_range : the categorized price of the device

Methods: I am planning to analyze different attributes or features of cell phones and will try to find if those attributes have a direct impact on cell phone price categories. I am also planning to choose multiple models to predict the categories of cell phone price and do a model level comparison to identify which model is better fit for this prediction.

Ethical Considerations: This data does not include any brand information about cell phones or information about customers who use these mobiles. So personal identifiable information wise we are good, we also must consider the social economic ethical considerations while fitting the model or predicting the price categories of mobile phones. If our predications are not correct then it will impact the purchase of corresponding features of the cell phone and impact the reputation of the cell phones that have corresponding features, say for example if we predicate the phone with dual sims with less price category by mistake, then people may avoid the phone models that have dual sims, so while doing the analysis on different prices on how the feature impact the prices of cell phones, have to be very careful and accurate while predicting.

Challenges/Issues: One of the major challenges I see here is four price categories for phone prices, so it's a multiclass classification problem. Neural Networks, K- Nearest Neighbour, Decision Tree, Naive Bayes are some of the models that is used in these scenarios. I will be continuing to do further research on this prediction method.

References:

Below are some of the references I am planning to use for this project.

https://en.wikipedia.org/wiki/Multiclass_classification
https://www.kaggle.com/code/atefehmirnaseri/mobile-price-eda-and-classification

https://www.kaggle.com/code/dimitriskatos/cell-phone-pred-accuracy-0-9
https://www.kaggle.com/code/zeynepsadkaylmaz/cell-phone-price-analys