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Samsung Innovation Campus

Presented By:

Artificial Intelligence Course

Together for Tomorrow!
Enabling People
Education for Future Generations

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AGENDA

Introduction

Some Information about the data

Data Analysis

Some visualization to discover the data

Data Preprocessing

How to make data available for modelling

Modelling

Predictions based on given data

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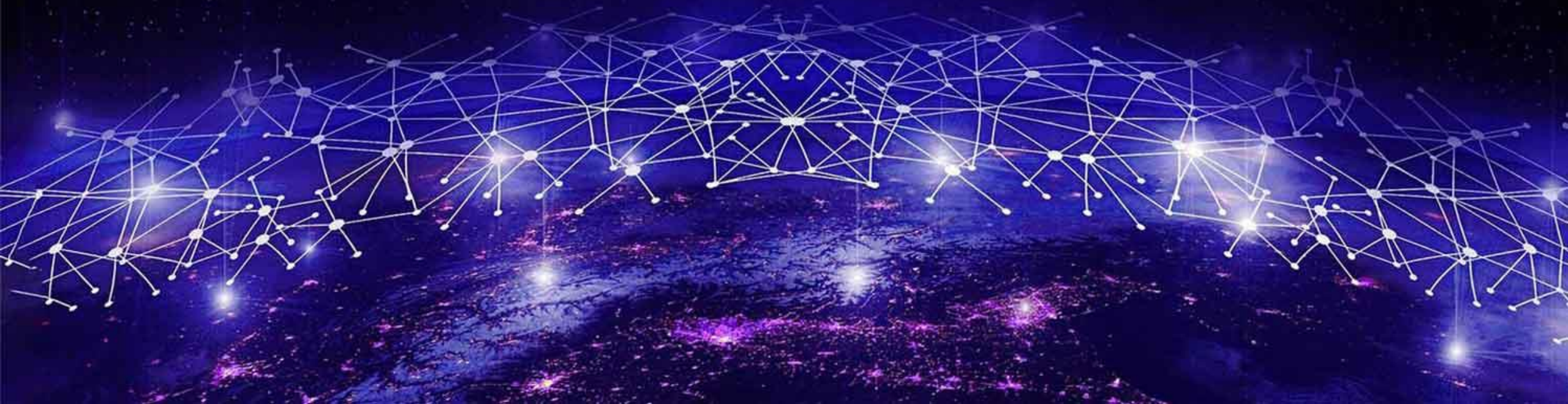
01 Introduction about Data

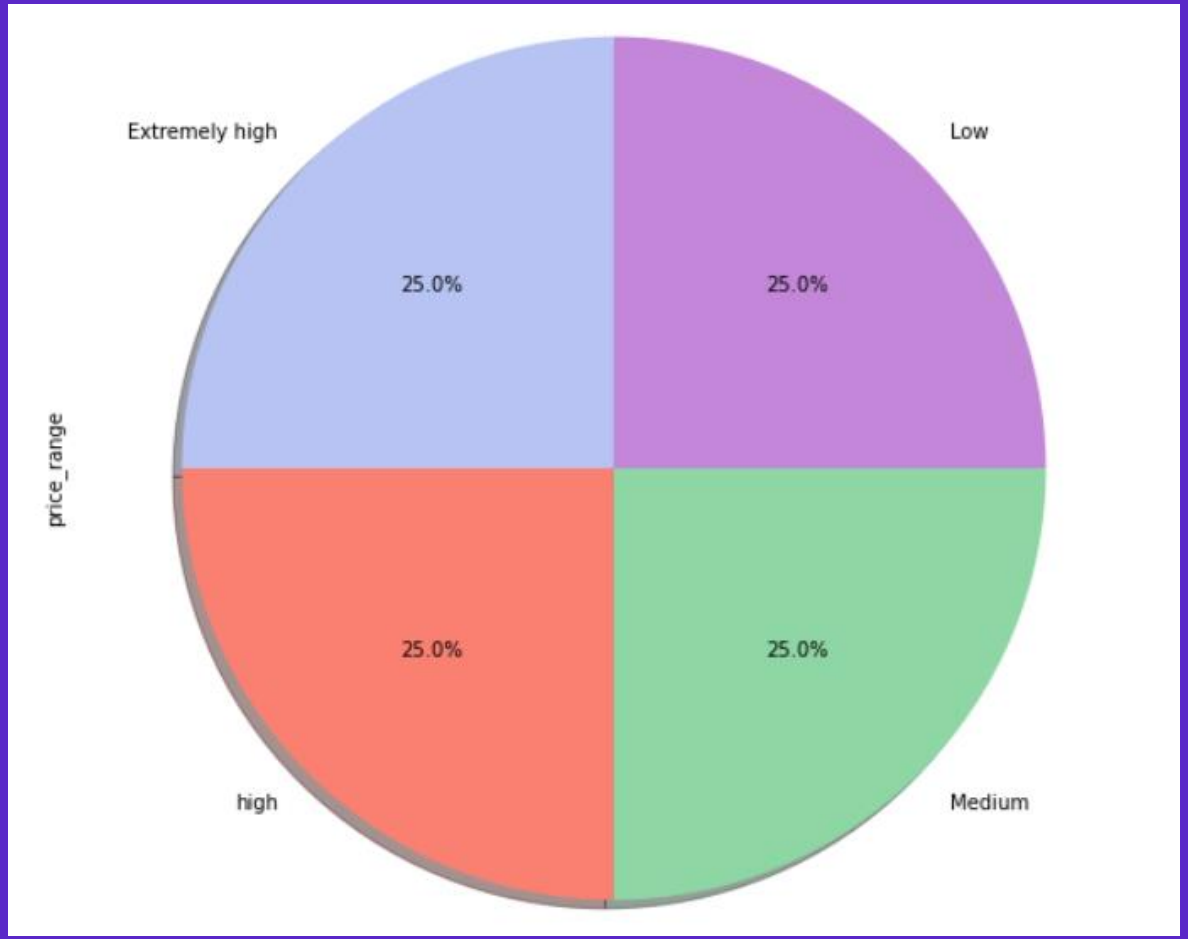


Data Informations:

Bob started his own mobile company and he wants to give a tough fight to big companies like Apple and Samsung.

He gathered data about different mobile Features to identify the price range of mobiles to his company.

The data is highly balanced and consists of 2000 rows and 21 columns.



Features

01 battery_power: Total energy a battery can store at a time

02 blue: If the mobile is supported with bluetooth or not

03 clock_speed: Speed of mobile processor in executing commands

04 dual_sim: has two SIM cards (1) or not (0)

05 fc: Front camera pixel

06 four_g: has 4G support (1) or not (0)

07 int_memory: Internal Memory (Gigabyte)

08 m_dep: Mobile Depth (cm)

09 n_cores: Cores number of microprocessor

Features

10 mobile_wt: wieght of mobile

11 pc: primary camera mega pixels

12 px_height: height of pixels resolution

13 px_width: width of pixels resolution

14 ram: random access memory (Megabytes)

15 sc_h: height of mobile screen(cm)

16 talk_time: longest time that a single battery charge will last when you are constantly talking on the phone

17 three_g: has 3G support (1) or not (0)

18 touch_screen: has touch screen (1) or not (0)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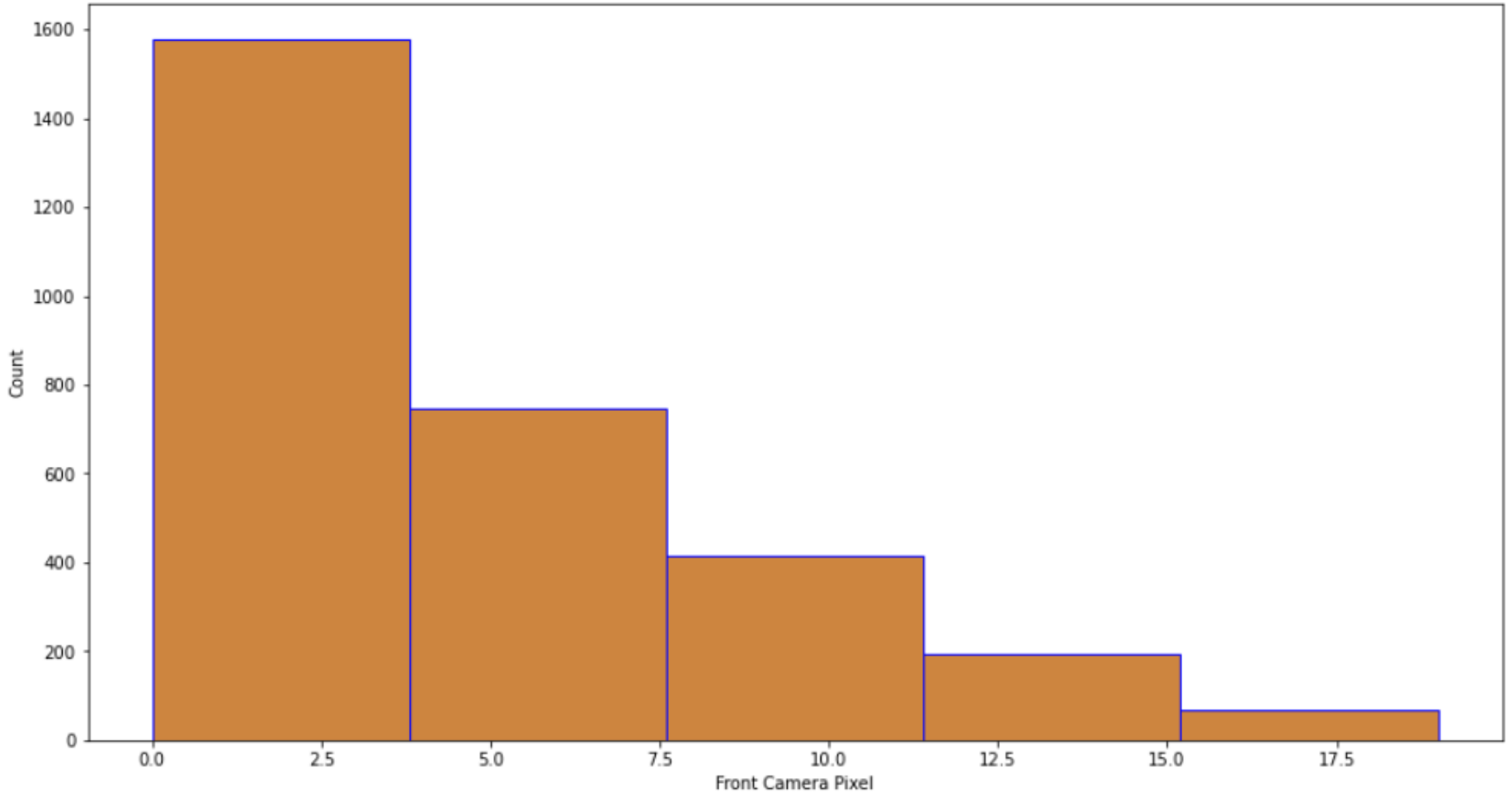
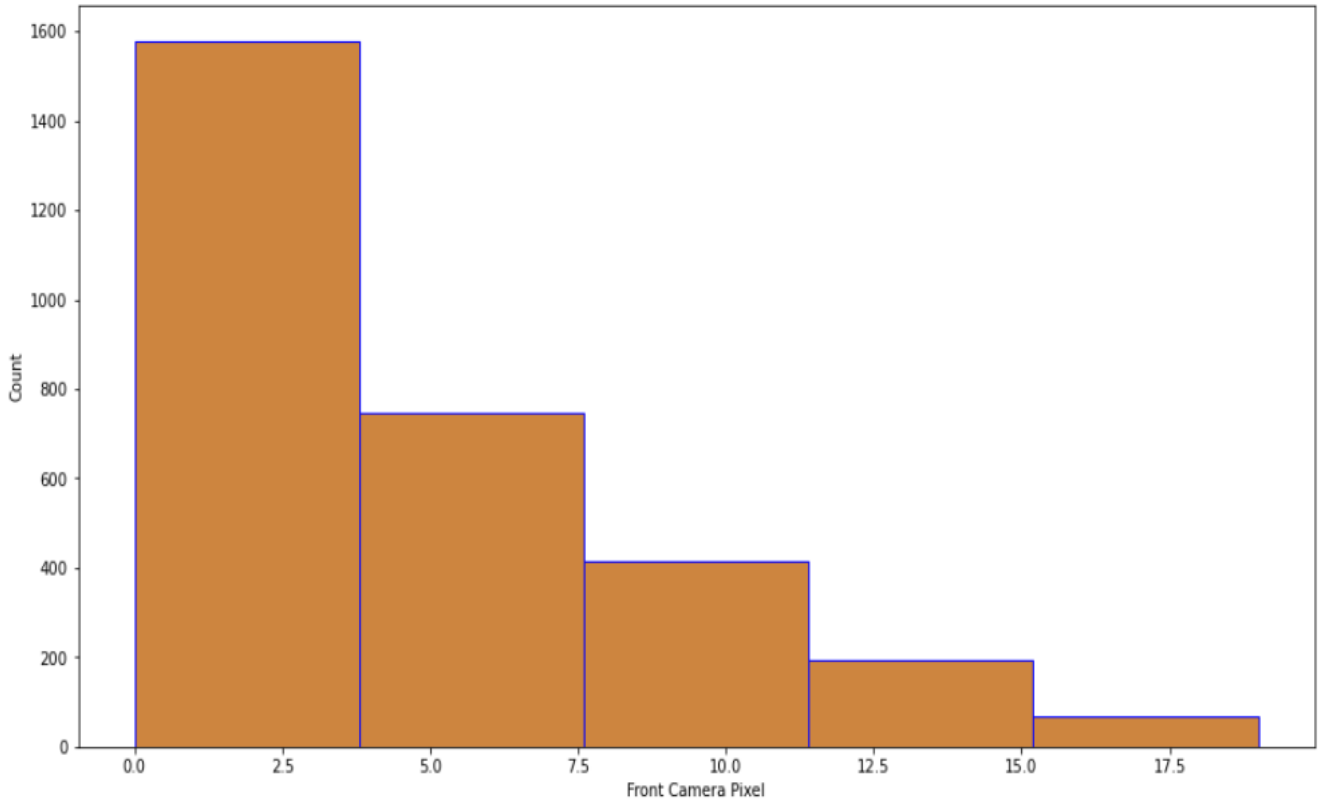
2. Data
Visualization

Price Range & Front Camera Pixel



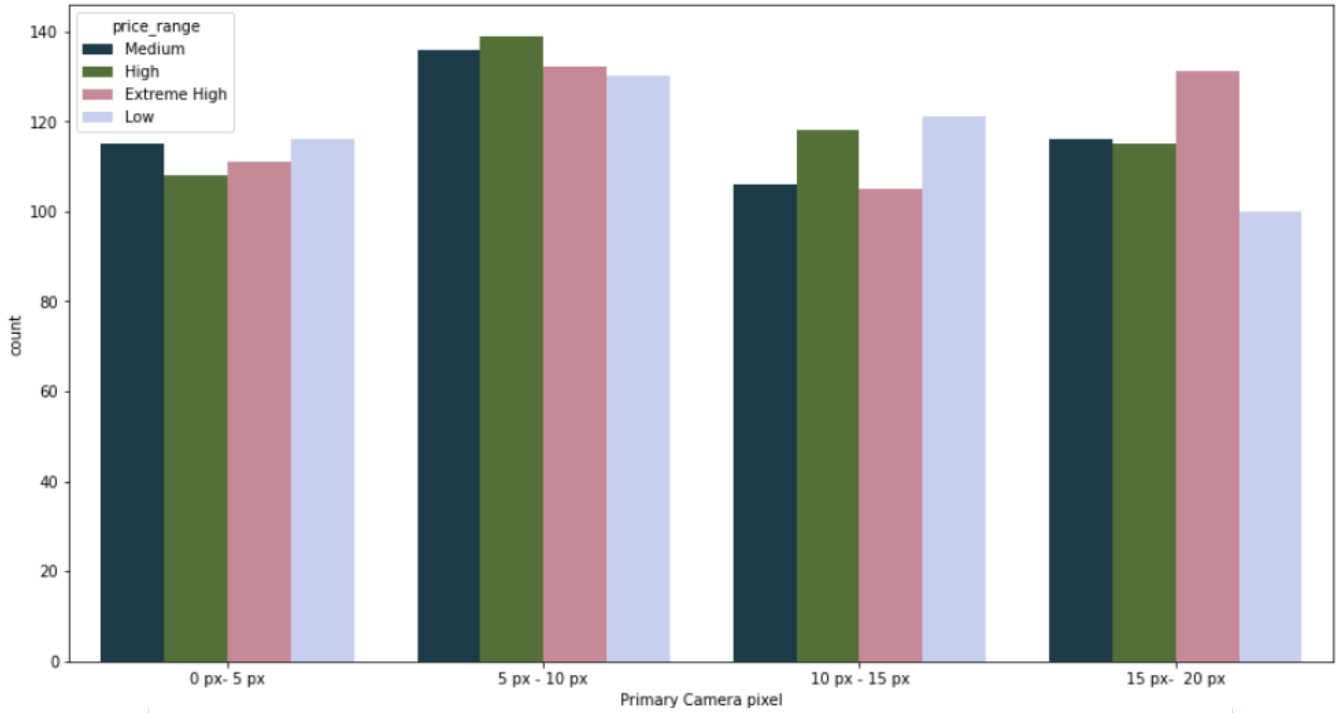
To display an image in UHD screen you only need about 8.3MP image and 12MP is the minimum resolution you need to record 4k UHD videos. So to have this feature companies pushed their cameras from 8 to 12MP, So anything above it is just plain overkill.

Price Range & Front Camera Pixel



It should be understood that a high megapixel count does not guarantee a high-quality image. However, it collects more information for a more detailed image, So When we capture an image and want to zoom on a subject, Higher megapixels cameras come handy.

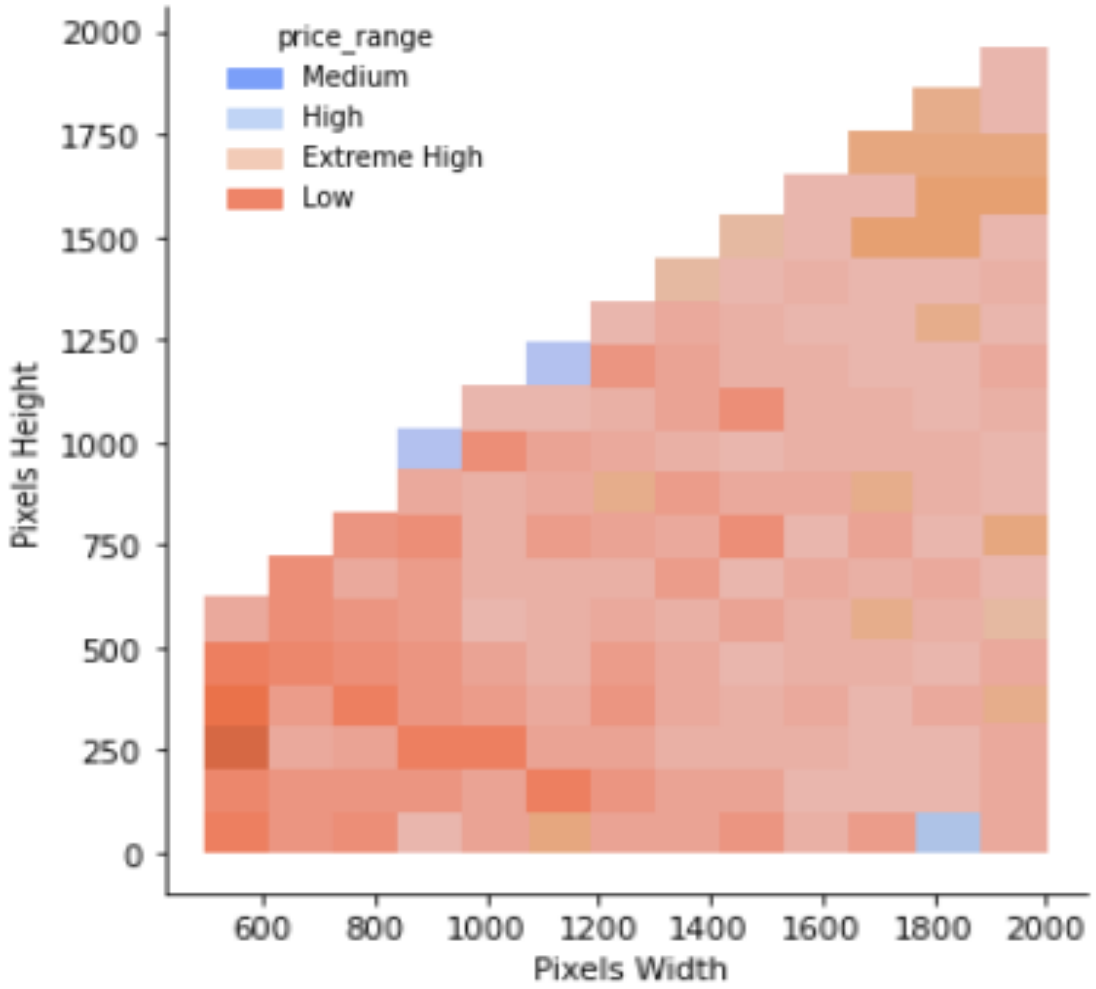
Price Range & Primary camera



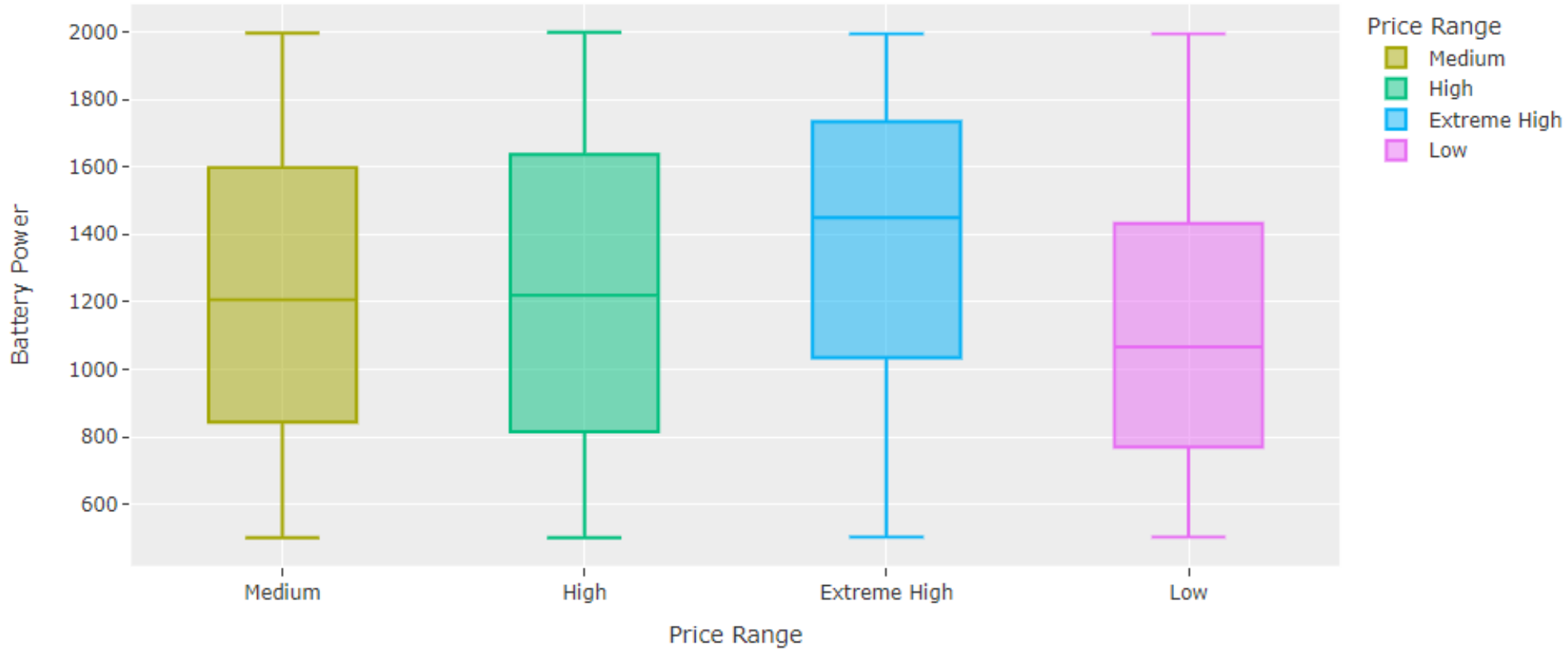
It is clear that the higher pixels a primary camera of mobile gives, the higher its price. Nowadays, Most people search for high-quality images, especially after the social media work market increase.

Price range & Pixels Resolution

As the pixels dimension a mobile provides increases, the price range increases due to the high-quality vision and high memory use.

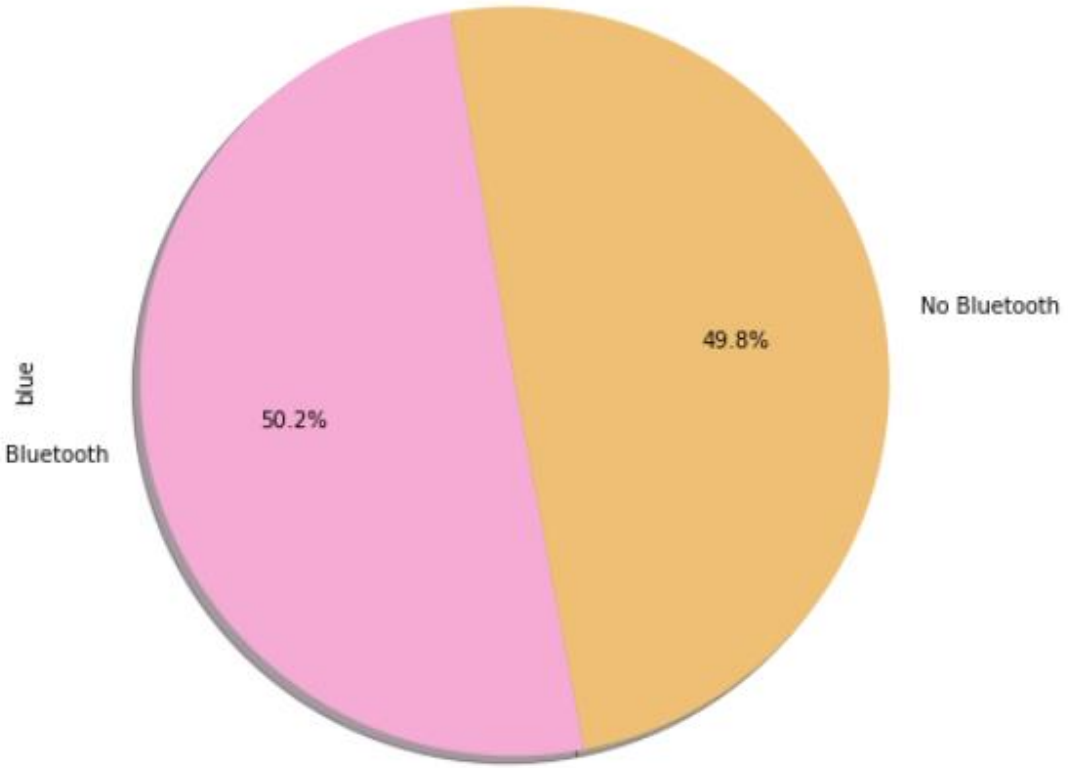


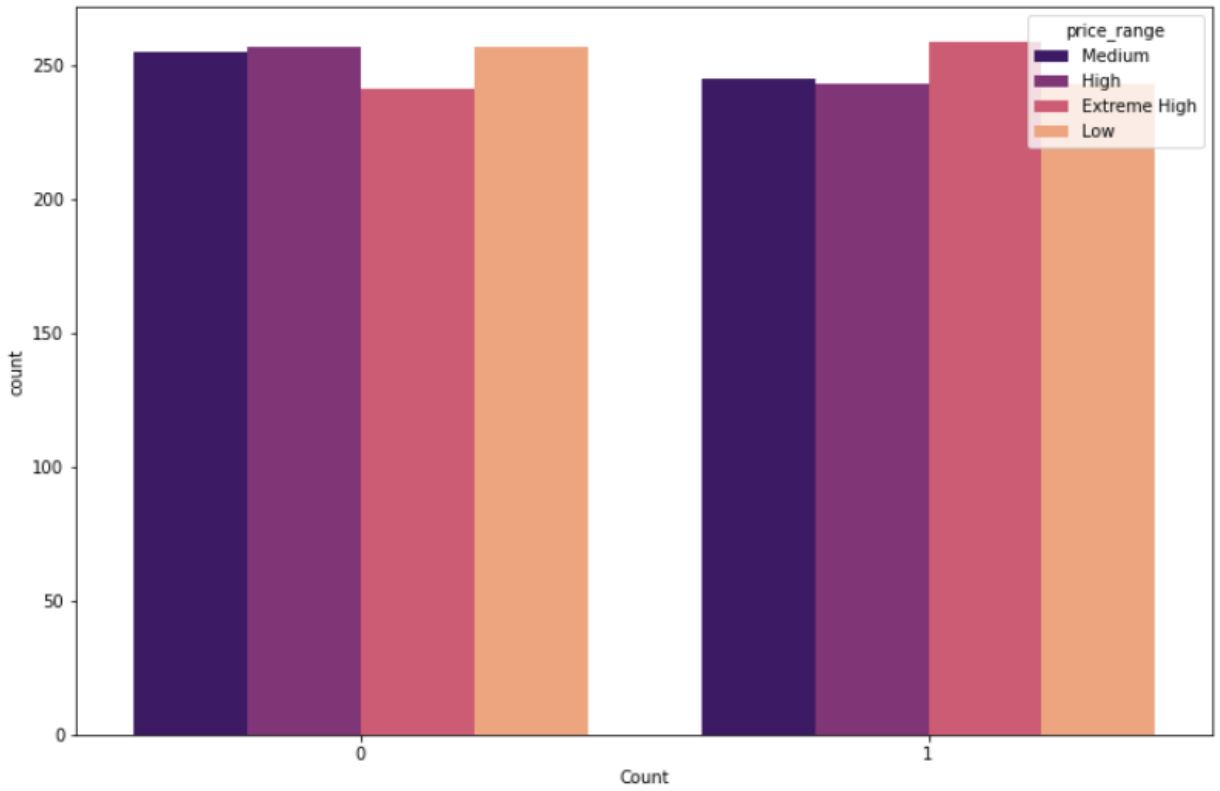
Price Range & Battery Power



To ensure a reliable long-term operation of smart devices, we should consider battery type, peak power consumption, wireless connectivity protocol, latency, throughput, and data transfer requirements.

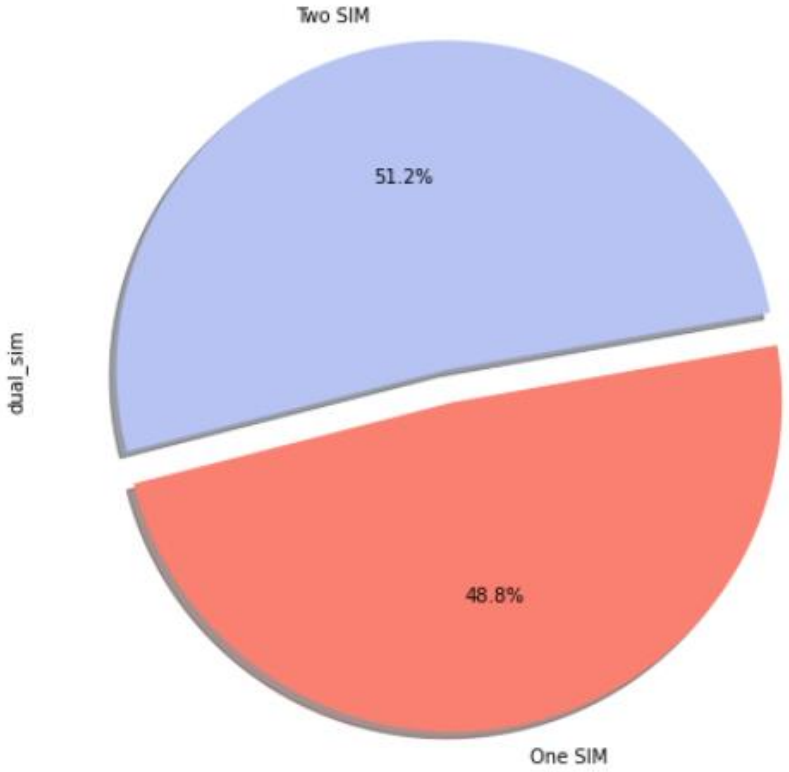
Price Range & Bluetooth

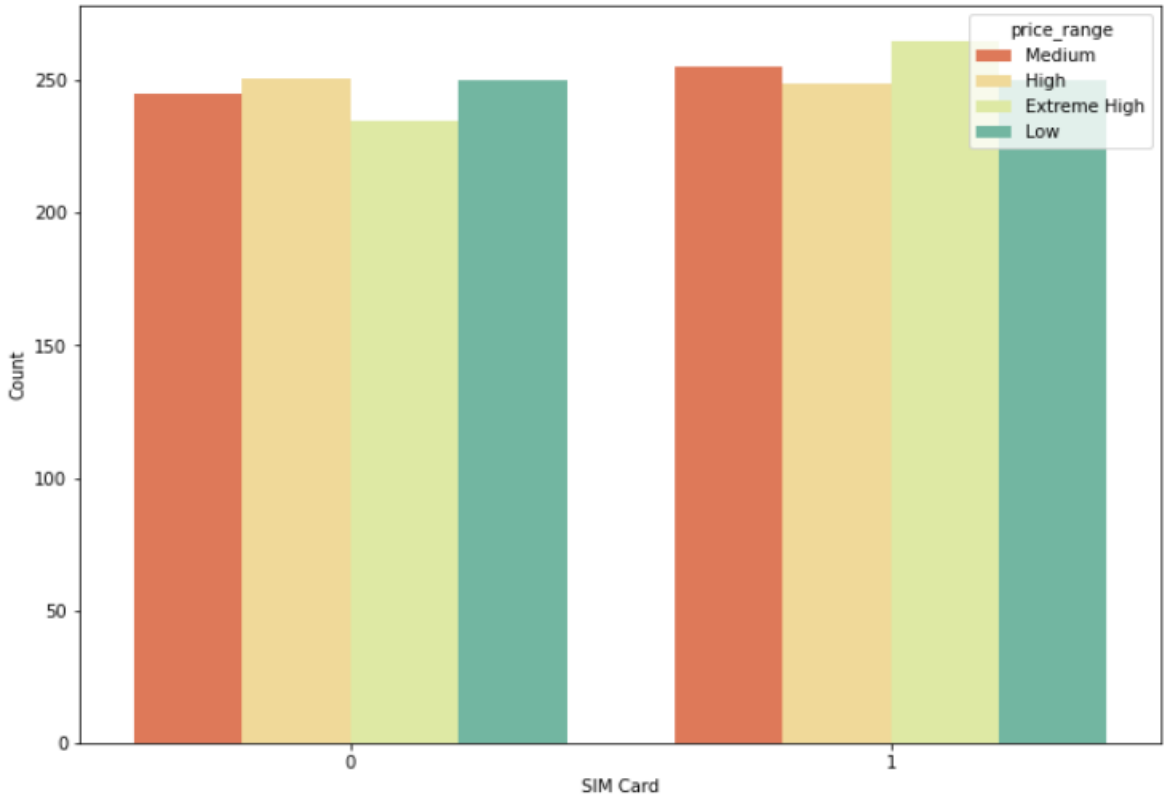




Bluetooth is mainly used as an alternative to wired connections, to transfer files between adjacent portable devices, and to pair wireless headphones and smartwatches with cell phones. (https://www.esrgear.com/blog/why-choose-a-dual-sim-smartphone-know-the-advantages-disadvantages/)

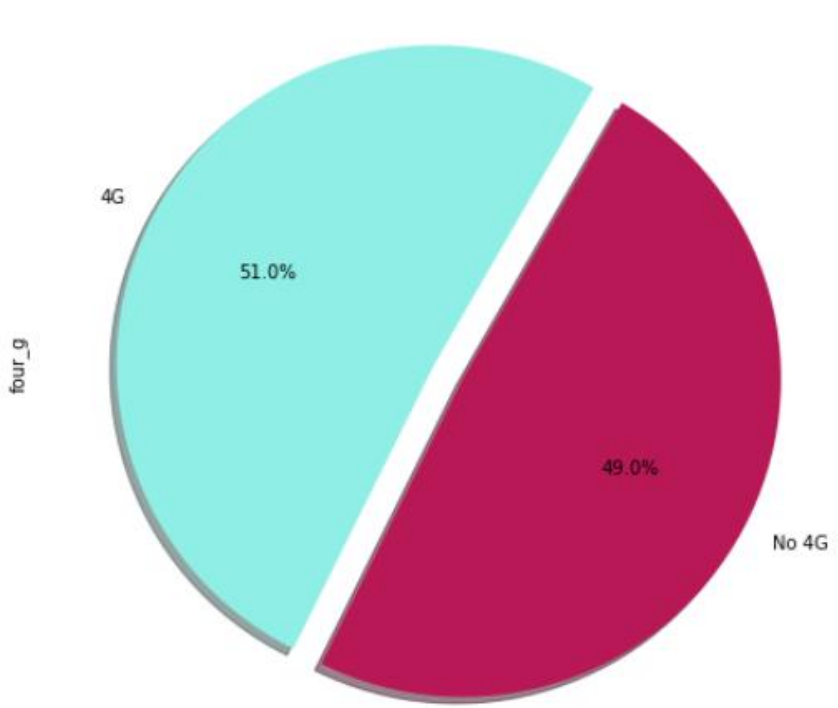
Price Range & SIM Card

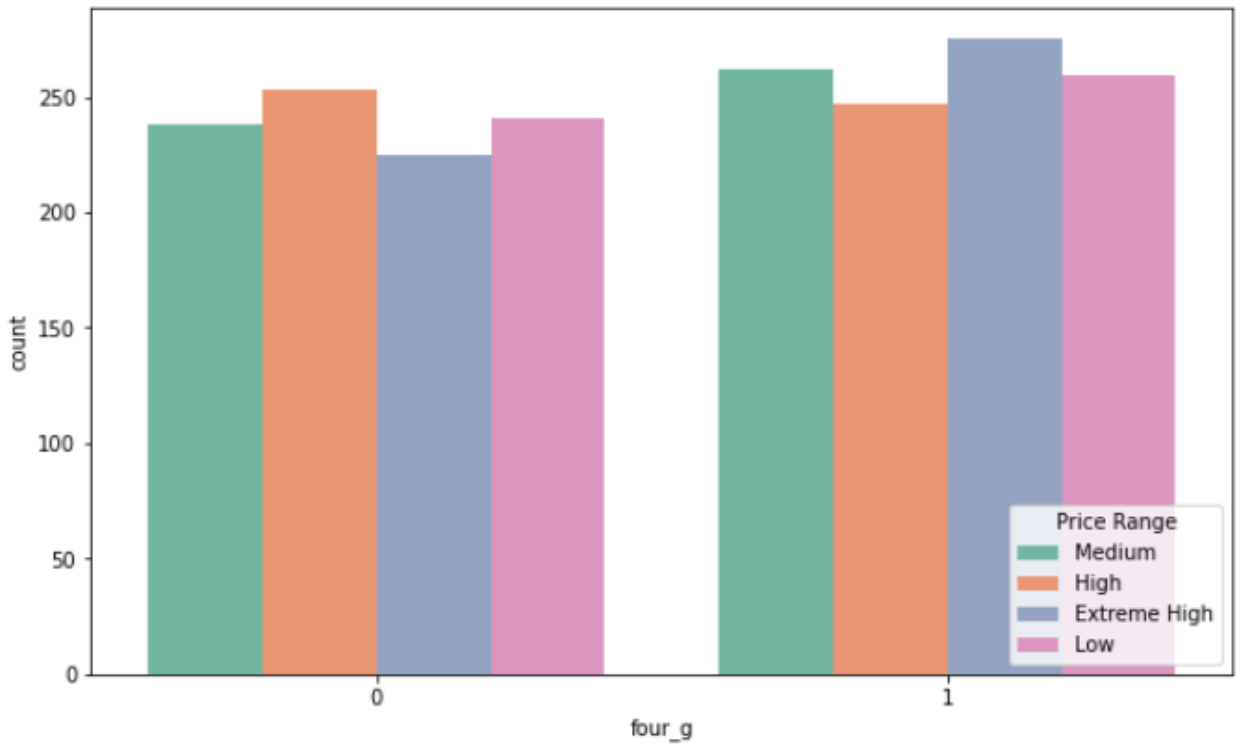




The main advantage of dual SIM mobile is allowing you to carry two mobile in one. However, it is not essential to most the people which express the equilibrium in this feature.

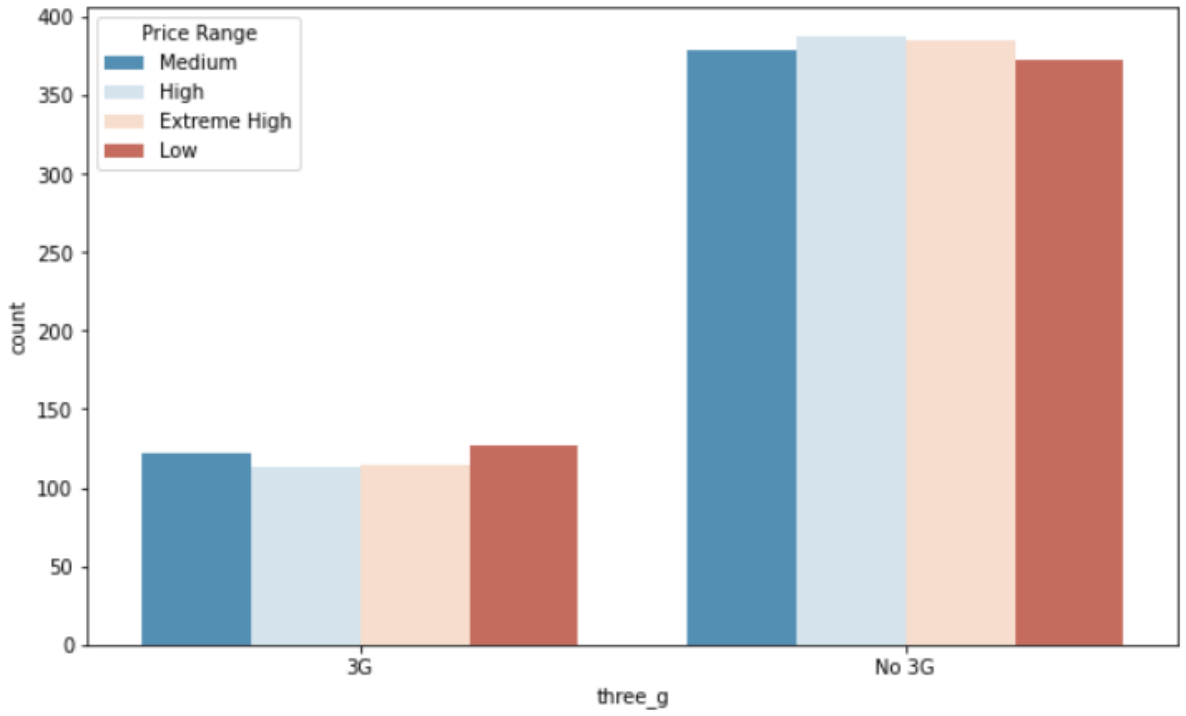
Price Range & 4G Property

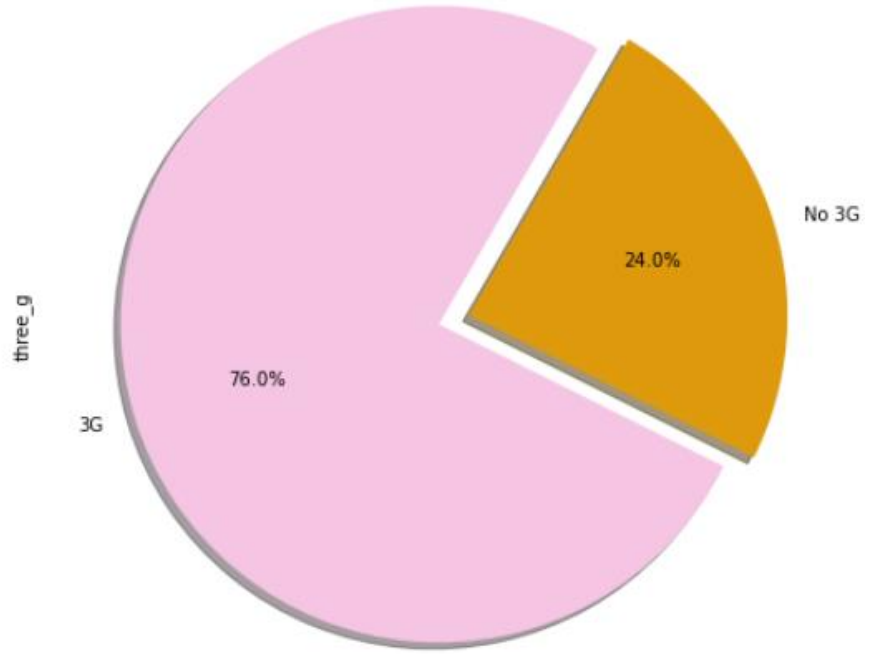




This property supports interactive multimedia, voice, video, wireless internet and high speed, high capacity and low cost per bit.

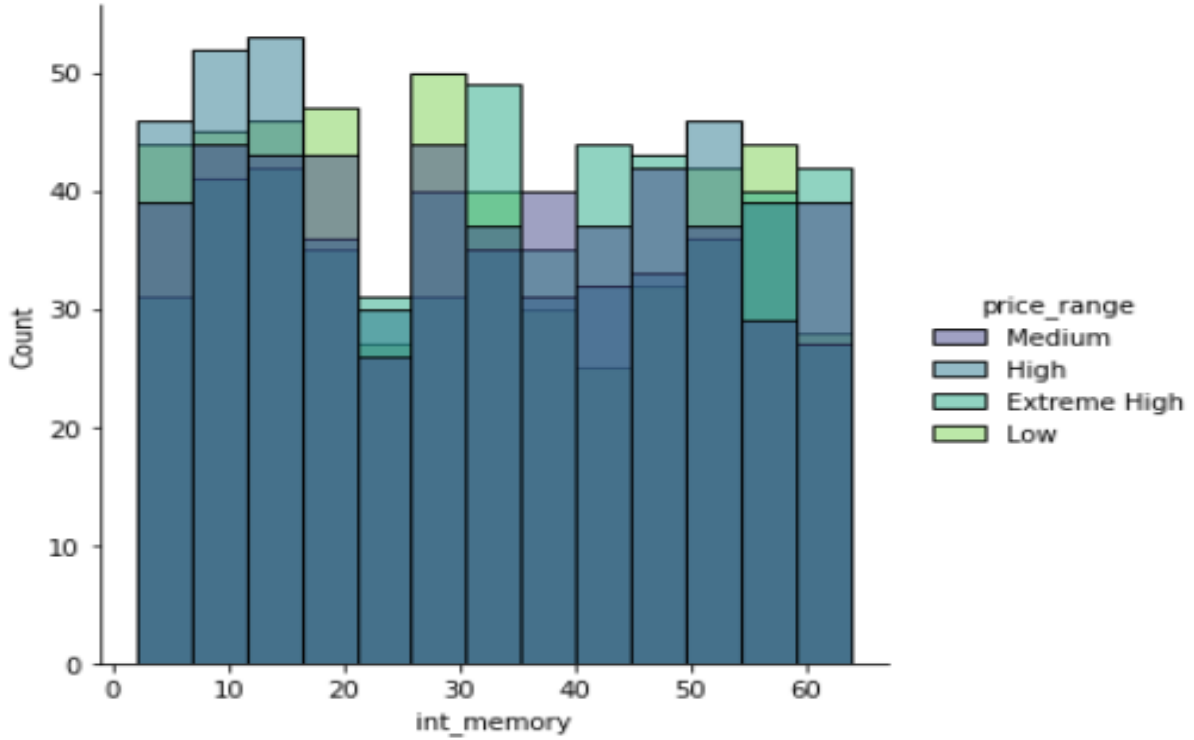
Price Range & 3G Property





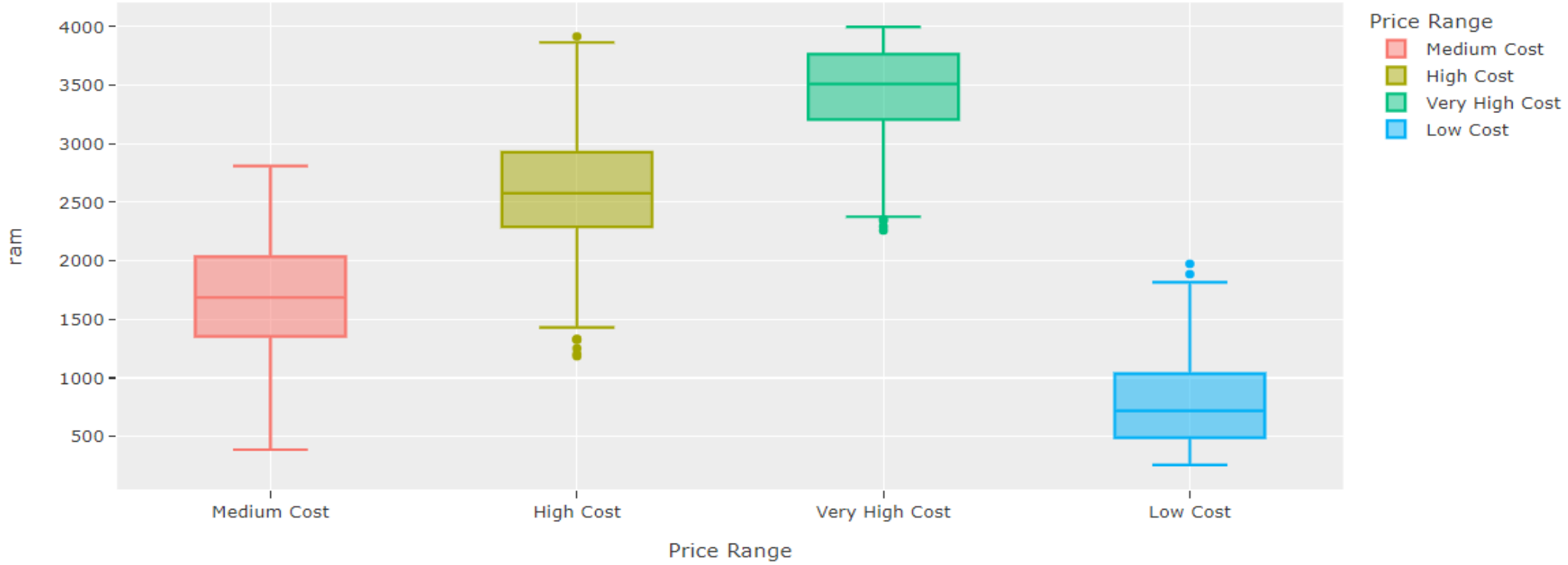
3G and 4G are both mobile data connections, but 3G is an older technology associated with the first wave of touch-screen smartphones. 4G is a newer technology that delivers much faster speeds and supports more intensive mobile activit.

Price Range & Internal memory



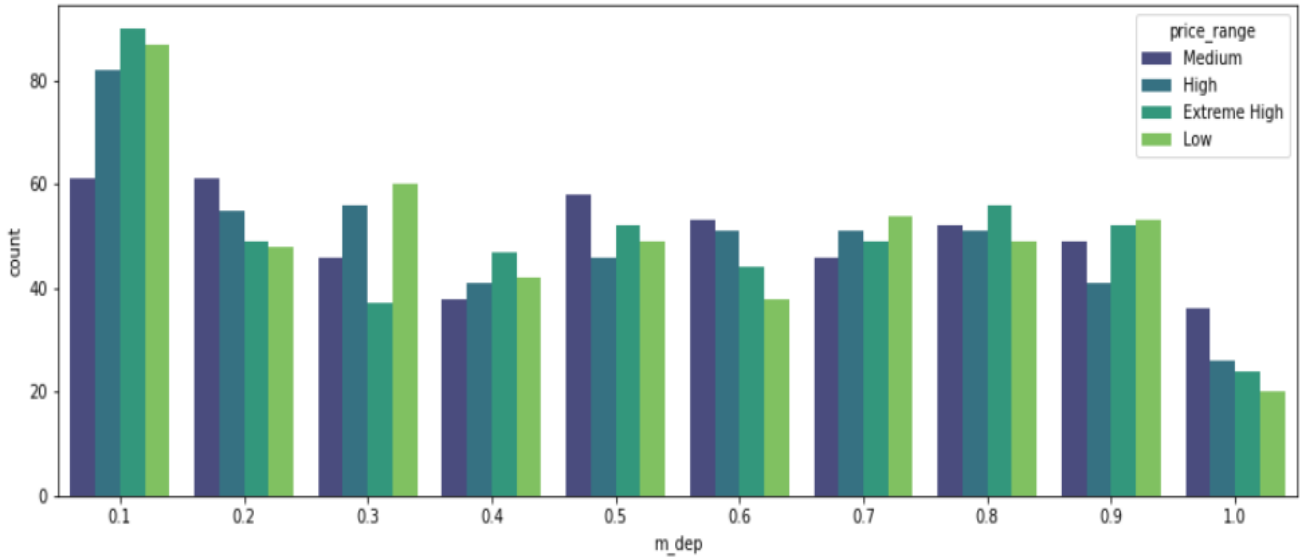
Flash memory is the one that store your programs, messages, contacts, appointments. If you want to download some games or applications then you'd need to take care about the memory issues, which can be not enough.

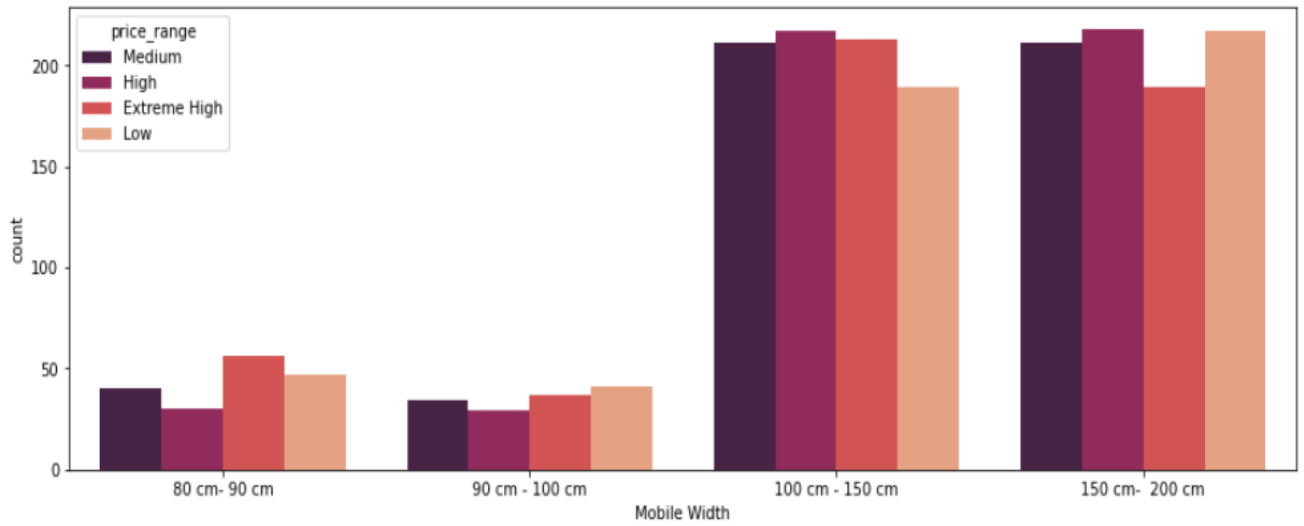
Price Range & Ram



RAM is a temporary memory used to run applications and programs. The stored data can be accessed in any order. Its random character refers to the idea that any piece of data can be quickly restored, no matter where it is located. (https://www.businessinsider.com/what-is-ram-and-why-it-matters-on-smartphones-2018-12)

Price Range & Mobile Dimension

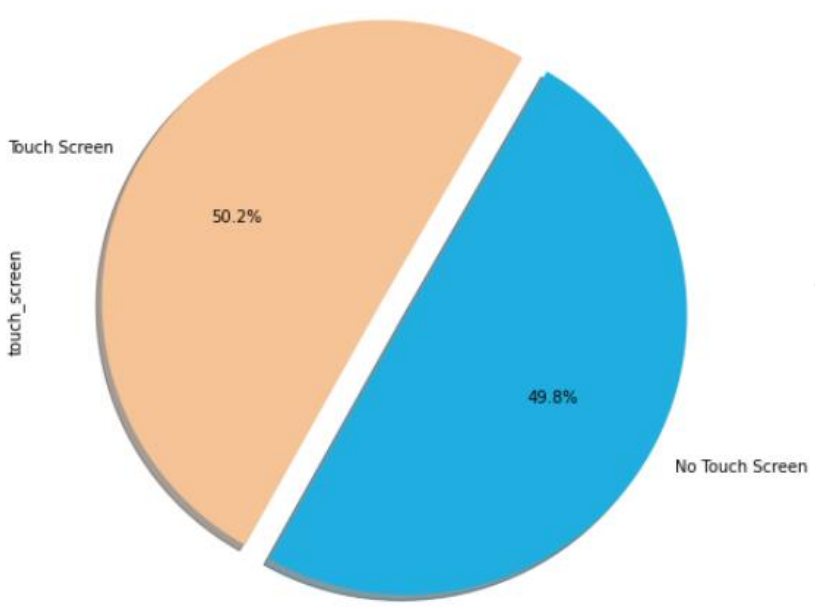


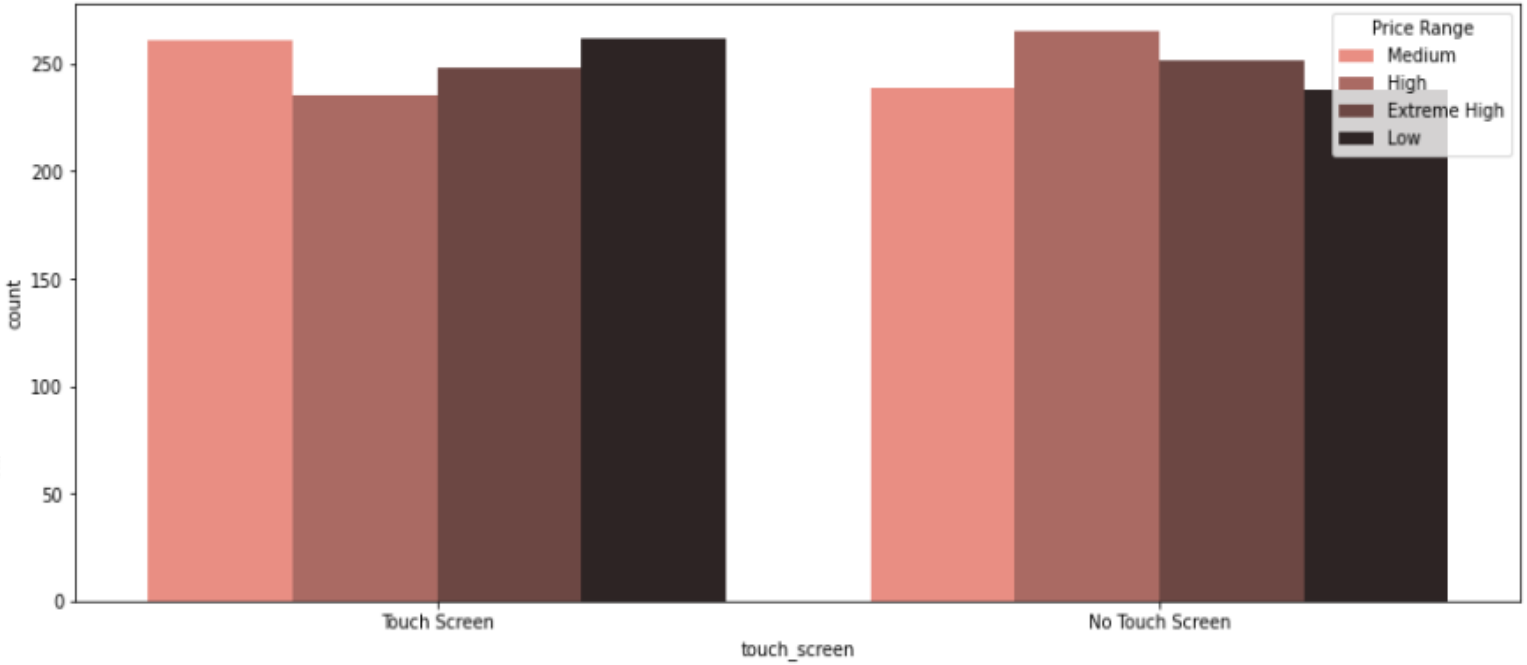


Most people prefer low-thickness mobile as it is easier to carry and hold, especially for the youth.

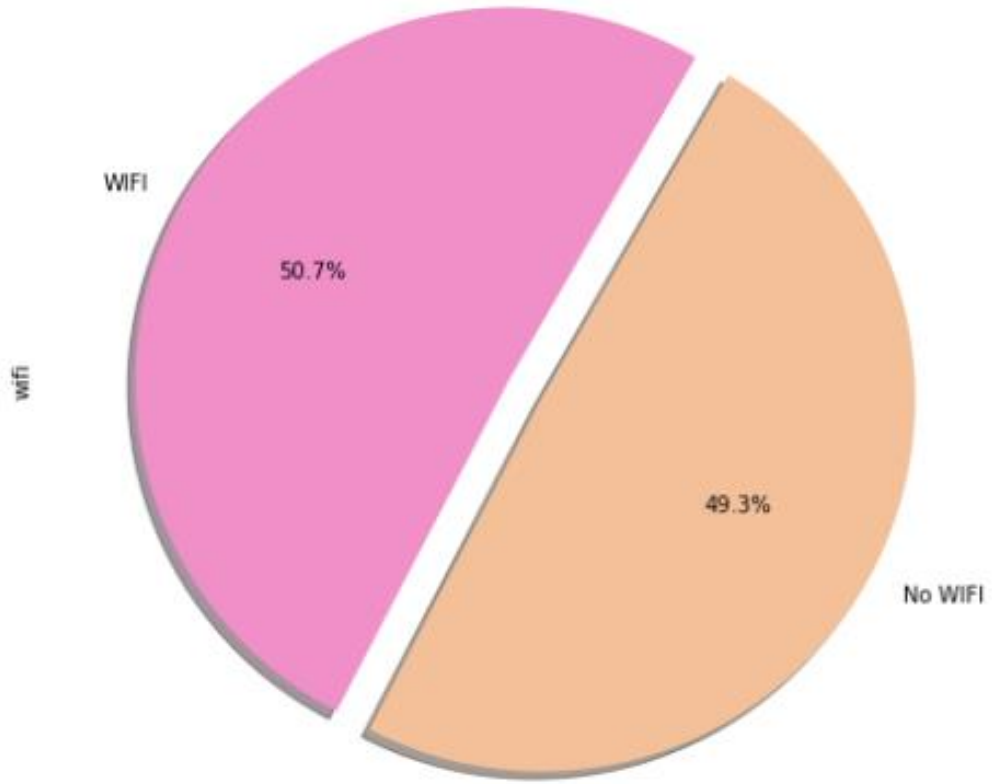
Also high width mobiles are highly preferred due to clear sight, Easier in reading articles and fantasy of watching movies.

Price Range & Touch Screen





Price Range & WIFI property



WIFI has become an important feature nowadays due to:

1. Online learning
2. Online Marketing and jobs
3. Distance Shortening

And other main parts that makes a mobile with this feature a valuable one.

(https://www.nibusinessinfo.co.uk/content/pros-and-cons-wireless-networking)

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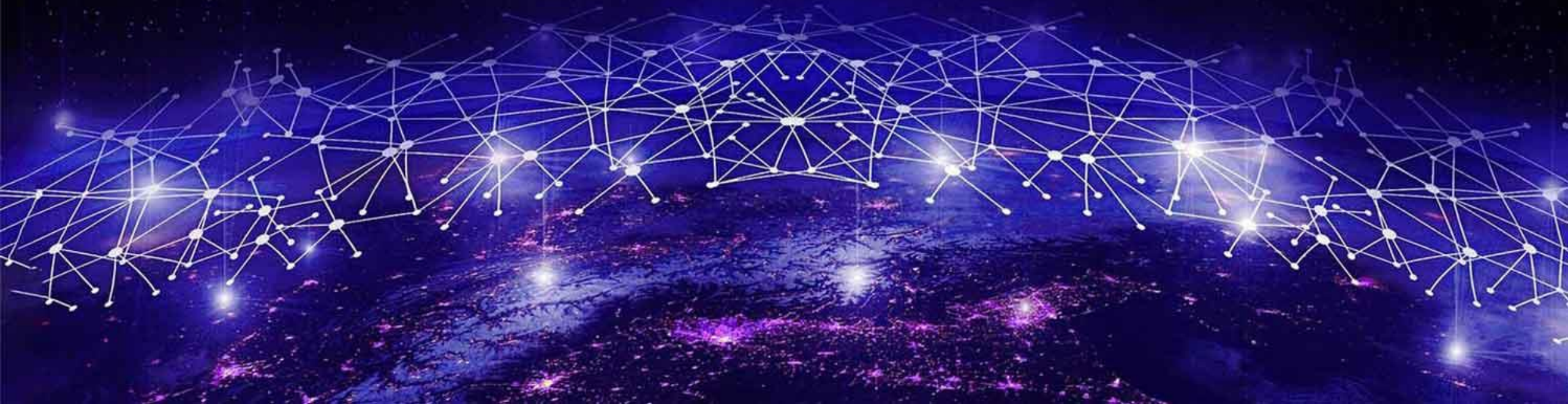
01 Data Preprocessing



MAIN STEPS

1. Missing Data Handling

No missing data

2. Handling Outliers

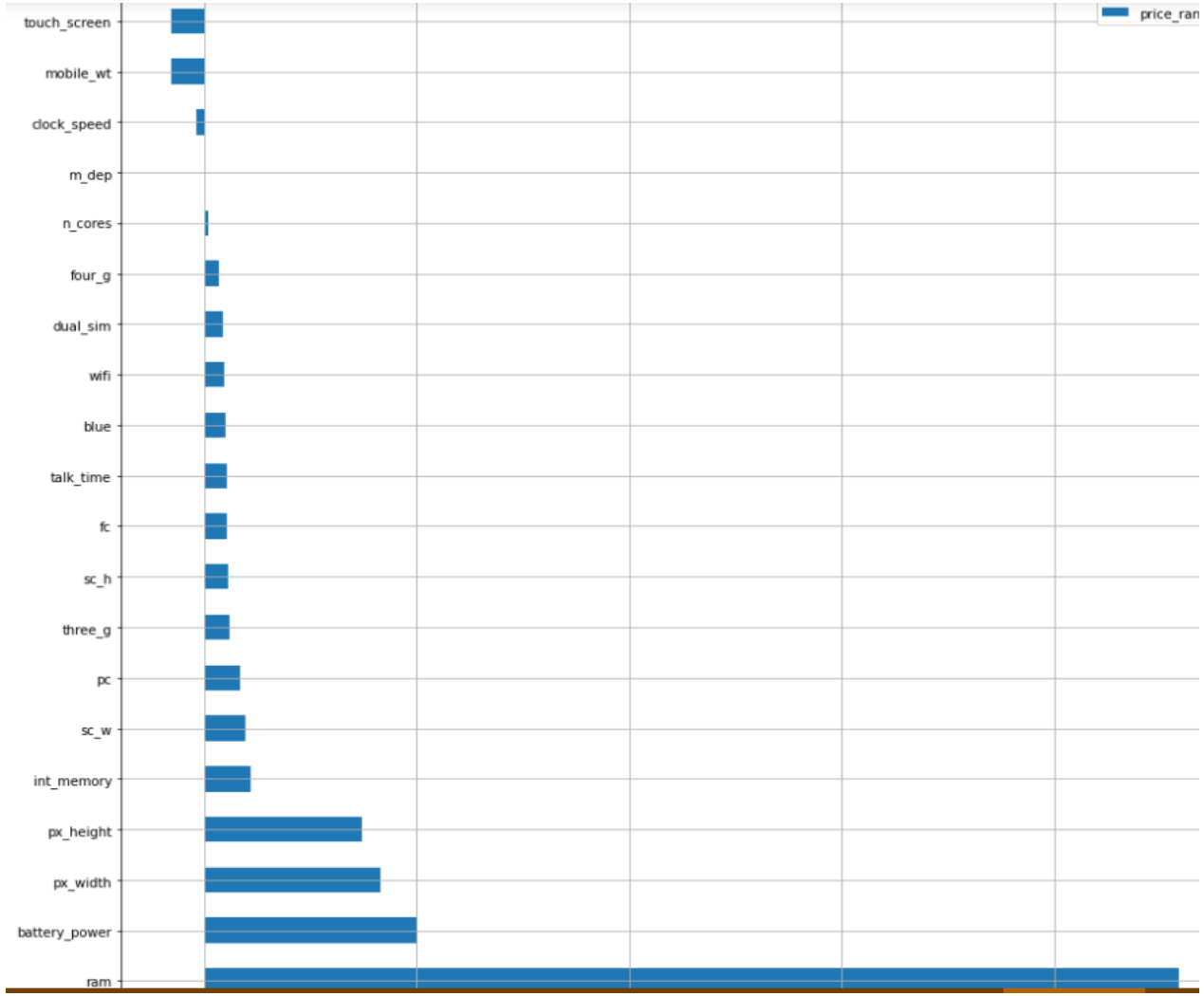
Bare outliers

3. Correlation Check

Remove 3 features

4. Data Splitting and Scaling

Using Robust Scaler



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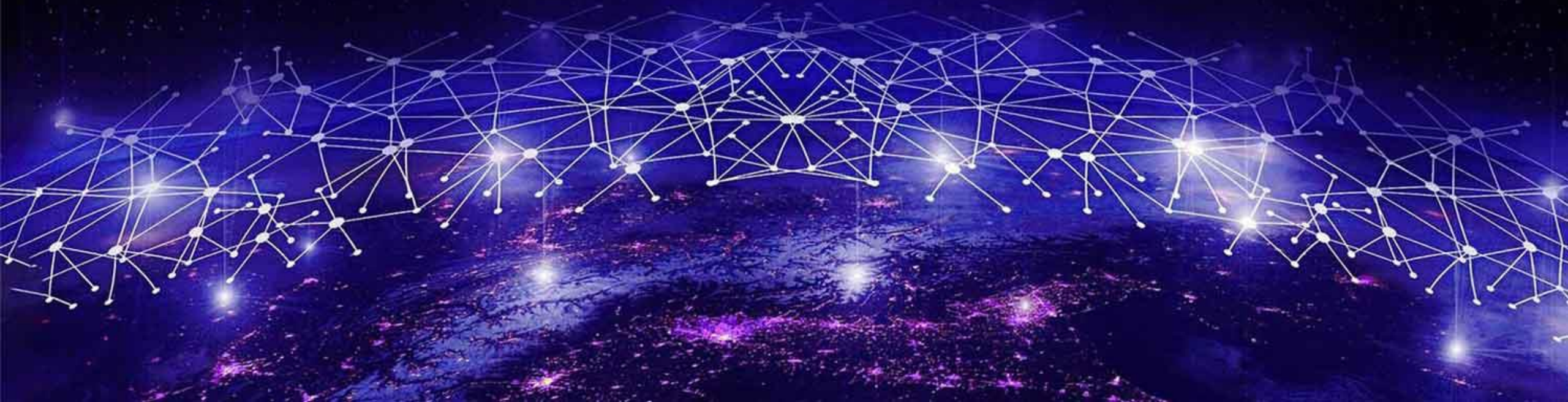
01 MODELLING AND PREDICTION



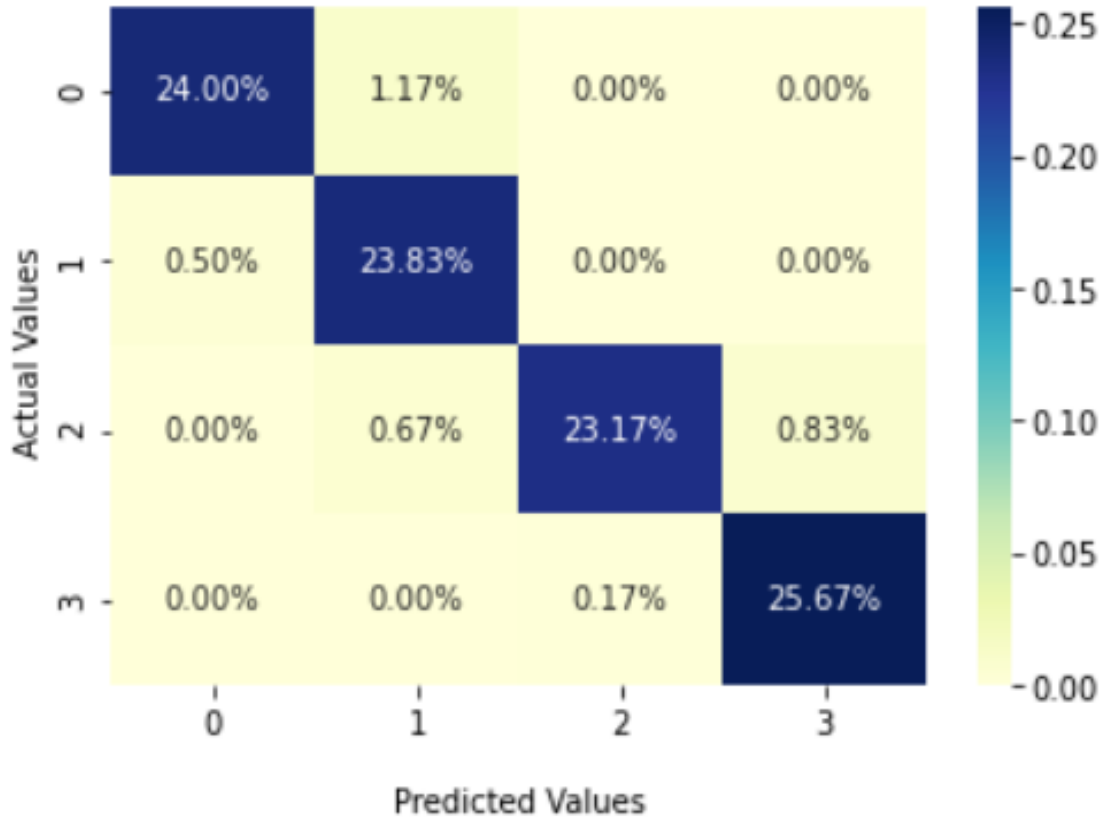
Logistic Regression:

It is the best model for prediction with:

Accuracy: 96.67%

The Classification Report for LR Classifier:

	precision	recall	f1-score	support
0	0.98	0.95	0.97	151
1	0.93	0.98	0.95	146
2	0.99	0.94	0.97	148
3	0.97	0.99	0.98	155
accuracy			0.97	600
macro avg	0.97	0.97	0.97	600
weighted avg	0.97	0.97	0.97	600



XGBOOST:

It is the best model for prediction with:

Accuracy: 91.83%

The Classification Report for XGBoost Classifier:

	precision	recall	f1-score	support
0	0.96	0.96	0.96	151
1	0.89	0.91	0.90	146
2	0.88	0.86	0.87	148
3	0.94	0.94	0.94	155
accuracy			0.92	600
macro avg	0.92	0.92	0.92	600
weighted avg	0.92	0.92	0.92	600

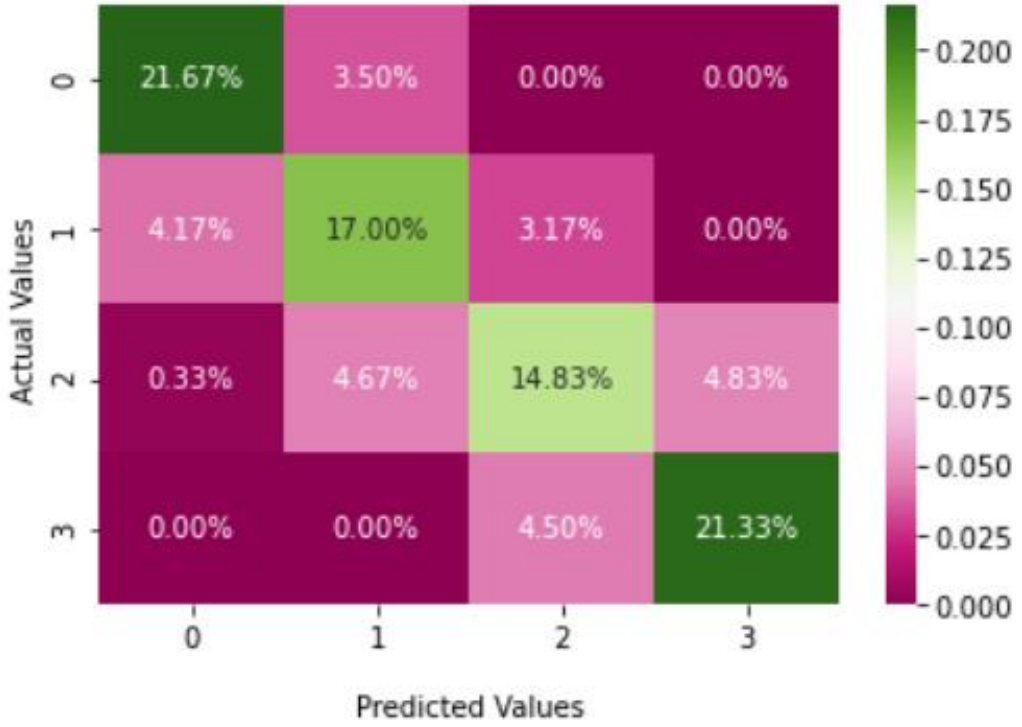
DECISION TREE:

It is the best model for prediction with:

Accuracy: 74.83%

The Classification Report for DT Classifier:

	precision	recall	f1-score	support
0	0.83	0.86	0.84	151
1	0.68	0.70	0.69	146
2	0.66	0.60	0.63	148
3	0.82	0.83	0.82	155
accuracy			0.75	600
macro avg	0.74	0.75	0.75	600
weighted avg	0.75	0.75	0.75	600



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THANKS

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