**Business and marketing.**

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**Abstract**

Recently years, with the spreading of using technologies especially smartphones and competition between companies that make up these smartphones, different features and prices for smartphones appeared to attract people to buy these devices. The features may be related to the components of the smartphone itself or it may be related to the services that smartphones are supported. In this project, we have tried to analyze the relationship between the features of smartphones and the unevenness of their prices that help the manufacturers of smart devices, mobile phone dealers in their trade and help users to buy smart devices at the best prices. To get the results, we apply a machine-learning approach with specific classification algorithms to classify mobile prices based on 20 features for smartphones such as battery power, ram and so on.

**Design**

This project helps to know the feature that has an impact on the mobile phone price and prediction, and find which one of the features is affected more than the others on mobile prices to help manufacturers of smart devices to develop these features to increase their profits and compete with other companies. On the other hand, it will help mobile phone dealers in their trade to bring the mobiles that have the best features to increase their profits and in marketing for mobiles. Also, it helps users to buy smart devices at the best prices with good features.

The data provided by Kaggle for the first stage. Kaggle is one of the famous communities for data scientists that involve a lot of datasets that help people to chive their objectives, explore and build helpful models and it provides challenges in data science. Then, I started to explore the dataset, then visualized the data to help identify features that affect the price of the mobile. Finally, I built different models and then evaluated each model.

**Data**

The dataset contains 20 features. These features are:

1. The power of the battery (battery\_power): This means the total of energy that battery can store in one time and is measured in mAh.
2. Blue: if the mobile has Bluetooth or not.
3. Clock\_speed: The speed of microprocessor to execute the instructions.
4. Dual\_sim: if the device has support of dual sim or not.
5. Fc: Front Camera in mega pixels.
6. Four\_g: if the mobile has and support 4G or not.
7. Int\_memory: Internal memory in GigaBytes.
8. M\_dep: Mobile depth in cm.
9. Mobile\_wt: weight of mobile phone.
10. N\_cores: number of cores of processor.
11. Pc: Primary camera in mega pixels.
12. Px\_height: Pixel Resolution Height.
13. Px\_width: Pixel Resolution Width.
14. Ram: Random Access Memory in Megabytes.
15. Sc\_h: The height of screen of mobile in cm.
16. Sc\_w: The width of screen of mobile in cm.
17. Talk\_time: The longest time that a single battery charge will last when you are.
18. Three\_g: if the mobile has and support 3G or not.
19. Touch\_screen: if the mobile has touch screen or not.
20. Wifi: if the mobile has wifi or not.

**Algorithms**

*Models*

* Random forest
* Decision tree
* KNN classifier
* Logistic Regression

### Naive Bayes classifiers

The entire dataset was split into 70 train and 30 test.

**Tools**

• Python Language

• Pandas, NumPy for data processing

• Scikit-learn library for building the model

• Matplotlib for visualization.

**Communication**

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| Random forest | Decision tree |
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| KNN classifier | Logistic Regression |
|  |  |
| Naive Bayes classifiers | |
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