MARMARA UNIVERSITY

COMPUTER ENGINEERING DEPARTMENT

CSE4088

INTRODUCTION TO MACHINE LEARNING

FINAL PROJECT
PRESENTATION

"Mobile Price Classification"

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PROBLEM DESCRIPTION

Given various features of phones, determine their price classes:

- 0 means phone is “cheap”,
- 1 means phone is “standard”,
- 2 means phone is “expensive”,
- 3 means phone is “very expensive”.

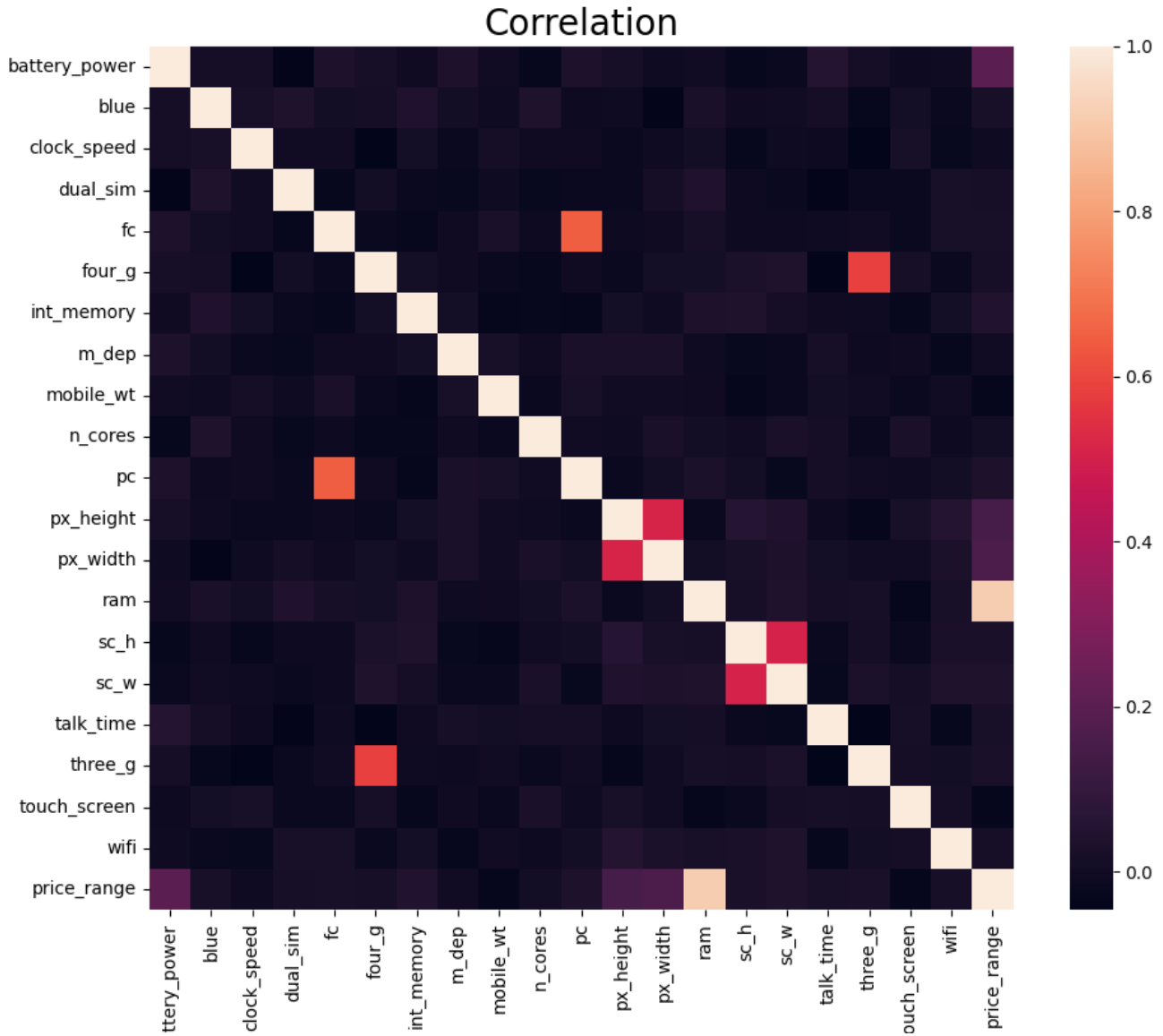
Features include Wi-Fi, 4G, Bluetooth, RAM (GB), Battery Power (mAh) etc.

EXPLORATORY DATA ANALYSIS-1

- There are 21 features. Train set has 2000 samples, and test set has 1000 samples but without labels.

- So, we will use some portion of train set as our test set.

- Correlation matrix simply tells you how pairs of variables are related. It is useful to identify the patterns in the given data.



EXPLORATORY DATA ANALYSIS-2

- Let's visualize how RAM size (GB), and Battery Power (mAh) effect the price classification of a phone.

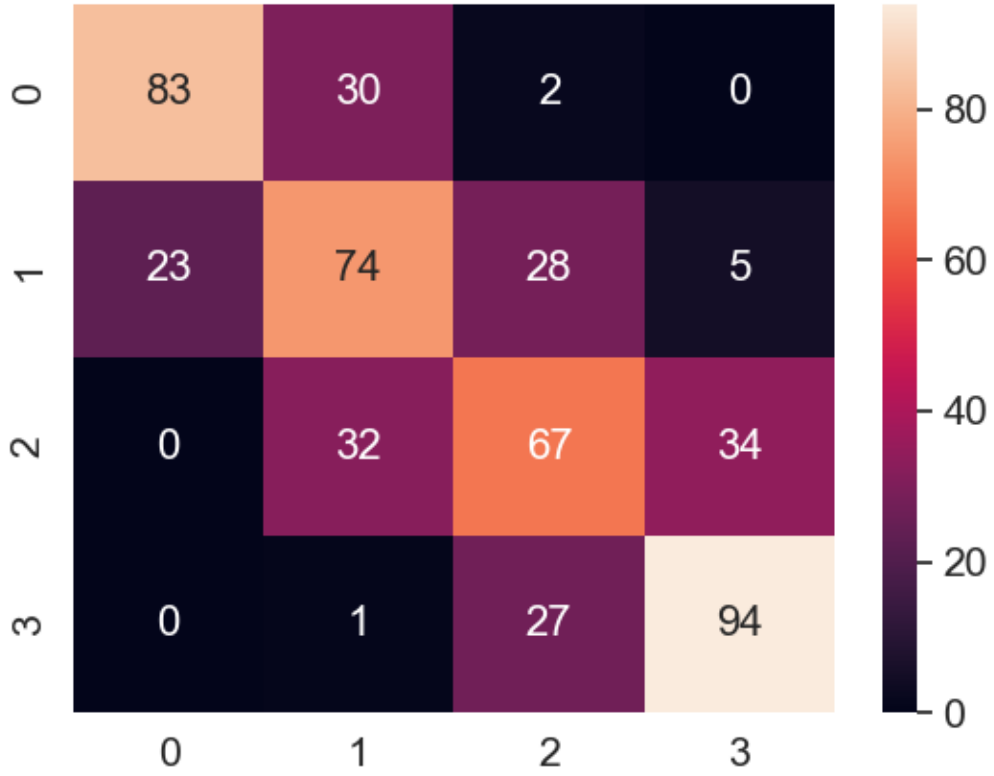
ALGORITHMS

- Since we are interested to classify the phones, we have used:
  - Logistic Regression
  - Random Forest
  - Support Vector Machines
  - K-nearest Neighbor
  - Decision Tree

Now, let’s give codes and results for each of these classification algorithms.

LOGISTIC REGRESSION

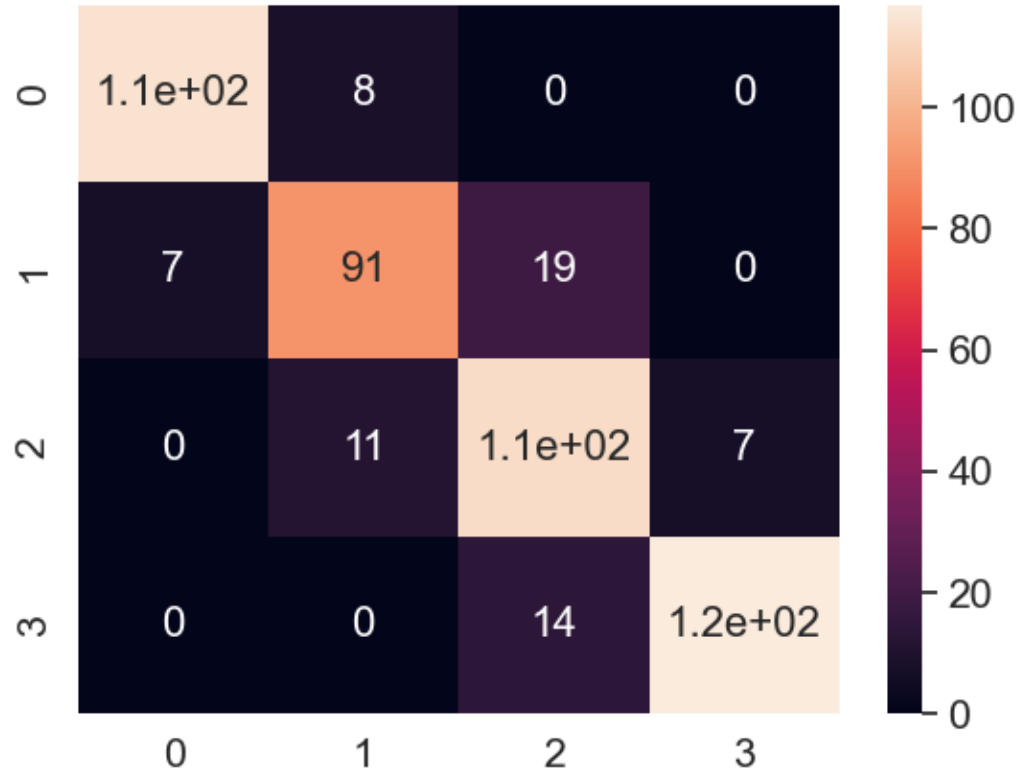
```
# 42 is the Answer to the Ultimate Question of Life...
lr = LogisticRegression(random_state = 42, max_iter=100000)
lr.fit(X_train, y_train)
y_pred_lr = lr.predict(X_test)
accuracy = metrics.accuracy_score(y_test, y_pred_lr)
```



Accuracy: 0.752

RANDOM FOREST

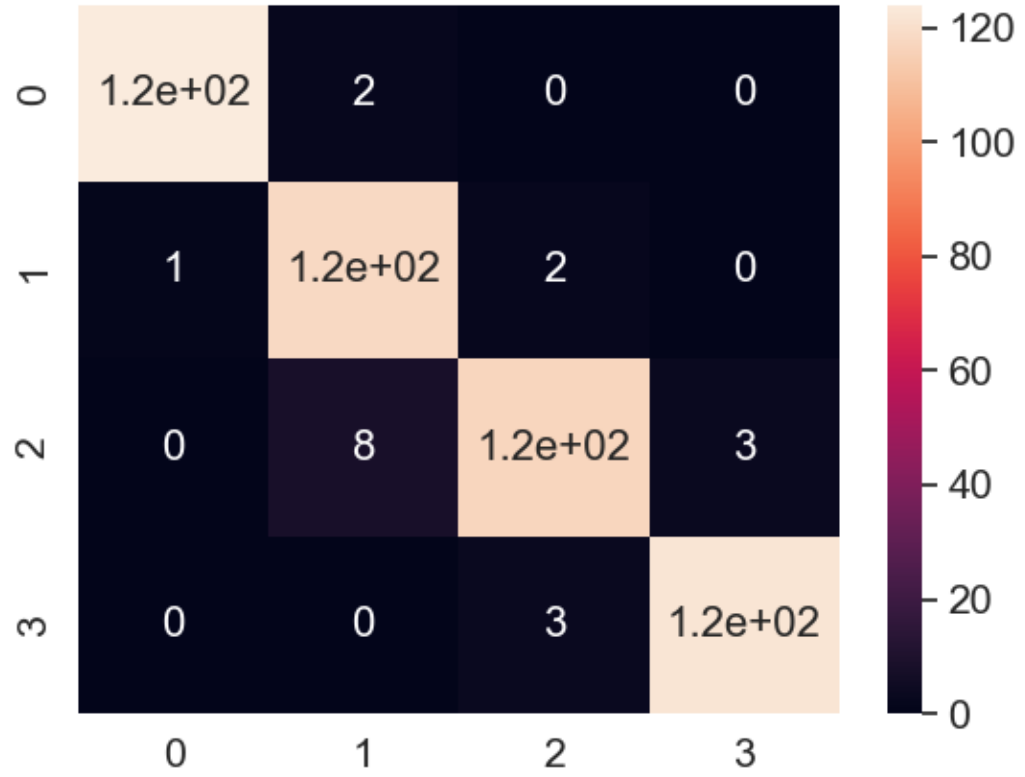
```
rc = RandomForestClassifier(random_state=42)
rc.fit(X_train,y_train)
y_pred_rc = rc.predict(X_test)
accuracy = metrics.accuracy_score(y_test, y_pred_rc)
```



Accuracy: 0.872

SUPPORT VECTOR MACHINES

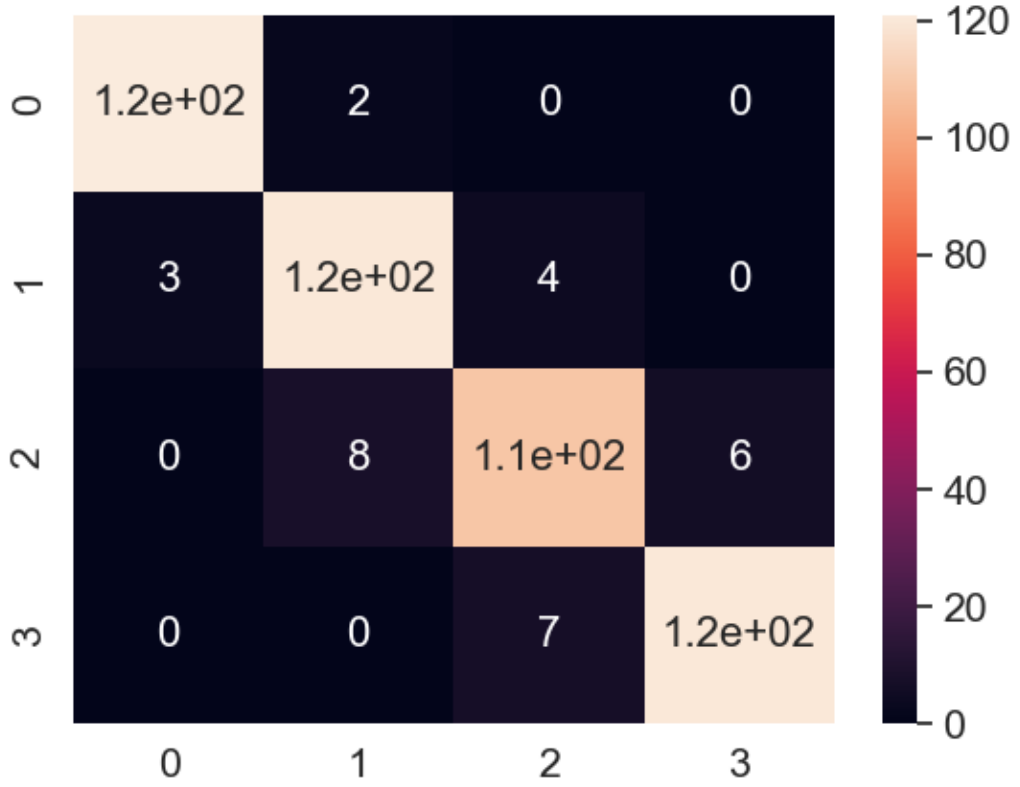
```
svc = SVC()
svc.fit(X_train, y_train)
y_pred_svc = svc.predict(X_test)
accuracy_svc = metrics.accuracy_score(y_test, y_pred_svc)
```



Accuracy: 0.964

K-NEAREST NEIGHBORS

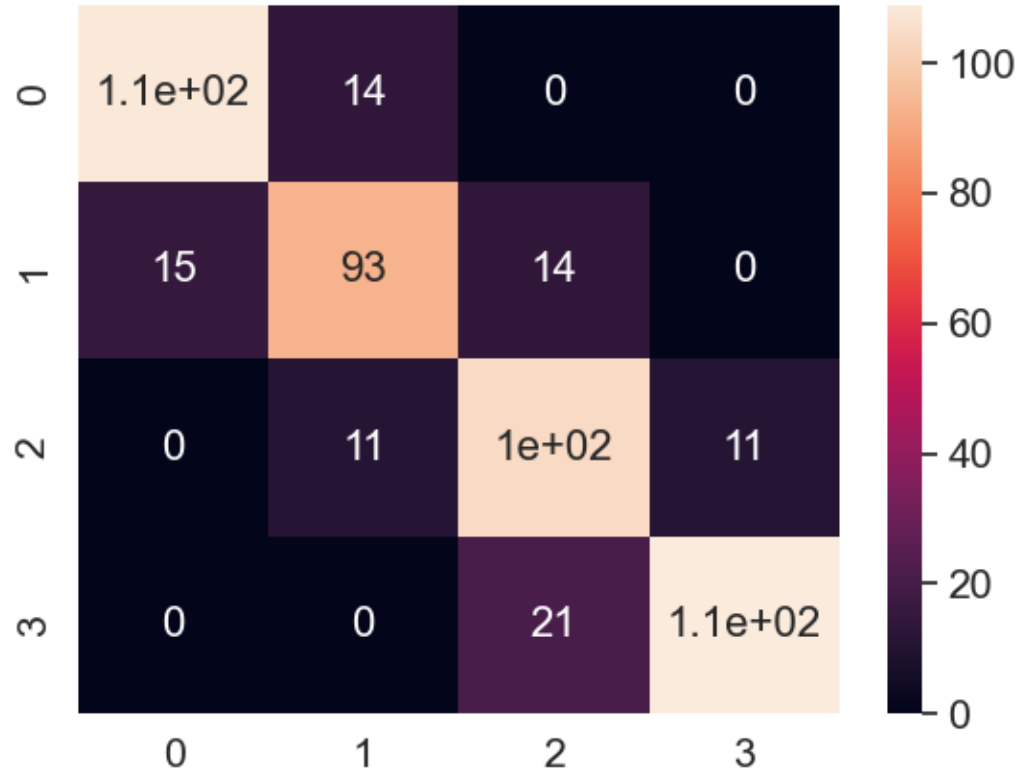
```
model = KNeighborsClassifier()
model.fit(X_train,y_train)
predicted= model.predict(X_test)
accuracy = metrics.accuracy_score(y_test,predicted)
```



Accuracy: 0.916

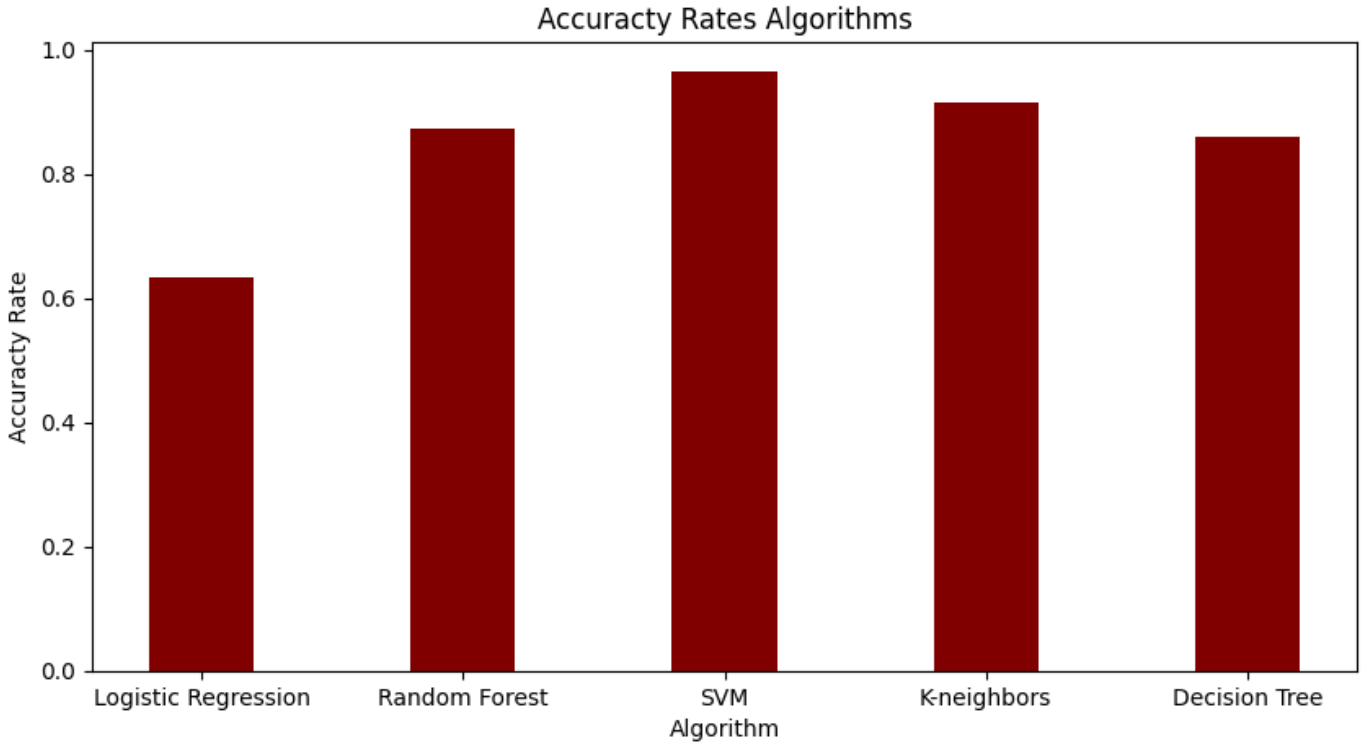
DECISION TREE

```
first_tree = DecisionTreeClassifier()
first_tree.fit(X_train, y_train)
y_pred=first_tree.predict(X_test)
accuracy = metrics.accuracy_score(y_test,y_pred)
```



Accuracy: 0.860

RESULTS



- We see SVM has slightly better accuracy rate than the other algorithms.
- In fact, SVMs are powerful on data where number of dimensions are large compared to sample size.
- In our case sample size is 2000, and dimensions is 21. So, SVM is slightly better option here.

REFERENCES

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