

Final Project

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1. Topic

Our task is to predict the rating of Apps based on attributes of the 12 terms, includes App, Category, Reviews, Size, Installs, Type, Price, Content Rating, Genres, Last Updated, Current Ver and Android Ver.

2. Methods

We choose KNN and Decision tree to train our data and use LOOCV to test our Machine Learning model.

For training:

We implement KNN first to train the model and it shows that when finding nearest 33 neighbors, we could get the most accuracy which is only 14%, so we feel it would not be a good idea so we implement Decision tree to train the raw data and the result shows we are right.

For testing and evaluation:

We implement LOOCV by dividing the data into 10 chunks which 9 set of data used to training and 1 left used for testing.

3. Dataset

We are using data set “GoogleplayStore”, which contains 13 attributes, includes

- App: String
- Category: String
- Rating: Number
- Reviews: Number
- Size: Number
- Installs: String
- Type: String
- Price: Number
- Content Rating: String
- Genres: String
- Last Updated: String
- Current Ver: Number
- Android Ver: Number

We first change the parse function to change the format of data from Google Play Store Apps (from www.kaggle.com) into “UTF-8” format.

For installs: we delete “,” and “+” in the numbers of Installs and change it back to number type;

For size: we transfer all “... MB” and “... KB” into the same format which is “... MB” based on binary system.

For Android Ver: we use NAN to represent default value.

For Price: we delete the symbol “\$” so that it could change to number type which makes sense when training.

For category, reviews and genres: we use Labelencoder to transfer all String type into int type which could be used in training after transformation.

4. Results

```
training accuracy: 1.0
validation accuracy: 0.9987184963690731
test accuracy: 0.9970111016225448
pruned tree train accuracy: 0.9989323083493488
pruned tree validation accuracy: 0.9987184963690731
pruned tree test accuracy: 0.9957301451750641
no pruning test accuracy: 0.9961571306575576
```

This is a random result which we run it once.

```
[0.9970111016225448, 0.9982920580700256, 0.9982920580700256, 0.9982920580700256, 0.9965841161400513, 0.997865072587532, 0.9982920580700256, 0.9974380871050385, 0.9982920580700256, 0.9957301451750641]
[0.9974380871050385, 0.9974380871050385, 0.9974380871050385, 0.9982920580700256, 0.9957301451750641, 0.9970111016225448, 0.997865072587532, 0.9970111016225448, 0.9974380871050385, 0.9961571306575576]
average with pruning 0.9976088812980359 without: 0.9971818958155423
Process finished with exit code 0
```

There are all the 10 results and average results.

5. Analysis and suggestions for future work

For KNN training, if we change rating to the integers (rather than float), the accuracy was about 61%. The best result using KNN shows when raw data is float and evaluation data is integer. If all changed to integer or float, it will be lower. It may be because the data is not comparatively equal, which means some

```
: count    7723.000000
   mean      61.414347
   std       32.603689
   min        0.000000
   25%       36.000000
   50%       65.000000
   75%       92.500000
   max      114.000000
   Name: Genres, dtype: float64
```

sample is far more than other samples and the graph is shown below.

For Decision tree, the accuracy is about 98% which shows that will be a good Machine Learning model for this dataset.