GTU

DEPARTMENT OF COMPUTER ENGINEERING

CSE 463 – Spring 2022

HOMEWORK 2 REPORT

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1-The list of object selected

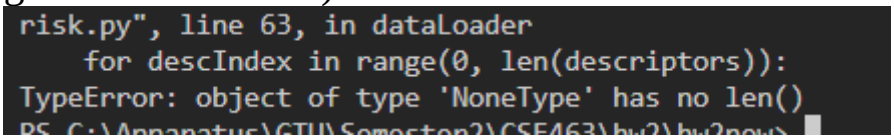
banana
calculator
camera
cell phone
flashlight
food bag
lemon
lightbulb
lime
marker

2) Details of your object recognition algorithm

1 Choose random 90% of the objects to be the training set in every class folder
2 select the png files that doesn't end with depthcrop.png and maskcrop.png and get their path
3 concatanate all the descriptors into one array for training
4 normalize the data to the range [0,1] to make the clustering more robust to different lighting conditions.
5 Apply k-means clustering to the descriptors to obtain the training set
6 Checking the size of labels to obtain a label for each of the descriptors
7 get label array of clusters
8 After this, clustering labels are now the labels of the training set which associated with it
9 Print confusion matrix

3) TESTS AND FAILURES

1- I couldn’t implement program for brisk and orb. But I did for SIFT. (Reason: because brisk and orb returns descriptors of none-type and this gives error for size)



2- Training files size were too big. So because of python and huge size of the dataset, it takes close to 15-20 minutes to run the code and get the confusion matrix. So I removed some images from dataset and created a new one to run the code faster to test.

3- It uses k means clustering for training but I couldn't handle testing images. I searched for it and I saw the bags of words method with SVM but because of my lack of information about natural language processing and machine learning I couldn't implement it.
Now my images uses same thing for clustering, calculating and finding confusion matrix.

4) FINAL CONFUSION MATRIX

Confusion matrix for small dataset

```
Confusion Matrix:
             banana  calculator  camera  cell_phone  flashlight  food_bag  lemon  lightbulb  lime  marker
banana           60          16      21           5          17        41      0          0    19      22
calculator        7        1070       7          17          43       188      0          2    10      33
camera            0          16      45           2          15       143      4          0    17      19
cell_phone        0          58       1          79          26        57      5         11     0       8
flashlight        7          81      21           5         180       123      2          2    38      24
food_bag         26         217      19          26          63      2403      3          7    22      45
lemon            11          37       1           0          11        24     39          0    19      18
lightbulb        13          15       0           2           6        89      7         24     3       4
lime              3           4      11           0          18        34      5          1    76       0
marker            7          22       5           2           9        60     17          1    18     166
PS C:\Apparatus\GTU\Semester2\CSE463\hw2\hw2new>
```