Assignment2 Report

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Introduction

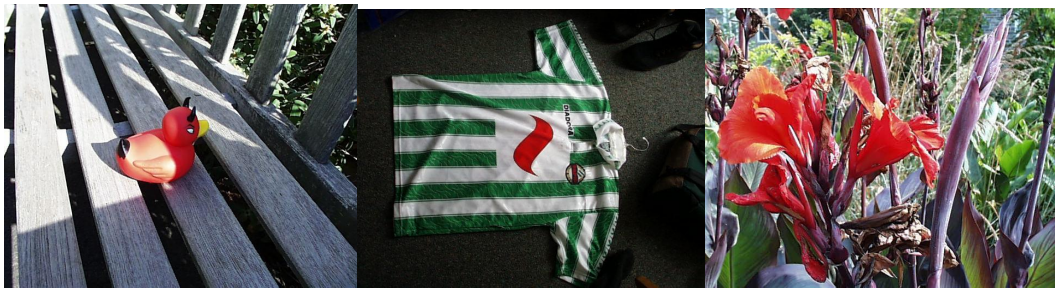
In this assignment, I implemented an code to find images in a given image dataset with similar content for a target image. To be specific I used multiple methods to match two different pictures, these methods mainly focus on more generic characteristics of the images such as color, texture, and their spatial layout.

Results

To be specific, here are the results for different match methods

Baseline match

pic.1016



Top three matches: pic.0986, pic.0641, pic.0233

We can see in baseline match, images tend to have similar color

Histogram Matching

pic.0164

Top three matches: pic.0080, pic.0898, pic.0461

We can see in Histogram match, images tend to have similar blue color

Multi-histogram Matching

pic.0164

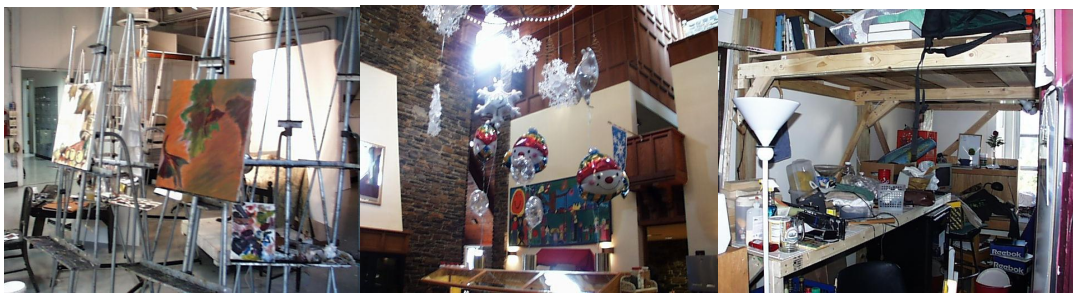


Top three matches: pic.0273, pic.1031, pic.0409

We can see in Multi-histogram match, the matched picture are quite close to the target.

Texture and Color match

pic.0535



Top three matches: pic.0011, pic.0628, pic.0171

We can see for texture match, the top matches have similar texture but not a same thing at all compare to Histogram Matching

Customized match

```
(base) PS C:\Users\hongchao\Desktop\assigment2> vidDisplay.exe pic.0052.jpg, ./olympus, 16, custom_matching_2, 10
./olympus/pic.0052.jpgThe target image is ./olympus/pic.0052.jpg
The target dataset is ./olympus
The first 10 similar img using custom_match_2 on./olympus/pic.0052.jpgare:
./olympus/pic.0954.jpg : -797459.000000
./olympus/pic.0250.jpg : -796971.000000
./olympus/pic.0248.jpg : -773263.000000
./olympus/pic.1068.jpg : -766614.000000
./olympus/pic.0890.jpg : -763783.000000
./olympus/pic.0121.jpg : -748929.000000
./olympus/pic.1011.jpg : -745205.000000
./olympus/pic.0447.jpg : -742096.000000
./olympus/pic.0098.jpg : -739520.000000
./olympus/pic.0368.jpg : -739319.000000
(base) PS C:\Users\hongchao\Desktop\assigment2> vidDisplay.exe pic.0052.jpg, ./olympus, 16, custom_matching_1, 10
./olympus/pic.0052.jpgThe target image is ./olympus/pic.0052.jpg
The target dataset is ./olympus
The first 10 similar img using custom_match_1 on./olympus/pic.0052.jpgare:
./olympus/pic.1010.jpg : -805988.000000
./olympus/pic.0666.jpg : -805738.000000
./olympus/pic.0984.jpg : -804075.000000
./olympus/pic.0495.jpg : -803781.000000
./olympus/pic.0872.jpg : -789668.000000
./olympus/pic.0577.jpg : -781723.000000
./olympus/pic.0887.jpg : -771555.000000
./olympus/pic.0988.jpg : -753509.000000
./olympus/pic.1011.jpg : -745205.000000
./olympus/pic.1017.jpg : -740064.000000
```

We can see in the customized matching with different color, there is totally different results.

Conclusion

In this assignment, I learned how to extract feature of a picture and multiple ways to match images. I practiced my skill with working with different color spaces, histograms, spatial features, and texture features.In the end, I also get familiar with many basic libs of opencv.

Acknowledgement

1. Gonzalez, Rafael C.; Woods, Richard E. (2008). Digital Image Processing (3rd ed.). Prentice Hall. p. 128. ISBN 9780131687288.
2. ^ Gonzalez, R.C.; Fittes, B.A. (June 9–11, 1975). Gray-level transformations for interactive image enhancement (PDF). 2nd Conference on Remotely Manned Systems: Technology and Applications. Los Angeles, California. pp. 17–19.
3. ^ Coltuc, Dinu; Bolon, Philippe; Chassery, Jean-Marc (May 2006). "Exact Histogram Specification". IEEE Transactions on Image Processing. 15 (5): 1143–52. Bibcode:2006ITIP...15.1143C. doi:10.1109/TIP.2005.864170. PMID 16671295. S2CID 16060881.