Performance survey of Anime Style Camera Filter

Anime Style Camera Filter is my final project of Digital Image Processing (ECSE-4540) course. It can use purely image processing technique to transform a real world landscape picture into a Japanese Anime style one.

I sincerely invite you to fill this short survey and evaluate the performance of this camera filter.

As the reference of the style that the filter wants to achieve, left is a stage photo of Shinkai ‘s cartoon movie Your Name, and right is the shooting location of the former one in Japan.

There are 12 cartoon style transforming result below. For each of the result, I showed the original landscape photo in upper left, its transformed cartoon style image in upper right and a zoomed in image of the transformed image in lower left which will show you more details.

For each of the pictures, I set five questions:
1.Good sky detection: Did the colorful fake sky cover the original sky appropriately?
2.Naturally sky futhon: Did the fake sky naturally fused in original image?
For example, the left one's sky was perfectly filled with fake sky and the fusion is very natural. However, the right one's sky detection failed and the fusion was not so natural.

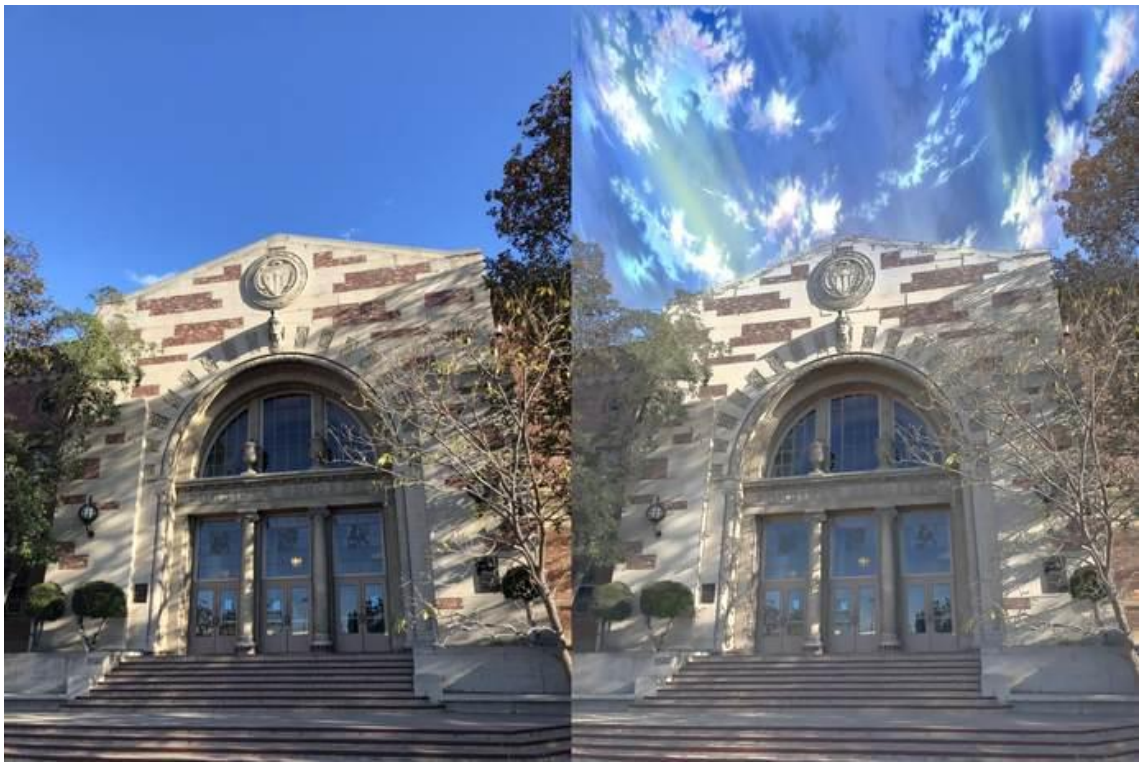
3.Appropriate location of black outlines:
4.Appropriate density of black outlines: I added black lines into the picture to make it seems like a hand drawn picture. Are the lines in right places? Are there too many lines? You can use the zoomed

in picture to evaluate.
5.Level of smoothing: Generally, cartoons don't have the details, like some texture, branched etc. Is my result blurry like a cartoon?
6.Choice of cartoon color: Does my result have color like Japanese cartoon? You can use the movie picture that I shown above as reference
7.Overall effect: Does the result look like a cartoon picture? Did my filter do a good job on this picture?

Please rate the information on a scale of 1 to 5, with 5 being"very good" and 1 being "very bad".

Thank you!

Question1

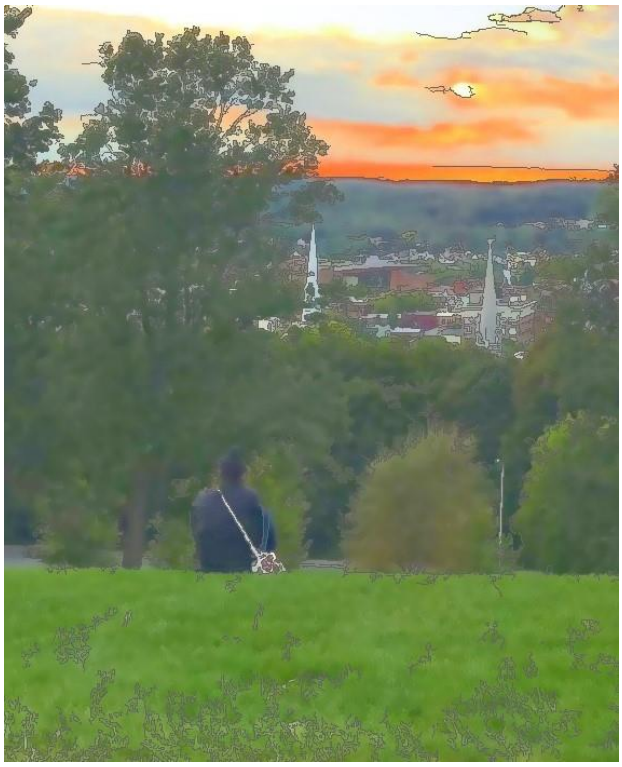


QUESTION 1

Average Score：4.79

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	1(1.3%)	0(0%)	2(2.6%)	5(6.49%)	69(89.61%)	4.83
Natural sky fusion	0(0%)	2(2.6%)	1(1.3%)	8(10.39%)	66(85.71%)	4.79
Appropriate location of black outlines	0(0%)	1(1.3%)	4(5.19%)	9(11.69%)	63(81.82%)	4.74
Appropriate density of black outlines	0(0%)	1(1.3%)	3(3.9%)	9(11.69%)	64(83.12%)	4.77
Level of smoothing	0(0%)	0(0%)	3(3.9%)	7(9.09%)	67(87.01%)	4.83
Choice of cartoon color	0(0%)	1(1.3%)	1(1.3%)	11(14.29%)	64(83.12%)	4.79
Overall effect	0(0%)	0(0%)	6(7.79%)	4(5.19%)	67(87.01%)	4.79
Total	1(0.19%)	5(0.93%)	20(3.71%)	53(9.83%)	460(85.34%)	4.79

Question2



QUESTION 2
Average Score：4.7

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	0(0%)	2(2.6%)	2(2.6%)	8(10.39%)	65(84.42%)	4.77
Natural sky fusion	1(1.3%)	2(2.6%)	2(2.6%)	9(11.69%)	63(81.82%)	4.7
Appropriate location of black outlines	1(1.3%)	4(5.19%)	3(3.9%)	8(10.39%)	61(79.22%)	4.61
Appropriate density of black outlines	1(1.3%)	3(3.9%)	2(2.6%)	7(9.09%)	64(83.12%)	4.69
Level of smoothing	1(1.3%)	3(3.9%)	1(1.3%)	9(11.69%)	63(81.82%)	4.69
Choice of cartoon color	0(0%)	4(5.19%)	0(0%)	11(14.29%)	62(80.52%)	4.7
Overall effect	0(0%)	3(3.9%)	2(2.6%)	7(9.09%)	65(84.42%)	4.74
Total	4(0.74%)	21(3.9%)	12(2.23%)	59(10.95%)	443(82.19%)	4.7

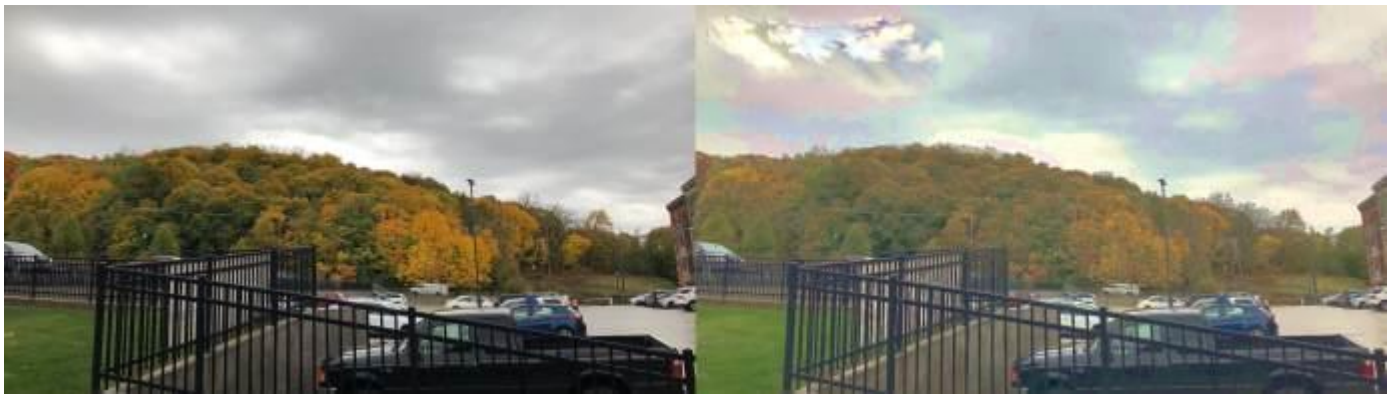
Question3

QUESTION 3

Average Score：4.52

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	0(0%)	4(5.19%)	5(6.49%)	6(7.79%)	62(80.5%)	4.64
Natural sky fusion	1(1.3%)	6(7.79%)	2(2.6%)	8(10.39%)	60(77.92%)	4.56
Appropriate location of black outlines	5(6.49%)	4(5.19%)	3(3.9%)	7(9.09%)	58(75.32%)	4.18
Appropriate density of black outlines	3(3.9%)	6(7.79%)	2(2.6%)	6(7.79%)	60(77.92%)	4.48
Level of smoothing	0(0%)	7(9.09%)	3(3.9%)	6(7.79%)	61(79.22%)	4.57
Choice of cartoon color	0(0%)	6(7.79%)	1(1.3%)	10(12.99%)	60(77.92%)	4.60
Overall effect	0(0%)	7(9.09%)	1(1.3%)	6(7.79%)	63(81.81%)	4.62
Total	9(1.67%)	40(7.42%)	17(3.15%)	49(9.09%)	424(78.66%)	4.52

Question4

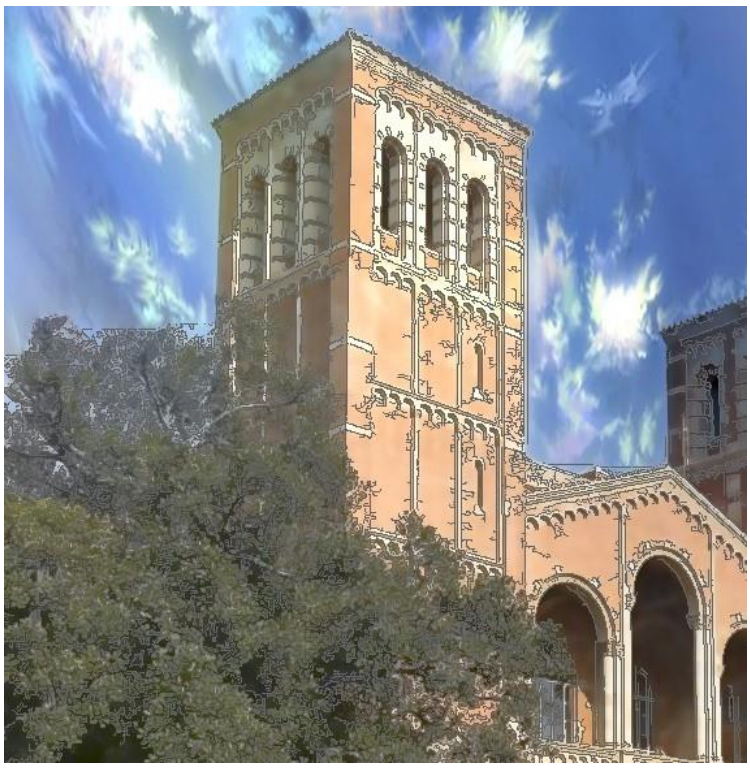


QUESTION 4

Average Score：4.69

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	0(0%)	4(5.19%)	1(1.3%)	6(7.79%)	66(85.71%)	4.74
Natural sky fusion	1(1.3%)	3(3.9%)	6(7.79%)	4(5.19%)	63(81.82%)	4.62
Appropriate location of black outlines	0(0%)	3(3.9%)	2(2.6%)	7(9.09%)	65(84.42%)	4.74
Appropriate density of black outlines	1(1.3%)	2(2.6%)	2(2.6%)	8(10.39%)	64(83.12%)	4.71
Level of smoothing	0(0%)	3(3.9%)	3(3.9%)	8(10.39%)	63(81.82%)	4.7
Choice of cartoon color	1(1.3%)	2(2.6%)	5(6.49%)	6(7.79%)	63(81.82%)	4.66
Overall effect	0(0%)	3(3.9%)	4(5.19%)	8(10.39%)	62(80.52%)	4.68
Total	3(0.56%)	20(3.71%)	23(4.27%)	47(8.72%)	446(82.75%)	4.69

Question5

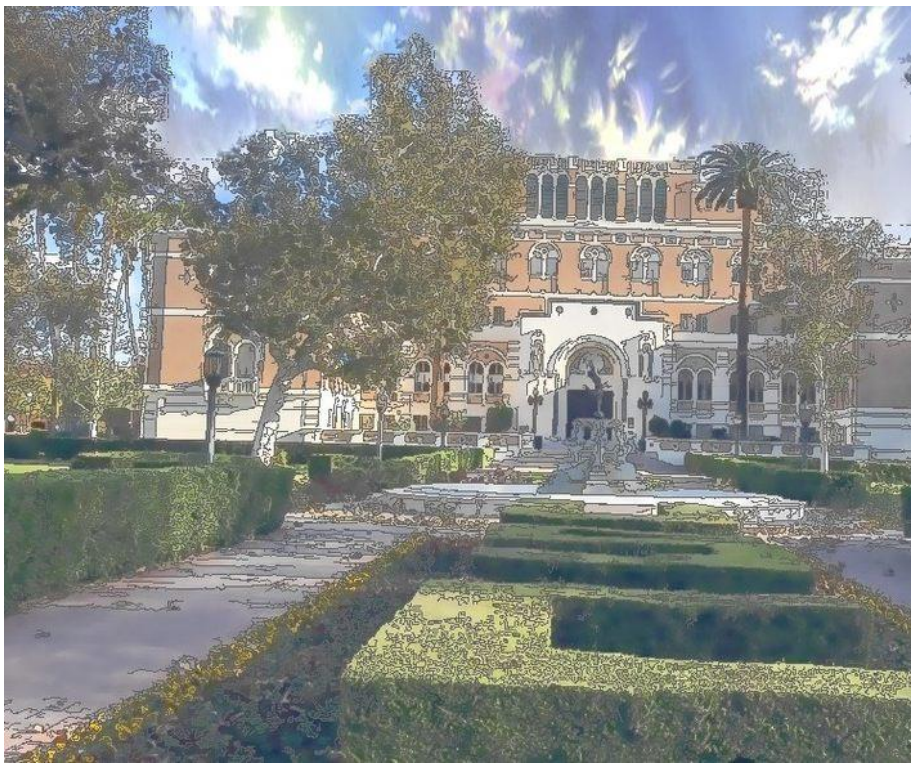


QUESTION 5

Average Score：4.8

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	0(0%)	1(1.3%)	1(1.3%)	5(6.49%)	70(90.91%)	4.87
Natural sky fusion	0(0%)	1(1.3%)	2(2.6%)	10(12.99%)	64(83.12%)	4.78
Appropriate location of black outlines	0(0%)	1(1.3%)	3(3.9%)	4(5.19%)	69(89.61%)	4.83
Appropriate density of black outlines	0(0%)	2(2.6%)	3(3.9%)	3(3.9%)	69(89.61%)	4.81
Level of smoothing	1(1.3%)	1(1.3%)	4(5.19%)	4(5.19%)	67(87.01%)	4.75
Choice of cartoon color	0(0%)	3(3.9%)	2(2.6%)	6(7.79%)	66(85.71%)	4.75
Overall effect	0(0%)	1(1.3%)	4(5.19%)	4(5.19%)	68(88.31%)	4.81
Total	1(0.19%)	10(1.86%)	19(3.53%)	36(6.68%)	473(87.76%)	4.8

Question6

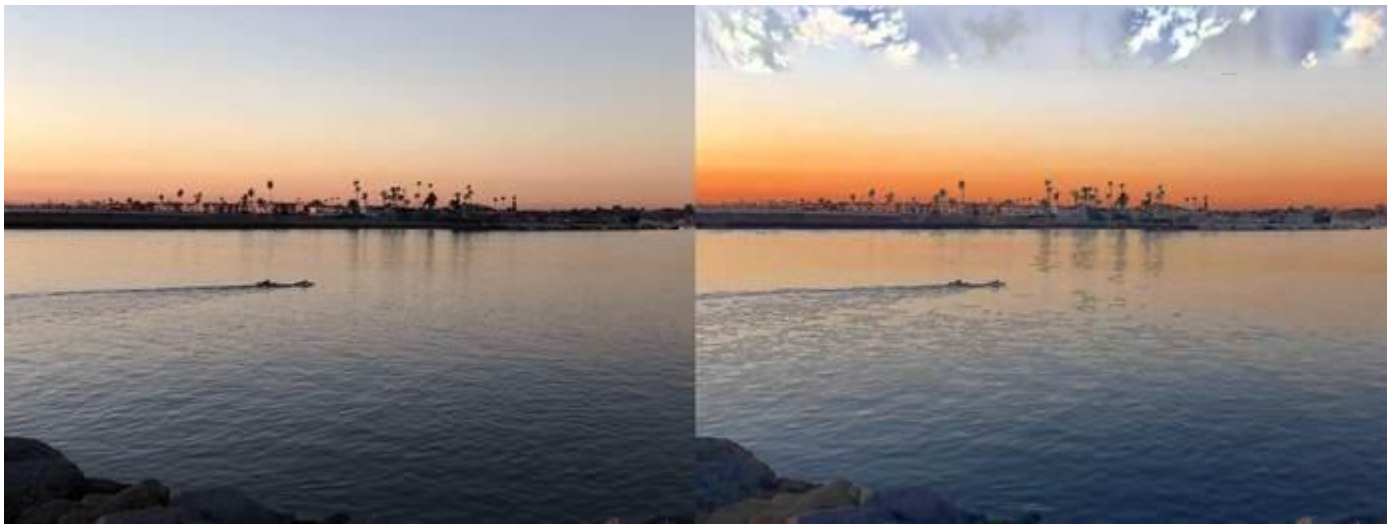


QUESTION 6

Average Score：4.79

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	1(1.3%)	1(1.3%)	2(2.6%)	4(5.19%)	69(89.61%)	4.81
Natural sky fusion	1(1.3%)	1(1.3%)	3(3.9%)	5(6.49%)	67(87.01%)	4.77
Appropriate location of black outlines	0(0%)	2(2.6%)	2(2.6%)	5(6.49%)	68(88.31%)	4.81
Appropriate density of black outlines	0(0%)	1(1.3%)	4(5.19%)	6(7.79%)	66(85.71%)	4.78
Level of smoothing	0(0%)	1(1.3%)	3(3.9%)	6(7.79%)	67(87.01%)	4.81
Choice of cartoon color	1(1.3%)	1(1.3%)	3(3.9%)	3(3.9%)	69(89.61%)	4.79
Overall effect	0(0%)	2(2.6%)	2(2.6%)	5(6.49%)	68(88.31%)	4.81
Total	3(0.56%)	9(1.67%)	19(3.53%)	34(6.31%)	474(87.94%)	4.79

Question7



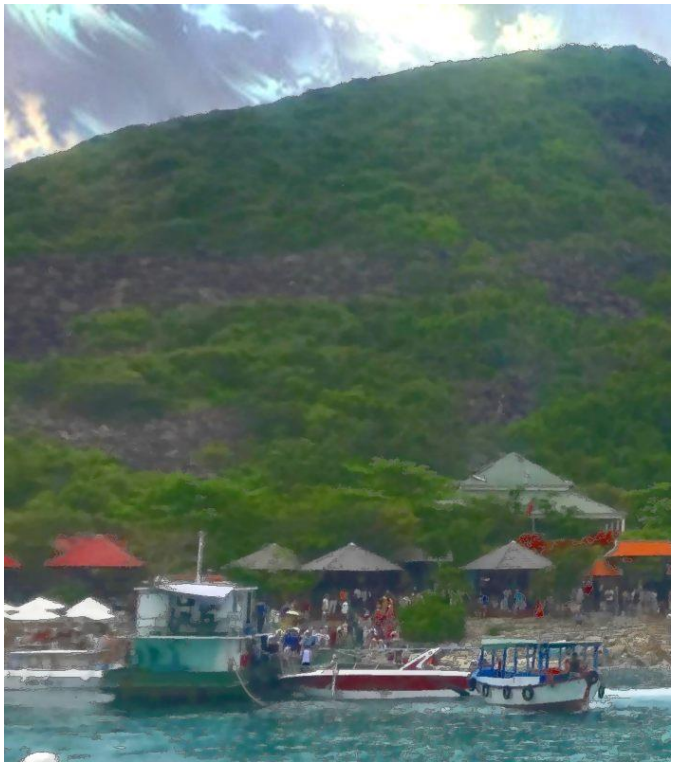
QUESTION 7

Average Score：4.74

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	0(0%)	2(2.6%)	5(6.49%)	4(5.19%)	66(85.71%)	4.74

Natural sky fusion	0(0%)	3(3.9%)	5(6.49%)	7(9.09%)	62(80.52%)	4.66
Appropriate location of black outlines	0(0%)	0(0%)	3(3.9%)	10(12.99%)	64(83.12%)	4.79
Appropriate density of black outlines	0(0%)	2(2.6%)	3(3.9%)	10(12.99%)	62(80.52%)	4.71
Level of smoothing	0(0%)	0(0%)	2(2.6%)	9(11.69%)	66(85.71%)	4.83
Choice of cartoon color	0(0%)	2(2.6%)	5(6.49%)	6(7.79%)	64(83.12%)	4.71
Overall effect	1(1.3%)	1(1.3%)	3(3.9%)	7(9.09%)	65(84.42%)	4.74
Total	1(0.19%)	10(1.86%)	26(4.82%)	53(9.83%)	449(83.3%)	4.74

Question8

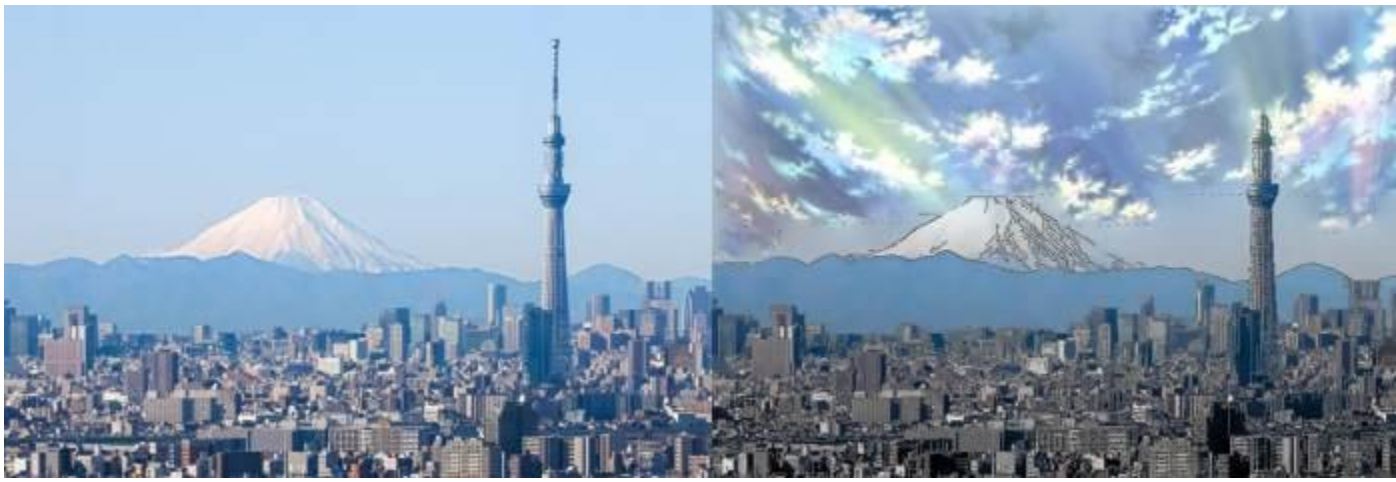


QUESTION 8

Average Score：4.72

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	1(1.3%)	2(2.6%)	1(1.3%)	3(3.9%)	70(90.91%)	4.81
Natural sky fusion	1(1.3%)	1(1.3%)	5(6.49%)	4(5.19%)	66(85.71%)	4.73
Appropriate location of black outlines	2(2.6%)	1(1.3%)	4(5.19%)	5(6.49%)	65(84.42%)	4.69
Appropriate density of black outlines	1(1.3%)	2(2.6%)	6(7.79%)	2(2.6%)	66(85.71%)	4.69
Level of smoothing	0(0%)	2(2.6%)	2(2.6%)	10(12.99%)	63(81.82%)	4.74
Choice of cartoon color	0(0%)	1(1.3%)	7(9.09%)	8(10.39%)	61(79.22%)	4.68
Overall effect	0(0%)	3(3.9%)	4(5.19%)	7(9.09%)	63(81.82%)	4.69
Total	5(0.93%)	12(2.23%)	29(5.38%)	39(7.24%)	454(84.23%)	4.72

Question9



QUESTION 9

Average Score：4.71

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	2(2.6%)	1(1.3%)	4(5.19%)	6(7.79%)	64(83.12%)	4.68
Natural sky fusion	0(0%)	3(3.9%)	5(6.49%)	6(7.79%)	63(81.82%)	4.68
Appropriate location of black outlines	0(0%)	2(2.6%)	5(6.49%)	7(9.09%)	63(81.82%)	4.7
Appropriate density of black outlines	0(0%)	2(2.6%)	4(5.19%)	8(10.39%)	63(81.82%)	4.71
Level of smoothing	0(0%)	1(1.3%)	4(5.19%)	8(10.39%)	64(83.12%)	4.75
Choice of cartoon color	0(0%)	1(1.3%)	5(6.49%)	9(11.69%)	62(80.52%)	4.71
Overall effect	0(0%)	1(1.3%)	6(7.79%)	7(9.09%)	63(81.82%)	4.71
Total	2(0.37%)	11(2.04%)	33(6.12%)	51(9.46%)	442(82%)	4.71

Question10

QUESTION 10

Average Score：4.75

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	0(0%)	2(2.6%)	1(1.3%)	7(9.09%)	67(87.01%)	4.81
Natural sky fusion	1(1.3%)	1(1.3%)	3(3.9%)	7(9.09%)	65(84.42%)	4.74
Appropriate location of black outlines	0(0%)	2(2.6%)	4(5.19%)	5(6.49%)	66(85.71%)	4.75
Appropriate density of black outlines	0(0%)	1(1.3%)	6(7.79%)	6(7.79%)	64(83.12%)	4.73
Level of smoothing	0(0%)	1(1.3%)	5(6.49%)	7(9.09%)	64(83.12%)	4.74
Choice of cartoon color	0(0%)	3(3.9%)	4(5.19%)	3(3.9%)	67(87.01%)	4.74
Overall effect	0(0%)	2(2.6%)	6(7.79%)	4(5.19%)	65(84.42%)	4.71
Total	1(0.19%)	12(2.23%)	29(5.38%)	39(7.24%)	458(84.97%)	4.75

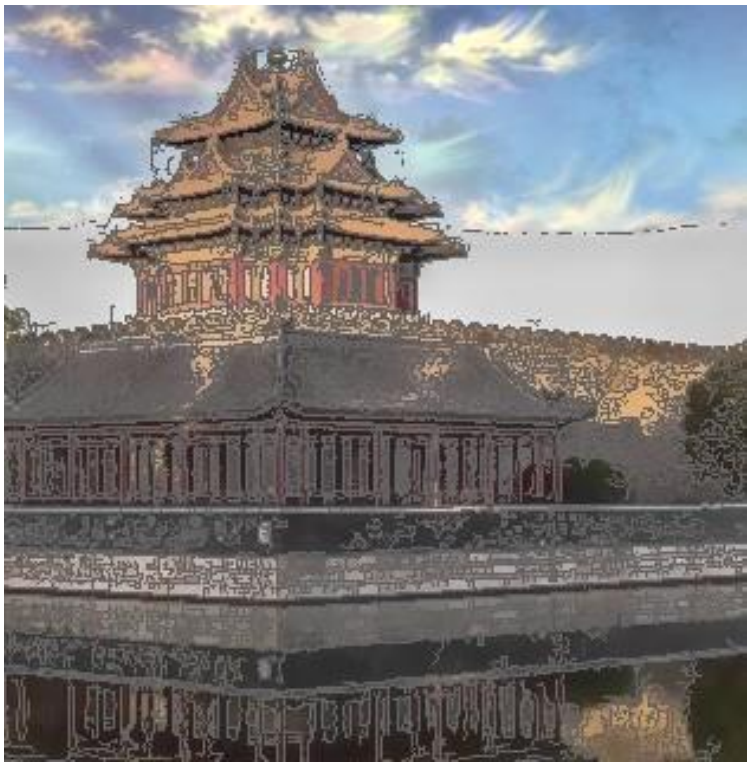
Question11

QUESTION 11

Average Score：4.79

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	0(0%)	1(1.3%)	2(2.6%)	6(7.79%)	68(88.31 %)	4.83
Natural sky fusion	0(0%)	2(2.6%)	4(5.19%)	4(5.19%)	67(87.01 %)	4.77
Appropriate location of black outlines	1(1.3%)	1(1.3%)	1(1.3%)	7(9.09%)	67(87.01 %)	4.79
Appropriate density of black outlines	0(0%)	2(2.6%)	2(2.6%)	8(10.39%)	65(84.42 %)	4.77
Level of smoothing	0(0%)	2(2.6%)	4(5.19%)	5(6.49%)	66(85.71 %)	4.75
Choice of cartoon color	0(0%)	2(2.6%)	3(3.9%)	6(7.79%)	66(85.71 %)	4.77
Overall effect	0(0%)	3 (3.9%)	6(7.79%)	2(2.6%)	65(84.42 %)	4.63
Total	1(0.19%)	11(2.41%)	20(4.08%)	38(7.05%)	464(86.09 %)	4.79

Question12



QUESTION 12
Average Score： 4.69

Question\ Choices	1	2	3	4	5	Average Score
Good sky detection	1(1.3%)	2(2.6%)	3(3.9%)	5(6.49%)	66(85.71%)	4.73
Natural sky fusion	1(1.3%)	3(3.9%)	4(5.19%)	5(6.49%)	64(83.12%)	4.66
Appropriate location of black outlines	1(1.3%)	6(7.79%)	3(3.9%)	3(3.9%)	64(83.12%)	4.6
Appropriate density of black outlines	2(2.6%)	1(1.3%)	4(5.19%)	5(6.49%)	65(84.42%)	4.69
Level of smoothing	0(0%)	2(2.6%)	3(3.9%)	8(10.39%)	64(83.12%)	4.74
Choice of cartoon color	0(0%)	1(1.3%)	6(7.79%)	5(6.49%)	65(84.42%)	4.74
Overall effect	0(0%)	3(3.9%)	2(2.6%)	11(14.29%)	61(79.22%)	4.69
Total	5(0.93%)	18(3.34%)	25(4.64%)	42(7.79%)	449(83.3%)	4.69

So far, there have been 77 people finished my survey. According to the data statistics above, most of the participant thought that my camera filter achieved a good effect on stylization. However, sometimes the high average score cannot indicate a perfect performance, since people usually tend to choose a lot of 5 without critically thinking. Even though, we can find that picture 3, 4, 8, 11 have more score1 and 2 than others.

Picture 3 have a good overall effect, but the long black line in the sky hasn't been eliminated and 5 people choose 1 in "Appropriate black outline location". Picture 4 failed in detect the whole cloudy sky, so that some people choose 1 and 2 in sky related questions. Picture 8 and 11 were successfully processed, but the overall effects are not good. 8's ocean doesn't look beautiful after stylization and 11's

mountain cannot be well stylized by my processing, these are the drawback of my method.

Picture 12's result beyond my expectation. Although the black lines in 12 are too dense and there is a long line in the sky, it's smoothing and color transfer are successful in my opinion. Nevertheless, there are still some people chose 2 or 3 in smoothing and color questions. I guess that the dense lines badly affected people's feeling on other effect in the picture.