A2 Algorithms' Evaluation

SBEN424 - Advanced Topics in Image Processing Computer Vision

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119088

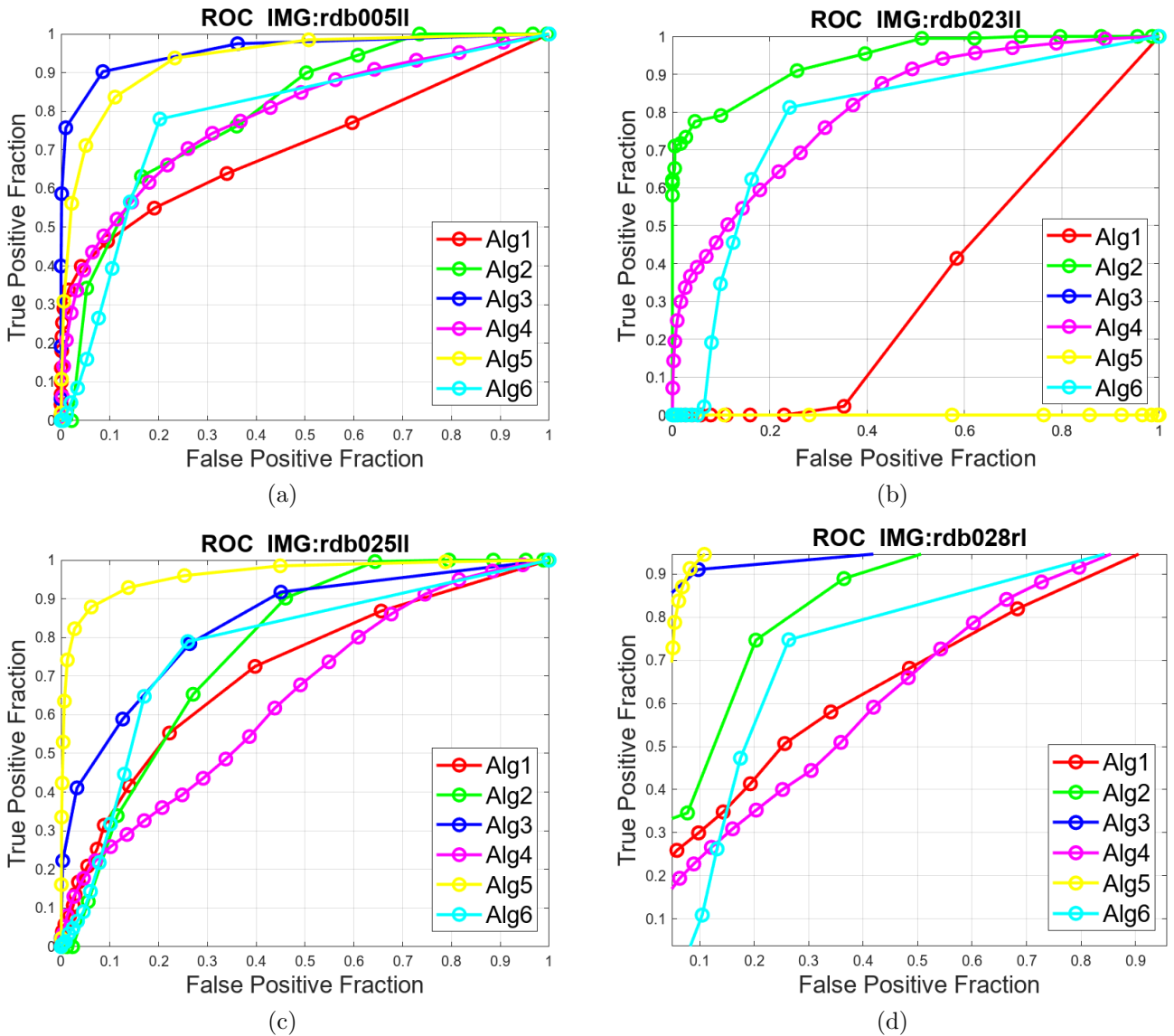## The ROC Curves for All 4 Images

Figure 1: R.O.C. for 4 images

The Results of the 2D Evaluation [wik, 2022] [wik, 2023]

	Alg1	Alg2	Alg3	Alg4	Alg5	Alg6
Area Under the curve	0.7122	0.8002	**0.9587**	0.7888	0.9340	0.7862
Jaccard	0.1419	0.0440	**0.7257**	0.1230	0.2844	0.0752
Dice	0.2485	0.0843	**0.8410**	0.2191	0.4429	0.1400
Hausdorff Distance	9.2736	13.5647	**4.4721**	10.0995	5.7446	9.7980

Table 1: 2D Evaluation for rdb005ll.png

The best algorithm as 1 shows is Alg3 because its AUC is larger than AUC of other algorithms, in addition to Jaccard and Dice similarity, and the Hausdorff Distance is smaller than other algorithms.

	Alg1	Alg2	Alg3	Alg4	Alg5	Alg6
Area Under the curve	0.3459	**0.9390**	0.0	0.8143	0.0	0.7816
Jaccard	0.0008	**0.1092**	0.0	0.0913	0.0	**0.0331**
Dice	0.0015	**0.1968**	0.0	0.1673	0.0	0.0641
Hausdorff Distance	11.4018	9.7468	**7.6811**	10.3441	**7.6811**	12.6886

Table 2: 2D Evaluation for rdb023ll.png

The best algorithm as 2 shows is **Alg2** because its AUC is larger than the AUC of other algorithms.

	Alg1	Alg2	Alg3	Alg4	Alg5	Alg6
Area Under the curve	0.7133	0.7701	0.8364	0.6439	**0.9630**	0.7726
Jaccard	**0.4684**	0.0626	0.3479	0.1013	0.4280	0.1070
Dice	**0.6380**	0.1179	0.5162	0.1839	0.5994	0.1933
Hausdorff Distance	**7.9373**	17.4642	11.1803	11.9164	8.3066	14.5945

Table 3: 2D Evaluation for rdb025ll.png

The best algorithm as 3 shows is **Alg5** because its AUC is larger than the AUC of other algorithms, in addition to its Jaccard and Dice distances is a 2nd smaller distance.

	Alg1	Alg2	Alg3	Alg4	Alg5	Alg6
Area Under the curve	0.6599	0.8419	0.9485	0.6356	**0.9588**	0.7205
Jaccard	0.3297	0.0828	**0.7260**	0.2491	0.5248	0.0983
Dice	0.4959	0.1529	**0.8412**	0.3988	0.6884	0.1791
Hausdorff Distance	8.0000	16.0624	6.2450	9.4868	**6.0828**	12.6095

Table 4: 2D Evaluation for rdb028rl.png

The best algorithm as 4 shows is **Alg5** because its AUC is larger than the AUC of other algorithms, in addition to its Jaccard and Dice distances is a 2nd smaller distance.

The Results of the 3D Evaluation

	Jaccard Index Mean	Dice Index Mean	Hausdorff Distance Mean
Measures	0.2171	0.2869	1.4502

Table 5: 3D Evaluation

Best Evaluation Measure

It depends on the input Data-set, There is no evaluation measure that is best for all cases, but each measure has some advantages and some disadvantages, and in general, the engineer must make a trade off according to the application that he is about to evaluate.

The Troubles You Have Encountered

- Dealing With Notebook in Matlab, the performance is prolonged.

- Can't use built-in trapezoid function in Matlab.

- Calculating Confusion Matrix parameters for 3D evaluation in one line.

Suggestions to Improve the Assignment

- Putting larger spaces of the code to complete them to take advantage of the assignment.

References

[wik, 2022] (2022). Jaccard index.

[wik, 2023] (2023). Sørensen–dice coefficient.