Weekly Report

Zhenyu Zhou

December 7, 2022

1 Joint Finger Knuckle and Fingerprint Verification

1.1 RFN64-RSSSIM with Quadruplet Loss

The quadruplet loss can increase inter-class variance and decrease intra-class variance result in more robust cluster when compared to the triplet loss function. Because the loss used two hard margin for training, the second margin is weak margin when compared to the first hard margin. The second margin is to help the original triplet loss for lower intra-class variance. For getting the best hard margin of quadruplet loss, we have tested the matching performance under changed α and $\alpha 2$ from the Table 1.

Table 1: Matching performance with different quadruplet margin

Loss	α	$\alpha 2$	Left-Little		Left-Ring		Left-Index	
			EER	GAR	EER	GAR	EER	GAR
RSSSIM	0.5	0.2	4.25%	83.00%	0.83%	96.00%	2.67%	85.50%
RSSSIM	**0.5**	**0.3**	**3.75%**	**88.00%**	**0.75%**	**98.00%**	**2.08%**	**92.00%**
RSSSIM	0.5	0.4	4.53%	87.00%	1.08%	97.00%	2.58%	92.00%
RSSSIM	0.5	0.5	3.75%	86.50%	0.67%	97.00%	1.92%	91.00%
RSSSIM	**0.6**	**0.3**	**4.45%**	**88.50%**	**0.67%**	**97.50%**	**1.92%**	**94.00%**
RSSSIM	0.6	0.4	3.43%	84.00%	0.50%	97.00%	1.92%	89.50%
RSSSIM	0.6	0.5	4.00%	68.00%	0.50%	89.50%	2.00%	84.00%
RSSSIM	0.5	0	4.08%	85.50%	0.67%	97.00%	2.58%	91.00%

1.2 Finger Knuckle and Fingerprint Score Fusion

Performance		RSSSIM-0.5-0.3	RSSIM-0.6-0.3
Left-Little	EER	3.75%	4.45%
	GAR	88.00%	88.50%
Left-Ring	EER	0.75%	0.67%
	GAR	98.00%	98.00%
Left-Index	EER	2.08%	1.92%
	GAR	92.00%	92.00%
Left-Thumb	EER	3.75%	3.50%
	GAR	76.00%	81.00%
Right-Thumb	EER	2.25%	2.58%
	GAR	82.00%	90.50%
Right-Index	EER	1.75%	1.92%
	GAR	94.00%	95.00%
Right-Middle	EER	1.58%	1.58%
	GAR	97.00%	98.00%
Right-Ring	EER	1.17%	1.08%
	GAR	97.50%	98.00%
Right-Little	EER	6.00%	5.39%
	GAR	84.00%	83.00%