



## **1.** Motivation

### **Observation from Right Fig:**

a. Some false positives are more similar to the probe image; b. These false positives never show up in training set.

## **Conclusion:**

The trained model has *lower* generalization ability on testing set.





# **Beyond triplet loss: a deep quadruplet network for person re-identification** Weihua Chen, Xiaotang Chen, Jianguo Zhang, Kaiqi Huang *{weihua.chen, xtchen, kqhuang}@nlpr.ia.ac.cn, j.n.zhang@dundee.ac.uk*

$$(x_k)^2 + \alpha_2]_+$$

# **3. Margin-based online hard negative mining**

**Advantage:** We use the average distances of two distinct distributions (i.e., the positive pair distance distribution and the negative pair distance distribution) to represent margin thresholds, which can be learned adaptively.

$$\alpha = w(\mu_n - \mu_p) = w(\frac{1}{N_n} \sum_{i,k}^N g(x_i, x_k)^2 - \frac{1}{N_p} \sum_{i,j}^N g(x_i, x_k)^2 - \frac{1}{N_$$

## 4. Quadruplet Network





$$L_{quad} = \sum_{i,j,k}^{N} [g(x_i, x_j)^2 - g(x_i, x_k)^2 + \alpha_1]_+$$

 $\int g(x_i, x_j)^2 \qquad s_i = s_j, s_i \neq s_k$ 



I'm now at the end of my PhD and looking for a place where my skills and passion will have the highest positive impact. My homepage: *http://cwhgn.github.io/* 

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3	CUHK01(p=486)			CUHK01(p=100)			VIPeR		
r = 10	r = 1	r = 5	r = 10	r = 1	r = 5	r = 10	r = 1	r = 5	r = 10
29.96	15.98	35.22	45.60	17.10	42.31	55.07	-	-	-
38.28	19.76	32.72	40.29	22.84	43.89	57.67	26.31	46.61	58.86
52.57	-	-	-	29.40	57.67	62.43	19.60	48.00	62.20
67.00	-	-	-	27.87	64.00	77.00	-	-	-
-	34.30	55.00	65.30	-	-	-	29.11	52.34	65.95
66.38	32.76	59.01	69.63	42.76	69.01	79.63	32.33	65.78	79.72
-	-	-	-	-	-	-	34.40	62.15	75.89
94.00	47.53	71.50	80.00	65.00	89.50	93.00	34.81	63.32	74.79
92.00	-	-	-	72.50	91.00	95.50	35.76	67.00	82.50
-	50.41	75.93	84.07	70.94	92.30	96.90	38.37	69.22	81.33
-	-	-	-	-	-	-	40.50	60.80	70.40
92.45	64.98	84.96	89.92	-	-	-	42.28	71.46	82.94
94.30	53.40	76.30	84.40	-	-	-	45.90	77.50	88.90
92.73	-	-	-	67.12	89.45	91.68	44.11	72.59	81.66
96.00	57.80	79.10	86.20	-	-	-	49.70	79.70	88.70
94.60	-	-	-	-	-	-	37.80	66.90	77.40
-	53.70	84.30	91.00	-	-	-	47.80	74.70	84.80
97.10	71.70	88.60	92.60	-	-	-	35.40	62.30	69.30
95.15	44.24	67.08	77.57	63.50	80.00	89.50	28.16	52.22	65.19
97.47	58.74	80.35	88.07	77.00	94.00	97.50	40.19	70.25	82.91
98.10	58.85	82.61	88.37	77.50	95.00	96.50	44.30	72.47	80.06
97.68	59.26	82.41	88.27	78.00	95.50	98.00	44.30	71.84	81.96
98.95	62.55	83.02	88.79	79.00	96.00	97.00	48.42	74.05	84.49
97.47	58.74	79.01	87.14	76.50	94.00	97.00	44.30	69.94	81.96
99.16	62.55	83.44	89.71	81.00	96.50	98.00	49.05	73.10	81.96

