

Siamese Networks

✓ **Video:** Week Introduction  
46 sec

✓ **Video:** Siamese Networks  
2 min

✓ **Reading:** Siamese Network  
5 min

✓ **Video:** Architecture  
3 min

✓ **Reading:** Architecture  
3 min

✓ **Lab:** Creating a Siamese Model  
20 min

✓ **Video:** Cost Function  
3 min

✓ **Reading:** Cost Function  
6 min

✓ **Video:** Triplets  
5 min

📖 **Reading:** Triplets  
6 min

▶ **Video:** Computing The Cost I  
5 min

📖 **Reading:** Computing the Cost I  
6 min

▶ **Video:** Computing The Cost II  
6 min

📖 **Reading:** Computing the Cost II

# Triplets

To get the full cost function you will add a margin to the previous cost function.

How old are you?

A

What is your age?

P

Where are you from?

N

Simplified cost:

$$-\cos(A, P) + \cos(A, N) \leq 0$$

-0.5

+ 0.5

+ 0.2

≤ 0

-1

+ -1

≤ 0

Add a margin:

$$-\cos(A, P) + \cos(A, N) + \alpha \leq 0$$

Full cost:

$$\max(-\cos(A, P) + \cos(A, N) + \alpha, 0)$$

Note the  $\alpha$  in the equation above, which represents the margin. This allows you to have some "safety", when comparing the sentences. When computing the full cost, you take the max of the outcome of  $-\cos(A, P) + \cos(A, N) + \alpha$  and 0. Note, we do not want to take a negative number as a cost.

Here is a quick summary:

- **$\alpha$ :** controls how far  $\cos(A, P)$  is from  $\cos(A, N)$
- **Easy** negative triplet:  $\cos(A, N) < \cos(A, P)$
- **Semi-hard** negative triplet:  $\cos(A, N) < \cos(A, P) < \cos(A, N) + \alpha$
- **Hard** negative triplet:  $\cos(A, P) < \cos(A, N)$