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Siamese Networks

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Video: Week Introduction

46 sec
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Video: Siamese Networks

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Reading: Siamese Network

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Video: Architecture

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Reading: Architecture

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Lab: Creating a Siamese Model

20 min
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Video: Cost Function

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Reading: Cost Function

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Video: Triplets

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Video: Computing The Cost I

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Lab: Implementing the Modified Triplet Loss in TensorFlow

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Lab: Evaluate a Siamese Model

20 min
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Video: Week Conclusion

37 sec

Lecture Notes (Optional)

Practice Quiz

Assignment: Question Duplicates

Acknowledgments

Cost Function

Take a close look at the following slide:

How old are you?

Anchor

$\cos(v_1, v_2) = \frac{v_1 \cdot v_2}{||v_1|| ||v_2||}$

What is your age?

Positive

$\cos(A, P) \approx 1$

Where are you from?

Negative

$\cos(A, N) \approx -1$

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

Note that when trying to compute the cost for a siamese network you use the triplet loss. The triplet loss looks at an Anchor, a Positive and a Negative example It's important to note that you aim to adjust the model's weights in a way that the anchor and the positive example have a cosine similarity score close to 1. Conversely, the anchor and the negative example should have a cosine similarity score close to -1. More concretely, you seek to minimize the following equation: n:

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

Note that if $\cos(A, P) = 1$ and $\cos(A, N) = -1$, then the equation is definitely less than 0. However, as $\cos(A,P)$ deviates from 1 and $\cos(A,N)$ deviates from -1, then you can end up getting a cost that is > 0. Here is a visualization that would help you understand what is going on. Feel free to play with different numbers.

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

$\cos(A, P) \approx 1$
 $\cos(A, N) \approx -1$

prediction	$-\cos(A,P)$	$\cos(A,N)$	sum
✓	-1	-1	-2
✗	-(-1)	1	2

Mark as completed