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# Neural Style Transfer

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## Content cost function

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$$\underline{J(G)} = \alpha \underline{J_{content}(C, G)} + \beta J_{style}(S, G)$$

- Say you use hidden layer  $\underline{l}$  to compute content cost.
- Use pre-trained ConvNet. (E.g., VGG network)
- Let  $\underline{a^{[l](C)}}$  and  $\underline{a^{[l](G)}}$  be the activation of layer  $l$  on the images
- If  $a^{[l](C)}$  and  $a^{[l](G)}$  are similar, both images have similar content

$$J_{content}(C, G) = \frac{1}{2} \left\| \underbrace{a^{[l](C)}}_{\text{activation of layer } l \text{ on } C} - \underbrace{a^{[l](G)}}_{\text{activation of layer } l \text{ on } G} \right\|^2$$