

# Spontaneous emergence of robustness to light variation in CNNs with precortically inspired module

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8 December 2023

Consider an image  $\vec{x}$ , with pixels  $x_i$ .  
We define the **brightness change** as  
the mean offset

$$x_i \rightarrow x_i - \mu$$

and the **contrast change** as the  
rescaling

$$x_i \rightarrow \frac{x_i - \langle \vec{x} \rangle}{\sigma} + \langle \vec{x} \rangle$$