



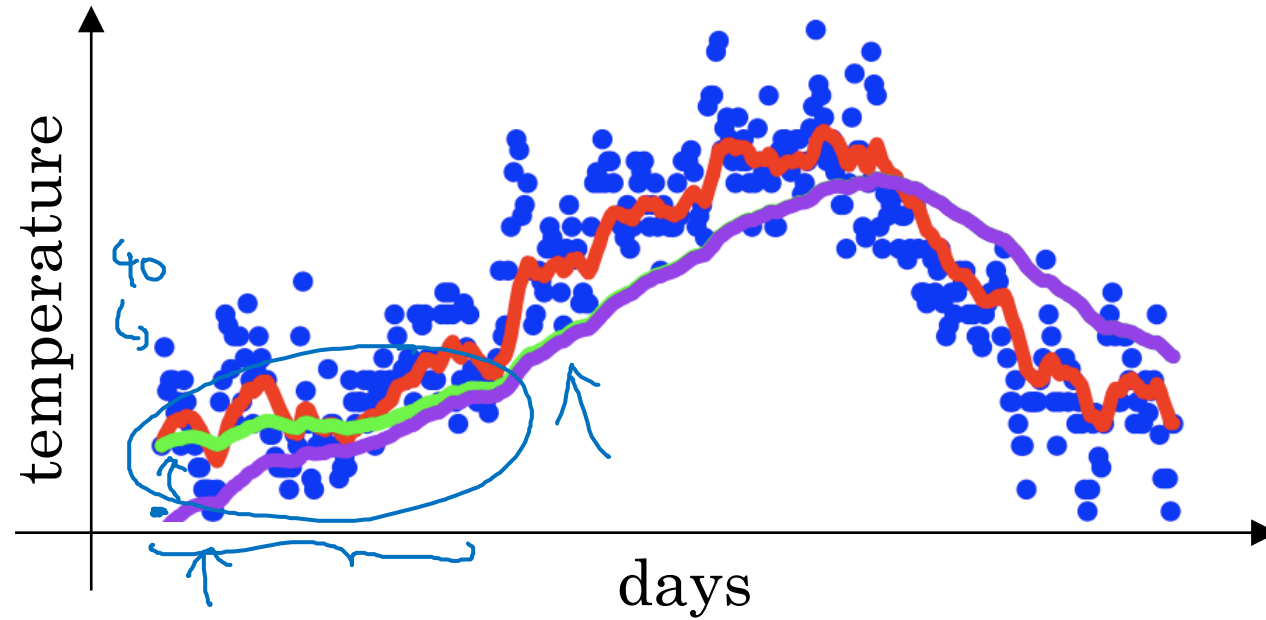
deeplearning.ai

# Optimization Algorithms

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Bias correction  
in exponentially  
weighted average

# Bias correction



$$\beta = 0.98$$

$$\rightarrow v_t = \beta v_{t-1} + (1 - \beta) \theta_t$$

$$v_0 = 0$$

$$\underline{v_1} = \cancel{0.98 v_0} + \underline{0.02 \theta_1}$$

$$v_2 = 0.98 v_1 + 0.02 \theta_2$$

$$= 0.98 \times 0.02 \times \theta_1 + 0.02 \theta_2$$

$$= \underline{0.0196 \theta_1} + \underline{0.02 \theta_2}$$

$$\frac{v_t}{1 - \beta^t}$$

$$t=2: 1 - \beta^t = 1 - (0.98)^2 = 0.0396$$

$$\frac{v_2}{0.0396} = \frac{0.0196 \theta_1 + 0.02 \theta_2}{0.0396}$$