Optimization Algorithms

Exponentially weighted averages

deeplearning.ai

Temperature in London

$\theta_1 = 40°F$ 4°C ←

$\theta_2 = 49°F$ 9°C

$\theta_3 = 45°F$

$\vdots$

$\theta_{180} = 60°F$ 15°C

$\theta_{181} = 56°F$

$\vdots$
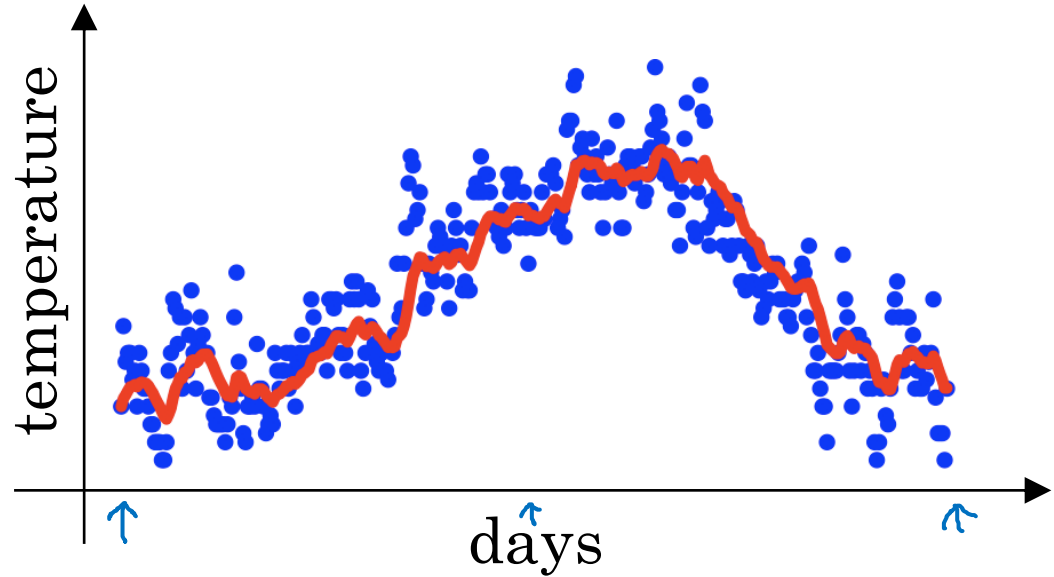
temperature

days

$V_0 = 0$

$V_1 = 0.9 V_0 + 0.1 \theta_1$

$V_2 = 0.9 V_1 + 0.1 \theta_2$

$V_3 = 0.9 V_2 + 0.1 \theta_3$

$\vdots$

$\boxed{V_t = 0.9 V_{t-1} + 0.1 \theta_t}$

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Exponentially weighted averages

moving

$$V_t = \beta V_{t-1} + (1-\beta)\Theta_t \leftarrow$$

$\beta = 0.9$: ≈ 10 days' temperature

$\beta = 0.98$: ≈ 50 days

$\beta = 0.5$: ≈ 2 days

V_t as approximately average over

$\rightarrow \approx \dfrac{1}{1-\beta}$ days' temperature.

$$\dfrac{1}{1-0.98} = 50$$

temperature / days

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