

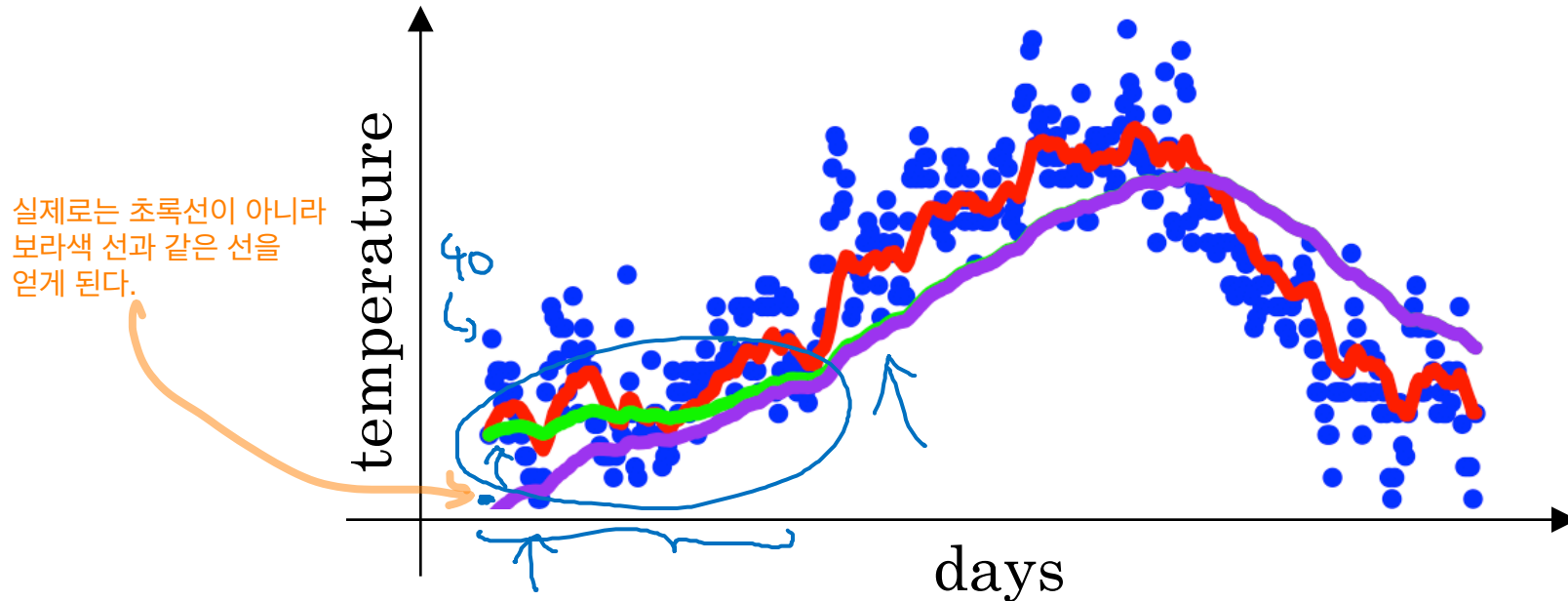


deeplearning.ai

Optimization Algorithms

Bias correction
in exponentially
weighted average

Bias correction



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

$$v_0 = 0$$

$$v_1 = \cancel{0.98 v_0} + \underbrace{0.02 \theta_1}_{\text{첫날 온도는 40인데 이렇게 계산하면 } v_1 \text{은 그다지 좋지 않은 추정값인 8을 갖게 된다.}}$$

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

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

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

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

이렇게 초기에 실제값과 추정값이 차이가 많이 나는 것을 보장해줄 수 있는 방법이 bias correction 이다.

$$t=1: 1 - \beta^t = 1 - 0.98 = 0.02$$

$$\frac{v_1}{0.02} = \frac{0.02 \theta_1}{0.02} = \theta_1$$

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

$$\frac{v_2}{0.0396}$$

$$= \frac{0.0196 \theta_1 + 0.02 \theta_2}{0.0396} \approx \frac{1}{2} \theta_1 + \frac{1}{2} \theta_2$$