

# 4. Understanding Exponentially Weighted Averages

Tags Exponentially weighted averages


Exponentially weighted averages

Implementing exponentially weighted averages

## Exponentially weighted averages

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

$$\begin{aligned}
 v_{100} &= 0.9v_{99} + 0.1\theta_{100} \\
 v_{99} &= 0.9v_{98} + 0.1\theta_{99} \\
 v_{98} &= 0.9v_{97} + 0.1\theta_{98} \\
 &\dots \\
 \rightarrow v_{100} &= 0.1\theta_{100} + 0.9(0.1\theta_{99} + 0.9(0.1\theta_{98} + 0.9(0.1\theta_{97} + 0.9(0.1\theta_{96} + \dots))) \\
 &= 0.1\theta_{100} + 0.1 \times 0.9 \times \theta_{99} + 0.1(0.9)^2\theta_{98} + 0.1(0.9)^3\theta_{97} + 0.1(0.9)^4\theta_{96} + \dots
 \end{aligned}$$


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## Implementing exponentially weighted averages

# Implementing exponentially weighted averages

$$v_0 = 0$$

$$v_1 = \beta v_0 + (1 - \beta) \theta_1$$

$$v_2 = \beta v_1 + (1 - \beta) \theta_2$$

$$v_3 = \beta v_2 + (1 - \beta) \theta_3$$

...

$$V_\theta := 0$$

$$V_\theta := \beta v + (1 - \beta) \theta_1$$

$$V_\theta := \beta v + (1 - \beta) \theta_2$$

⋮

$$\rightarrow V_\theta = 0$$

Repeat {

Get next  $\theta_t$

$$V_\theta := \beta V_\theta + (1 - \beta) \theta_t$$

}

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- it takes very low memory
- overite하면서 메모리를 절약할 수 있음