

This is the same as checking if:

$$\vec{w} \cdot \vec{\phi}(\text{the,dog,barks,loudly, 4, VB, ADV}) > \vec{w} \cdot \vec{\phi}(\text{the,dog,barks,loudly, 4, VB, VB})$$

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$$\vec{w}$$

↓		↓	↓
1	← $s_i = \text{ADV}$ and x_i ends in “-ly” →	0	3
1	← $s_i = \text{ADV}$ and $s_{i-1} = \text{VB}$ →	0	2
0	← $s_i = \text{VB}$ and $s_{i-1} = \text{VB}$ →	1	-2
0	← $s_i = \text{NN}$ and $s_{i-1} = \text{VB}$ →	0	-2
0	← $s_i = \text{VB}$ and $x_i = \text{loudly}$ →	1	-4
0	← $s_i = \text{NN}$ and $x_i = \text{loudly}$ →	0	-5
0	← $s_i = \text{DET}$ and $x_i = \text{loudly}$ →	0	-5
1	← $s_i = \text{ADV}$ and $x_i = \text{loudly}$ →	0	3

frequent events get positive weights after training while infrequent events get negative (or close to zero) weights.

$$\vec{w} \cdot \vec{\phi}(\text{the,dog,barks,loudly, 4, VB, ADV}) = 1 * 3 + 1 * 2 + 1 * 3 = 6$$

$$> \vec{w} \cdot \vec{\phi}(\text{the,dog,barks,loudly, 4, VB, VB}) = 1 * -2 + 1 * -4 = -6$$