

## Softmax Classifier (Multinomial Logistic Regression)



$$L_i = -\log\left(\frac{e^{s_{y_i}}}{\sum_j e^{s_j}}\right)$$

unnormalized probabilities

cat  
car  
frog

**3.2**  
5.1  
-1.7

exp

**24.5**  
164.0  
0.18

normalize

**0.13**  
0.87  
0.00

unnormalized log probabilities

probabilities

$L_i = -\log(0.13)$   
 $= 0.89$