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CSC 487-01
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1. magnitude(w) = sqrt(a^2 + b^2)
   = sqrt($(0.5)^2$ + $(0.5)^2$)
   = sqrt(0.25 + 0.25)
   = sqrt(0.5)
   ~= **0.7071**

2. $x * w^T$ = [0.5, 0.5] * $[0.75, 1.25]^T$
   = (0.5 * 0.75) + (0.5 * 1.25)
   = 0.375 + .625
   = **1**

3. $x^T * w$ = $[0.5, 0.5]^T$ * [0.75, 1.25]
   = [(0.5 * 0.75) (0.5 * 1.25)
   (0.5 * 0.75) (0.5 * 1.25)]
   = [0.375 0.625
   0.375 0.625]

4. dot product = (0.5 * 0.75) + (0.5 * 1.25)
   = 0.375 + 0.625
   = 1

5. 1 = |a| * |b| * cos(theta)
   1 = 0.7071 * 1.25 * cos(theta)
   1 / (0.7071 * 1.25) = cos(theta)
   theta = $\cos^{-1}(0.8)$

6. resultant vector = [0.5 + 0.75, 0.5 + 1.25]
   = **[1.25, 1.75]**

7. Prediction is for a model to predict a continuous numeric value or range of values. This is like float numbers or a numeric value that can be desired. Classification is used for classifying inputs into various discrete categories.

8. w0 = w0 + v*(t-y)x0 = 0 + 0.25(1-1)1 = 0
   w1 = w1 + v(t-y)x1 = 0.5 + 0.25(1-1)0 = 0.5
   w2 = w2 + v(t-y)x2 = -0.5 + 0.25(1-1)*1 = -0.5

   w0 = w0 + v*(t-y)x0 = 0 + 0.25(0-1)1 = -0.25

w1 = w1 + v(t-y)x1 = 0.5 + 0.25(0-1)0 = 0.5
w2 = w2 + v(t-y)x2 = -0.5 + 0.25(0-1)*0 = -0.5