

Quiz Instructions

Instructions:

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Question 1

20 pts

Construct a support vector machine that computes the XOR function. Use values of +1 and -1 (instead of 1 and 0) for both inputs and outputs, so that an example looks like $([-1, 1], 1)$ or $([-1, -1], -1)$. Map the input $[x_1, x_2]$ into a space consisting of x_1 and $x_1 x_2$. Draw the four input points in this space and the maximal margin separator. What is the margin? Now draw the separating line back in the original Euclidean input space.

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Question 2

10 pts

Recall that the equation of the circle in the 2-dimensional plane is $(x_1 - a)^2 + (x_2 - b)^2 - r^2 = 0$.

Expand out the formula and show that every circular region is linearly separable from the rest of the plane in the feature space (x_1, x_2, x_1^2, x_2^2) .

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