2. Higher Order Feature Vectors

Exercises due Mar 8, 2023 08:59 -03 Completed

Higher Order Feature Vectors

0:00 / 0:00 1.0x

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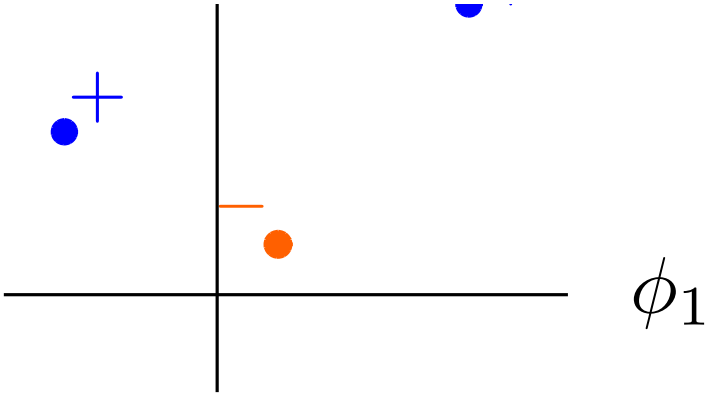
We can use linear classifiers to make non-linear predictions. The easiest way to do this examples $\boldsymbol{x} \in \mathbb{R}^{d}$ to different feature vectors $\boldsymbol{\phi}\left(\boldsymbol{x}\right) \in \mathbb{R}^{p}$ where typically $\boldsymbol{p}$ is much la then simply use a linear classifier on the new (higher dimensional) feature vectors, pret the original input vectors. As a result, all the linear classifiers we have learned remain a non-linear classifiers in the original coordinates.

There are many ways to create such feature vectors. One common way is to use polyno original coordinates as the components of the feature vectors. We have seen two exam We will recall the 1-dimensional example here and see another 2-dimensional example

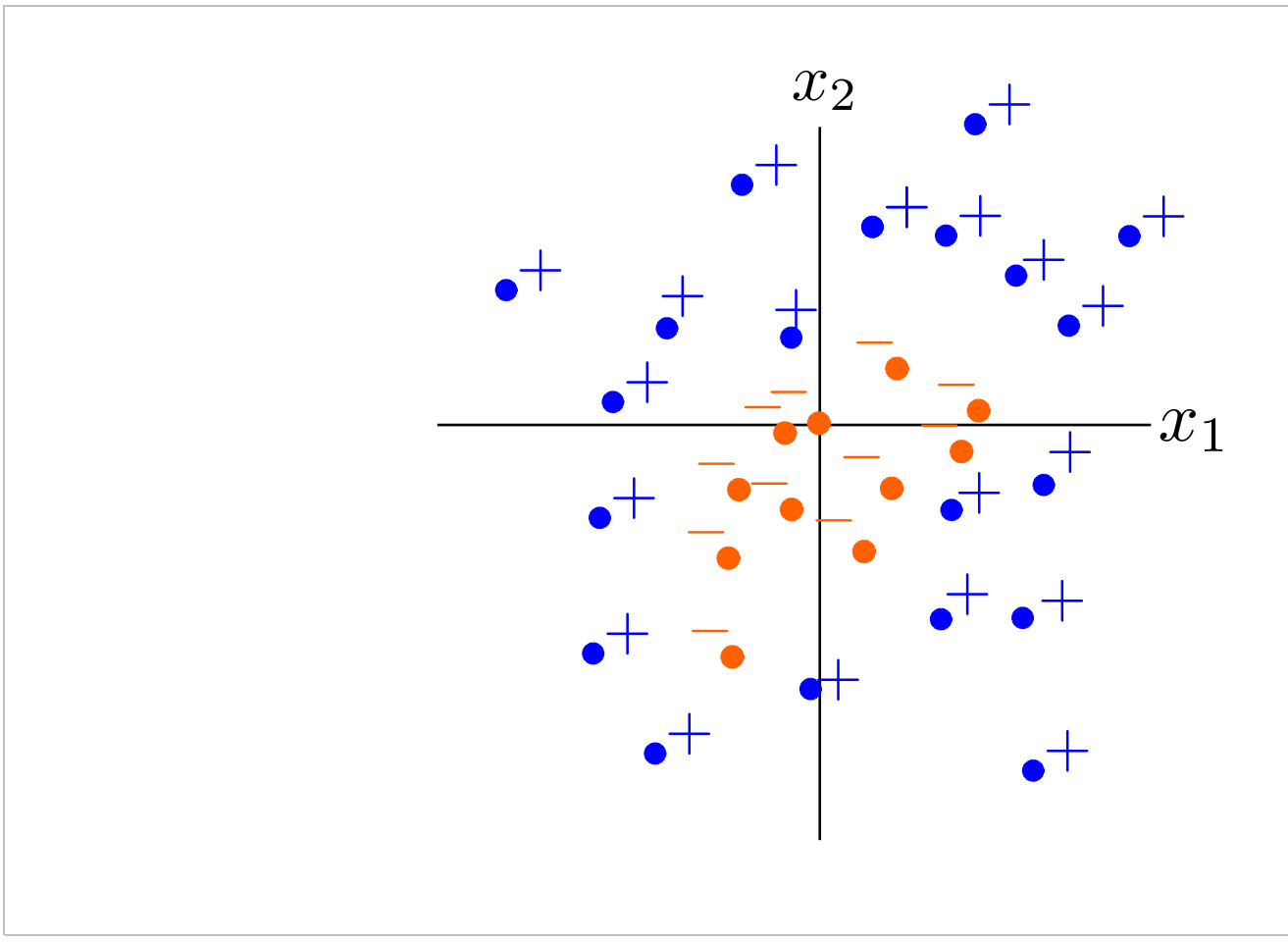
Example: Given 3 training examples with $\boldsymbol{x}^{(t)} \in \mathbb{R}\ \left(t = 1, 2, 3\right)$ that are not linearly s 1-dimensional space as shown below,



The new training set is linearly separable in the 2-dimensional -space, and we
classifier" that is linear in the -coordinates.

Another 2-Dimensional Example

0/1 point (graded)



Given the training examples with above, where a boundary bet
labeled examples and the negatively-labeled examples is an ellipse, which of the follow
will guarantee that the training set (where
linearly separable?

Hint: You'll likely find it helpful to review equations for ellipses. We implicitly include bia

✖

Submit You have used 3 of 3 attempts

Discussion

Topic: Unit 2. Nonlinear Classification, Linear regression, Collaborative Filtering (2 weeks):Lecture 6. Nonlinear Classification / 2. Higher Order Feature Vectors

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? So for higher power like 3, will there always be a term x1×2×3?
Just trying to understand for higher power if the same concept applies and why this is so.

? Slides?
Are clean slides available anywhere?

Pourpose of higher order feature vectors
1. Can we say that, in summary, the higher order feature vectors perform a transformation on our dataset suc

Read Carefully
Rad careful what is written in the problem description: > where a boundary between the positively-labeled e

Any hint? I don't know how to interpret the last one, Phi(x)
I don't know how to interpret the last equation on the options provided. I can't make sense out of it. Can som

? How much does the third element of a 3D mapping need to resemble the target shape?
So, it's fairly obvious that you can't use just any shape in the higher dimension. But I'm not clear on the paran

Keeping Original features from Polynomial Transformation?
Is it necessary to keep the original feature x when we use x^2 in our classifier?

Wrong separator at time 3:07 in the video
Because theta is one dimensional, it can not be a vector as shown in the video. theta is just a scalar, so shou

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