7. The Radial Basis Kernel

The Radial Basis Kernel

9:35 / 9:35 Speed 1.50x

powerful.

Then, we can collapse those computations by operating implicitly in the feature representations with the help of kernel functions.

And one kernel function, radial basis kernel, is particularly powerful, because it is easy to evaluate,

but it corresponds to infinite dimensional feature vectors,

that we could not operate explicitly,

but we can operate through the kernel function quite well.

Video

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Calculating the Radial Basis Kernel

0 points possible (ungraded)

Recall from the video above that the **radial basis kernel** K is given by

$$K\left(x, x'\right) = e^{-\frac{1}{2}||x-x'||^2}$$

Let

$$\begin{aligned} x &= \left[1, 0, 0\right]^T \\ x' &= \left[0, 1, 0\right]^T. \end{aligned}$$

Compute the radial basis kernel $K\left(x, x'\right)$.

- [ ] $\frac{\sqrt{2}}{2}$
- [x] e^{-1} ✔
- [ ] $e^{-\frac{1}{2}}$
- [ ] $e^{\frac{\sqrt{2}}{2}}$

✔

Solution:

$K\left(x, x'\right) = e^{-\frac{1}{2}||x-x'||^2} = e^{-\frac{1}{2}(2)} = e^{-1}.$

Submit You have used 1 of 2 attempts

Answers are displayed within the problem

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Topic: Unit 2 Nonlinear Classification, Linear regression, Collaborative Filtering (2 weeks):Lecture 6. Nonlinear Classification / 7. The Radial Basis Kernel

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? Why RBF can be a kernel? 9
Hi, any idea to show why the RBF \\(e^{-\frac{1}{2}\Vert x-x'\Vert ^2}\\) can be a kernel? Thanks

? Calculating the Radial Basis Kernel 4
Is there single answer or multiple ? I thought it was single but the format has checkbox instead of radio button

2.5 minutes on decision trees and random forests... 2
Hah, shows what folks are not interested in any more. 😜 Back in the day, we'd have started with "instance-based learning", then K-means, then decision trees,... (Then Naive ...
Community TA

Drawing the decision boundary 3
Hi, I understand that using the kernel perceptron algorithm, we find alpha values instead of theta values. However, after knowing the alpha values, how to go about drawing t...

Notation 2
I have a question regarding the notation |x-x'|. Does this assume an element wise operation? Hence x and x' being of the same shape?

Most of the shortcomings of KNN can be significantly mitigated by High Order Clustering 1
My strong recommendation to the lecturers of this course is to read the following paper: "Clustering Irregular Shapes Using High-Order Neurons" by Hod Lipson and Hava T. ...

? What are the additional features created by RBF 4
hi What are the features that RBF creates, x is the original feature vectors, x' is some transformation of x. We know RGF function, how is it leaning to new features ?