theory5

by Kondrashov Anton

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1 Task

Done at the lesson.

2 Task

Suppose that we have 2 points of one class(l): x_1 and x_2 and the third point x_n that lies on the line connecting the previous two.

$$\left.\begin{aligned} x_n &= \lambda x_1 + (1-\lambda)x_2 \\ g_c(x) &= w_c^T x + w_{c0} \end{aligned}\right| \Rightarrow g_l(x_n) = \lambda g_l(x_1) + (1-\lambda) g_l(x_2) \tag{1}$$

Then $g_l(x_1) > g_m(x_1)$ and $g_l(x_1) > g_m(x_1)$ for all m and l that are not related to the same class. That means that x_n also lies in decision region of class l. Decision region l is convex and it was representing any decision region of linear classifier without constraints.

3 Task

The commonly used technique is called regularization.