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Application of Classification Algorithms of Machine Learning in Practice

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ABSTRACT

In this article, machine learning is an important technology in the field of programming that studies data analysis and mapping data to class classes. Its main tasks are to analyze data and connect them to certain classes, to teach how to perform classification. This is classification algorithms data in analysis, technical in the fields and another in the fields wide is used.

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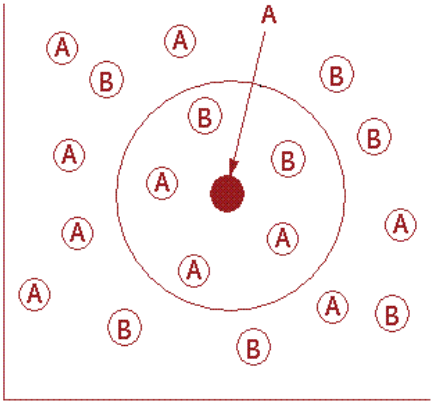
K is close neighbors' method. K is close neighbors method (k-nearest neighbors , k-NN) is different of methods different respectively training phase _ Demand does not Classification the issue solve method a lot dimensional characters from the collection the most a lot found k close neighbors to classes separate is considered This is classification models of teaching the most simple from algorithms is one The number K is characters in the field classifiable objects with comparable neighbor objects is the number Otherwise that is , if k=10 in it each one object Oz's 10 neighbors between distance with is compared . The method is in Data Mining technologies classification the issue solve for is used.

Teaching in the process algorithm all vector characters ini and to him suitable class levels simple way remembering remains.

the test set each one the object classification for ship respectively under actions perform is necessary:

- ✓ Teaching in the selection each one to the object was the distance count
- ✓ Teaching from selection from each other distance minimal k objects _ _ choose get
- ✓ Classifiable your object class is k close _ neighbors between a lot occurring is a class.



Euclid distance: Many dimensional characters in the field geometric the distance the formula below is visible count can _

$$d_{ab} = \sqrt{\sum_{i=1}^{n}(x_{ai} - x_{bi})^2},$$

this on the ground a and$b$ n - dimensional in the field dot , i - character order number , $x_{ai}$and x_{bi}– i sign according to a and b coordinates .

Simple weightless sound give:
The new item is the most a lot sound received to class will be added this process through the formula below is executed:

$$y_a(a, X, k) = argmax_{y \in Y} \sum_{i=1}^{k} (y_a^{(i)} = y)$$

Here _ *a is* new object ,
X- teaching selection ,
y- class
Y- classes collection
y_a^i- of a in class *i is* the neighbor of th
k- add the number

Such in case new to the object was considering the distance is taken .

$$y_a(a, X, k) = argmax_{y \in Y} \sum_{i=1}^{k} \frac{1}{d^2(a, b)} (y_a^{(i)} = y)$$

this on the ground a- new facility ,
X- teaching selection ,
y- class
Y- classes collection
y_a^i- a of in class i -th neighbor .
$d(a, b)$- b is known of the object new to the object was distance _
k- neighbors the number

Knn method advantages :

- ✓ Algorithm program done increase relatively simple _
- ✓ Algorithm modification can _
- ✓ Algorithm anomalous leave to be sent resistant
- ✓ Algorithm niche interpretation to do ability _

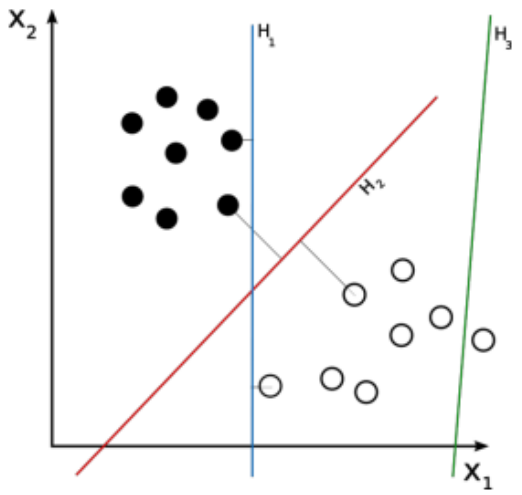
Knn method disadvantages :

- ✓ Algorithm for applied data collection representative to be need _
- ✓ Teaching selection full without storage necessity .
- ✓ Most simple cases metric algorithms the algorithm information adaptation opportunity an exception who does very less parameters to the complex have _
- ✓ To productivity expendable value high because _ each one example and all samples between the distance our calculation need _

SVM method (Support Vector Machine). The SVM method is a "tutored learning" type algorithm used for regression analysis and classification problems. The main idea of the SVM method is to transform the incoming vectors into a higher-dimensional domain and search for maximum slots separating the hyperplane in this domain. Two parallel hyperplanes are constructed on 2 sides of our class-separating hyperplane.
A separating hyperplane is a hyperplane that maximizes the distance to 2 parallel hyperplanes. The greater the distance between these parallel hyperposes, the smaller the average error of the classification algorithm [20].
We will consider the issue of classification of 2 non-intersecting objects.
Let us be given the following:

- X is the field of objects, $X \in R^n$,
- C are classes , $C \in \{-1,1\}$

(x_1, c_1), .., (x_m, c_m) teacher sample.
Let us be required to construct a function F: X → C that matches a free object x to a class.



To do this, consider the training set for each element, which is set to the corresponding class. Our task is to ensure that the SVM classifies them in the same way. To do this, the method generates a separating hyperbola that looks like this:

$$w * x - b = 0 (25)$$

w- vector is perpendicular to the separating hyperplane. b parameter is equal to the module of the distance from the hyperbola to the coordinate origin.

If the parameter b=0, the hyperbola passes through the origin of the coordinate.

Choosing a separating hyperpus

The optimal separating hyperplane for the SVM method is constructed at 2 class points. Points close to the parallel hyperbola are called support (opornymi) vectors.

Since it is necessary for optimal separation, we need a hypersurface parallel to the optimal direction and as close as possible to the support vectors of both classes. Without limiting the generality of reasoning, such parallel hyperposes can be characterized by the following equations:

$$w * x - b = 1$$

$$w * x - b = -1 (26)$$

If the training sample is linearly separable, then we can choose hyperposes so that they are not between any points of the training problem and then increase the distance between the hyperposes . The width of the line between them $\frac{2}{\|w\|}$is equal to So the problem ||w|| can be minimized to .

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