Mahdieh Najafy
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What are pros and cons of decision tree versus other classifier as KNN,SVM,NN?

I have to explain advantage and disadvantage of decision tree versus other classifier

Topics

KNN | Support Vector Machine | Data Mining and Knowledge Discovery | Machine Learning

Nov 8, 2012

All Answers (10)

Corrado Mencar · Università degli Studi di Bari Aldo Moro

The main advantage is interpretability. Decision trees are "white boxes" in the sense that the acquired knowledge can be expressed in a readable form, while KNN,SVM,NN are generally black boxes, i.e. you cannot read the acquired knowledge in a comprehensible way. You can read Michalski on the topic.

Nov 9, 2012

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Agree that Decision tree is easy to interpret, complexity is the down side & the tree might get too large even after some pruning.
NN is a black box, and the net model is not interpretable, but the accuracy usually high.
SVM is convex, unlike NN, it is always convergent & the accuracy is comparable to NN.

Nov 9, 2012

Mahdieh Najafy · University of Zanjan

thanks for your reply. I want exert Decision tree for my project.

Nov 10, 2012

Ali Katanforoush · Shahid Beheshti University

The main different somehow is about the domain of application. Note that kNN and SVM are used for continuous value inputs, unlike Decision Trees that is applicable for continuous and categorical inputs. If you deal with a problem where inputs are categorical values (~ discrete values) even in part then you have to apply the trees.

Nov 11, 2012

Ryan Benton · University of South Alabama

Two quick notes:
1) In terms of decision trees, the comprehensibility will depend on the tree type. CART, C5.0, C4.5 and so forth can lead to nice rules. LTREE, Logistic Model Trees, Naive Bayes Trees generally are less so. They are running models within each node. In this case, the latter are using a divide and conquer approach, merged with 'modeling'. CART and the C5.0/C4.5 family are using unit tests, which lead to the comprehensibility.

2) KNN, at least, can be used with categorical data and/or mixture of continuation and/or categorical. This can impact the distance measure utilized. You could look at D. Randall Wilson's Advances in Instance-Based Learning Algorithms (dissertation) or Improved Heterogeneous Distance Functions (journal) for examples. Granted, a bit old, but the point is still valid. Papers can be seen here:
http://synapse.cs.byu.edu/~randy/misc/pubs.html

Nov 19, 2012

Beau Piccart · University of Leuven

I'd like to add that a tree does automatic feature selection, is faster to build and has less parameters to tune.

Ali Fakhari · Semnan University

for the type of input data, i can say that CART algorithm can handle continuous data and of course can be used in regression problems.
These are pros of DT:
+ Ability of selecting the most discriminatory features.
+ Comprehensibility so that can be used in Rule Generation problem
+ Data classification without much calculations
+ Dealing with noisy or incomplete data
+ Handling both continuous and discrete data (you have to choose proper algorithm)
Cons:

- The high classification error rate while training set is small in comparison with the number of classes
- Exponential calculation growth while problem is getting bigger.
- Need to discrete data for some particular construction algorithm.

Nov 26, 2012

Dr. Pratyush Banerjee · ICFAI Business School

In an analysis, I found NN is best in terms of predicting power compared to logistic regression and DT. In the DT Analysis all the continuous predictors were not psrt of the DT, only the categorical variables remained. Does this count as a shortcoming of DT?

17 days ago

• they do not need variable scaling;

• they can deal with a reasonable amount of missing values;

• they are not affected by outliers.

– Easy to interpret and explain.

– Can generate rules helping experts to formalize their knowledge.

You can also use ensemble of decision trees, e.g.,:

Random Forest

C5 combined with boosting

stochastic gradient boosting, e.g. xgboost)the winner of many Kagle competitions)

BaliPaper.pdf

17 days ago

Dr. Pratyush Banerjee · ICFAI Business School

Thank you for the answer. Is there any specific case where NN will be more applicable? As I have found out, NNs being black boxes are less useful for understanding meanings, but due to the scope of getting better acclimatized to the data through training iterations, it can have more predictive power. So which one is better?

17 days ago