

Exploring the Impact of Decision Tree Depth

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ABSTRACT

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CCS CONCEPTS

• **Computing methodologies** → **Machine learning**; *Supervised learning by classification*; *Classification and regression trees*; Cross-validation.

KEYWORDS

decision trees, model selection

1 BACKGROUND AND MOTIVATION

Construction of decision trees commonly occurs in two phases: first, a “growing” phase, in which data is used to expand the decision tree, followed by a “pruning” phase, in which noisy or otherwise meaningless nodes are removed from the tree and replaced with leaves. This second phase is used to combat overfitting and eliminate noise.

Additionally, decision tree models can be constrained by size to combat overfitting. Russell and Norvig [3] showcase an implementation of restricting a decision tree to be beneath a maximum size by generating the tree in breadth-first fashion, and stopping when the maximum number of nodes has been reached. Garofalakis and Hyun [1] support this type of algorithm, rather than implementing the constraint in the pruning phase: after all, if the program knows a branch of a tree will later be pruned, there is no purpose in constructing that tree branch.

2 METHODS

The foundation of our decision tree algorithm was the one provided by Russell and Norvig [3] which, in turn, is based on the ID3 algorithm [2].

3 RESULTS

4 DISCUSSION

ACKNOWLEDGMENTS

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REFERENCES

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- [2] J. R. Quinlan. 1986. Induction of decision trees. *Machine Learning* 1, 1 (01 Mar 1986), 81–106. <https://doi.org/10.1007/BF00116251>

- [3] Stuart J. Russell and Peter Norvig. 2010. *Artificial intelligence: a modern approach* (3rd ed.). Prentice Hall.

A RESEARCH METHODS

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B ONLINE RESOURCES

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