

Week 7 Practical

Learning Classification Rules

Overview

In this Practical we will learn how to produce a set of classification rules using the RIPPER algorithm.

Objectives

- Understand the principles of the RIPPER algorithm.
- Learn classification rules on a sample dataset.
- Apply the learned rules on test tuples.

Sharing results

While tasks should be self-explanatory, some of the challenges might be more complex. Feel free to share your results or questions in the course discussion forum. Results to all the challenges will be available UPON REQUEST (discussion forum or email).

Dataset

We will be using a sample dataset that can be found in other examples that introduce rule-based classification. The point here is on learning the basics behind the RIPPER algorithm and not necessarily on covering various types of variables. That is why we have four categorical variables – **Age** (young, pre-presbyopic, and presbyopic), **Spectacle prescription** (myope and hypermetrope), **Astigmatism** (yes, no), and **Tear production rate** (reduced, normal). The outcome we are trying to predict is **Recommended lenses** that has three levels – none, soft, and hard.

Table 1. Contact lens dataset

Age	Spectacle prescription	Astigmatism	Tear production rate	Recommended lenses
young	myope	no	reduced	none
young	myope	no	normal	soft
young	myope	yes	reduced	none
young	myope	yes	normal	hard
young	hypermetrope	no	reduced	none
young	hypermetrope	yes	normal	hard
pre-presbyopic	myope	no	reduced	none
pre-presbyopic	myope	no	normal	soft
pre-presbyopic	myope	yes	reduced	none
pre-presbyopic	hypermetrope	no	reduced	none
pre-presbyopic	hypermetrope	no	normal	soft
pre-presbyopic	hypermetrope	yes	reduced	none
pre-presbyopic	hypermetrope	yes	normal	none
presbyopic	myope	no	reduced	none
presbyopic	myope	no	normal	none
presbyopic	hypermetrope	no	normal	soft
presbyopic	hypermetrope	yes	reduced	none
presbyopic	hypermetrope	yes	normal	none

Task 1. RIPPER algorithm

Apply the RIPPER algorithm to find a set of all the classification rules for the dataset provided above. Please note that RIPPER algorithm learns rules starting from the minority class. In the practical folder (learnonline), you will find a RIPPER example on a different dataset (p7-ripper-sample.xlsx).

Task 2. Applying the rules

Apply the rules the algorithm learned for the above dataset to make a prediction for the following tuples:

<A = “young”, SP = “hypermetrope”, AST = “no”, TP = “normal”, RL = ?>

<A = “presbyopic”, SP = “myope”, AST = “yes”, TP = “normal”, RL = ?>

<A = “presbyopic”, SP = “hypermetrope”, AST = “no”, TP = “reduced”, RL = ?>

Where:

A – Age, SP – Spectacle prescription, AST – Astigmatism, TP – Tear production, and RL – Recommended lenses (CLASS).

What are the predicted classes for the three tuples above?

Feel free to share your results in the discussion forum.