

Foundations of Artificial Intelligence

Exercise Sheet 10

Robin Vogt, Riccardo Salvalaggio, Simon Lempp, Josephine Bergmeier

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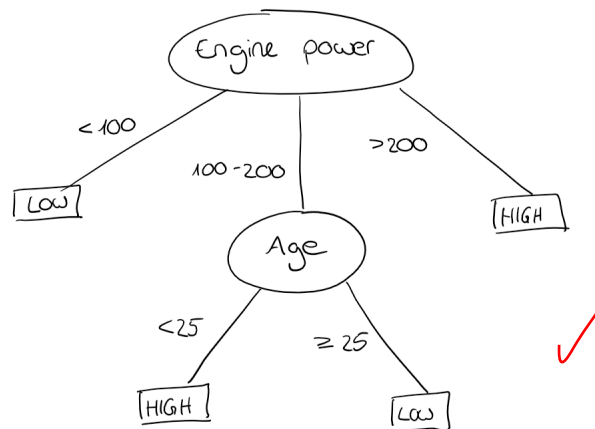
Exercise 10.1

$$R(\text{engine power}) = \frac{2}{6}I(0, \frac{2}{2}) + \frac{2}{6}I(\frac{1}{2}, \frac{1}{2}) + \frac{2}{6}I(\frac{2}{2}, 0) = \frac{1}{3}(0 + 1 + 0) = \frac{1}{3} \quad \checkmark$$

$$R(\text{age}) = \frac{1}{2}(I(\frac{2}{3}, \frac{1}{3}) + I(\frac{2}{3}, \frac{1}{3})) = \frac{1}{2}(\frac{5}{6} + \frac{5}{6}) = \frac{5}{6} \quad \checkmark$$

$$\text{Gain}(\text{engine power}) = I(\frac{3}{6}, \frac{3}{6}) - \frac{1}{3} = 1 - \frac{1}{3} = \frac{2}{3} \quad \checkmark$$

$$\text{Gain}(\text{age}) = I(\frac{3}{6}, \frac{3}{6}) - \frac{5}{6} = 1 - \frac{5}{6} = \frac{1}{6} \quad \checkmark$$



Exercise 10.2

- (a) training ✓
 - (b) ~~training~~ validation ✓
 - (c) validation ✓
 - (d) validation, ~~test~~
 - (e) test ✓
- In general you would use the validation set,
but sometimes the training set can be used as well
(cross-validation)
- the test set should only
be used for the final model

The test set should always be fixed a priori, because it defines the desired behaviour of the final model. ✓