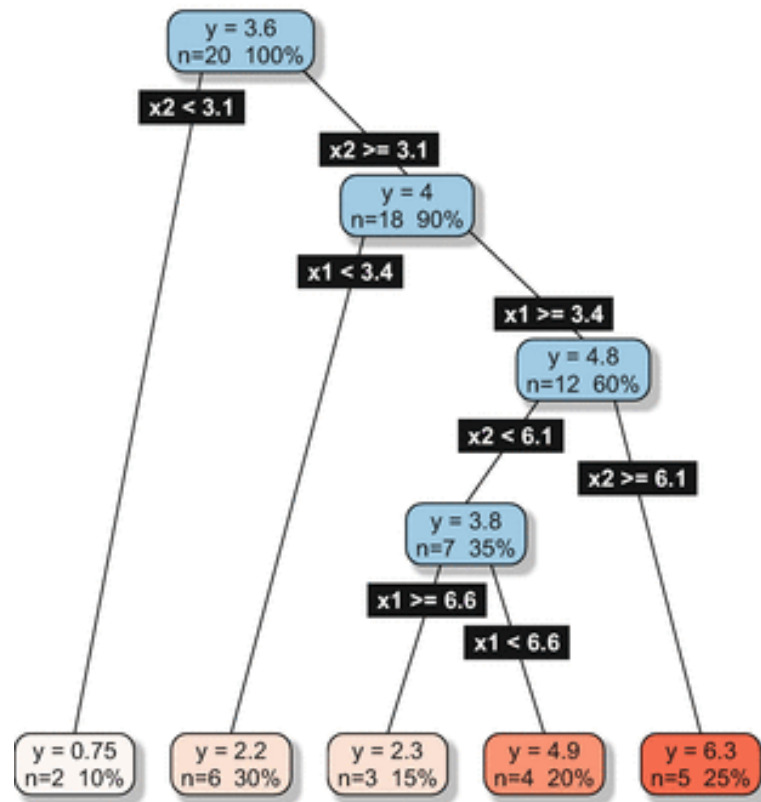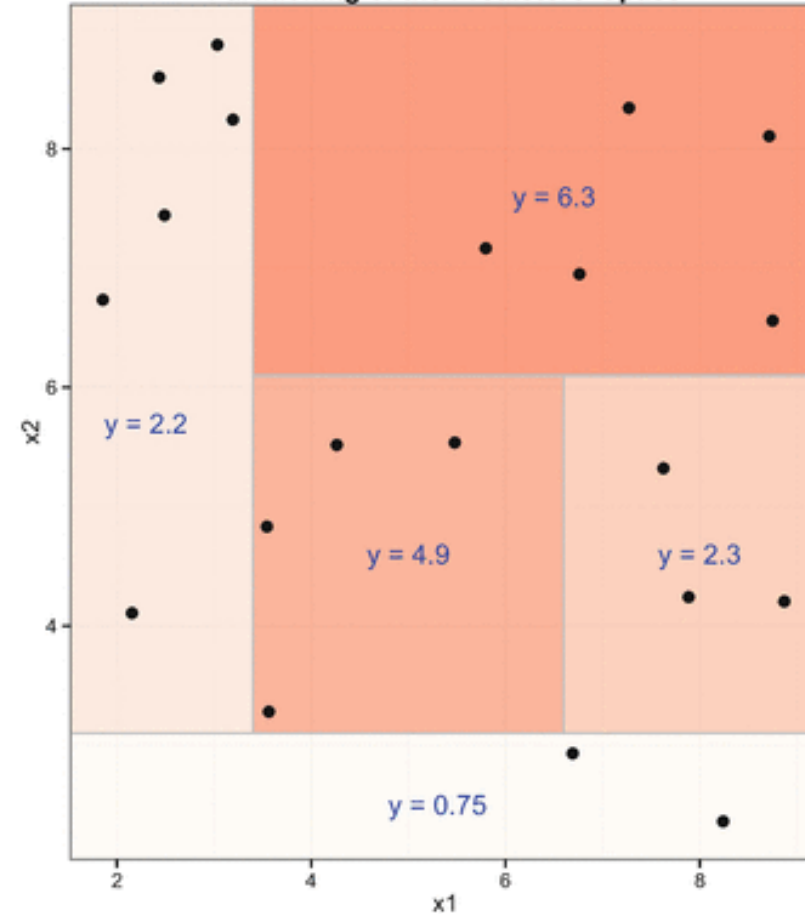# Decision Tree

Regression Tree

Example of a Regression Tree
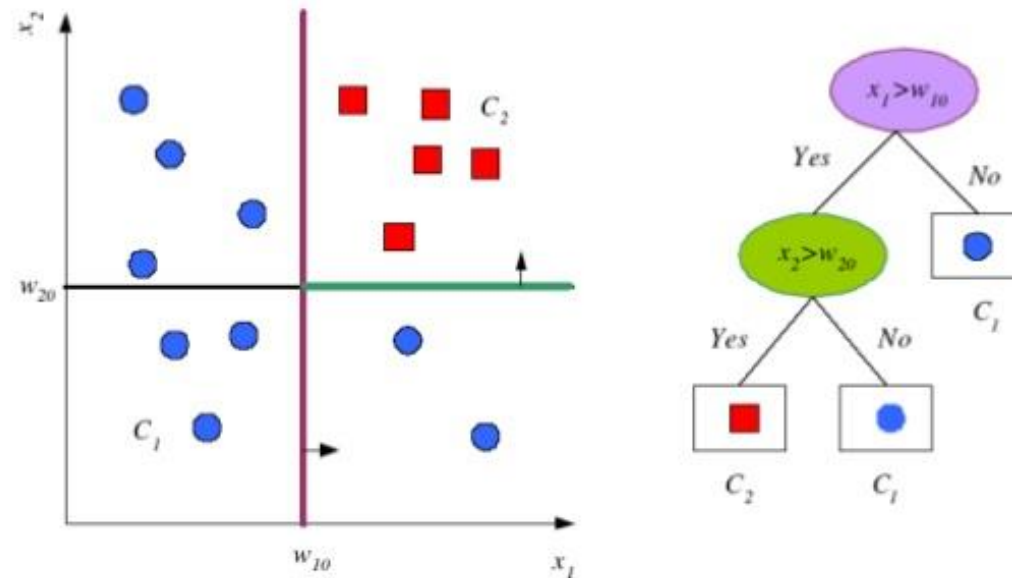
Partitioning of the Predictors' Space

Classification Tree

Noncontinuous nonlinear model

Salary vs Level (Decision Tree Regressor)
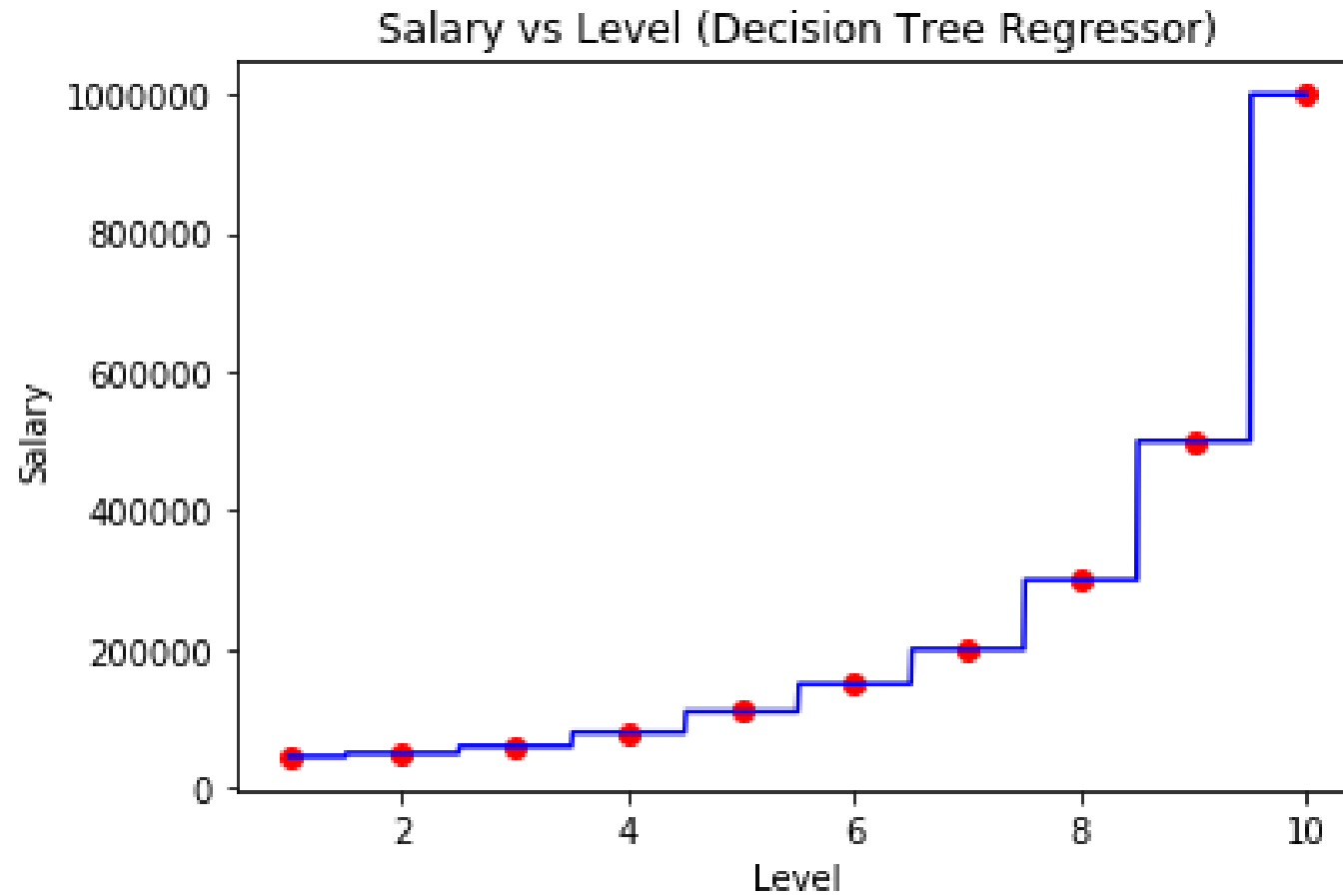
Extra information

- Regression Tree functions to measure quality of split:
  - Mean squared error
  - Mean squared error with Friedman's improvement score
  - Mean absolute error
- Classification Tree functions to measure quality of split:
  - Gini
  - Entropy
- Stopping condition:
  - Pure nodes
  - All leaves contain less than the "minimum samples to split"
  - Maximum depth
- Creating 3 children from a single node is possible but may lead to overfitting

Decision Tree advantages

- Does not require feature scaling
- Able to handle both numerical and categorical data (not in scikit-learn)
- Able to handle multi-class output
- Easy to interpret

Decision Tree disadvantages

- Overfitting. Solutions:
  - Prune the tree
  - Change the stop conditions
- Unstable. Solution:
  - Ensemble methods
- Biased towards dominate classes. Solution:
  - Balance your dataset