

Introduction to trees

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In this note we will only look at examples and motivations for two new models. We will see how these models are defined and can be used to make predictions (if you have a trained model). But only in the next notes will we look at how these models are actually trained on data.

So you can think about this note as only specifying the structure of the models $f(\mathbf{x}; \boldsymbol{\theta})$.

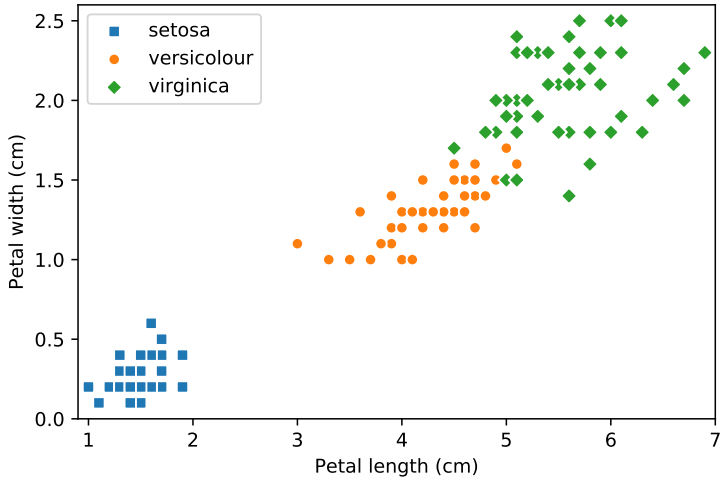
We look at two new models:

- Decision trees for classification
- Regression trees for regression

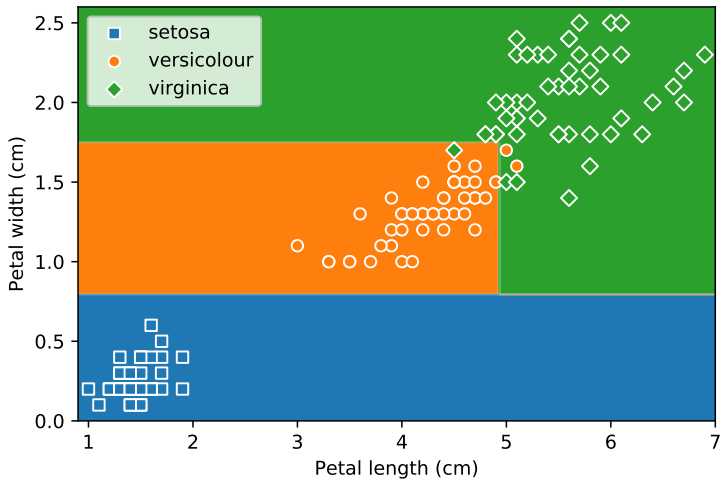
Sometimes these are referred to together as *classification and regression trees* (CART).

Motivation: Classification

Softmax regression on iris data

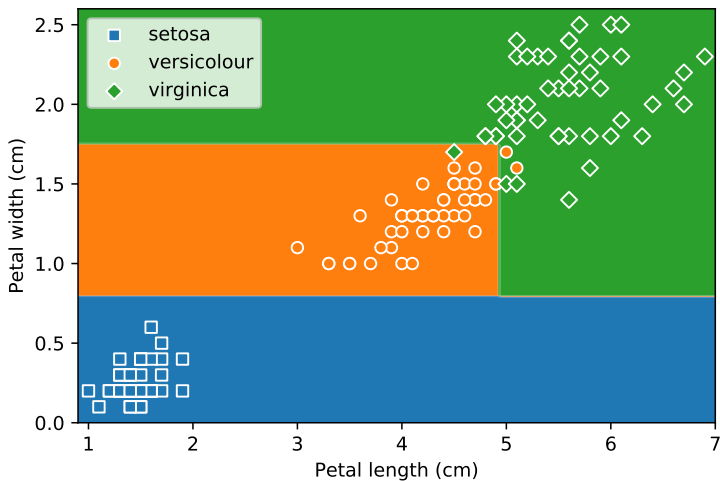
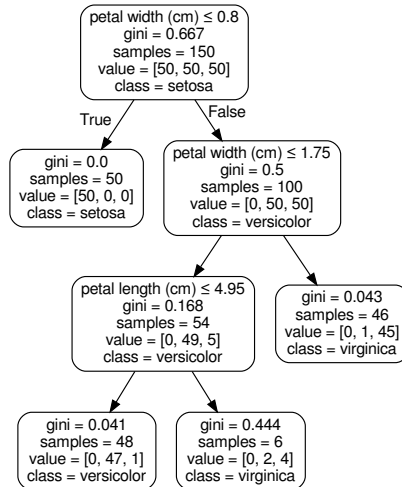


What about rather using “blocks”?

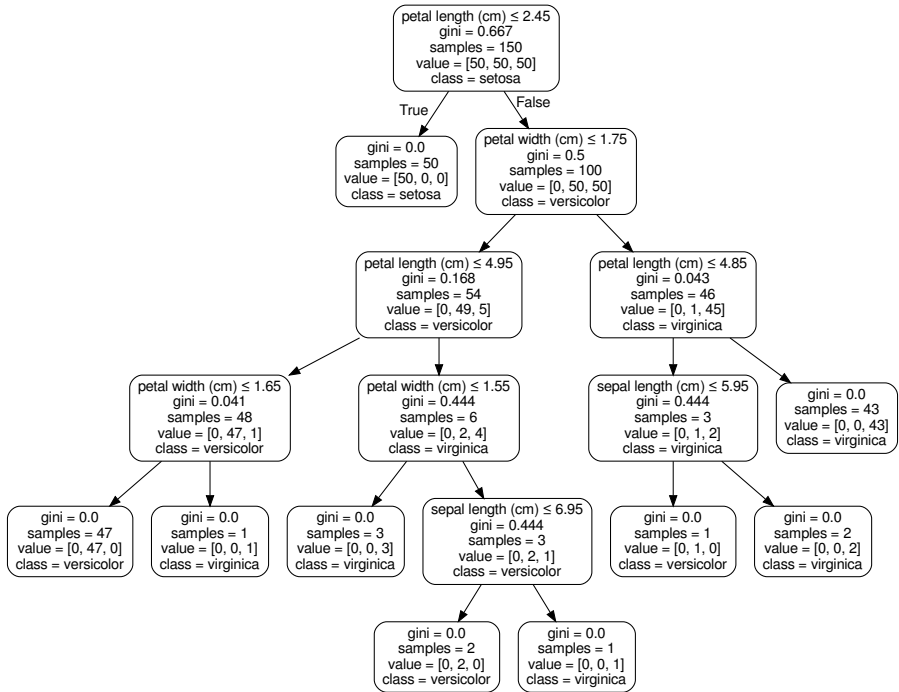


Classification: Decision trees on iris data

Two features



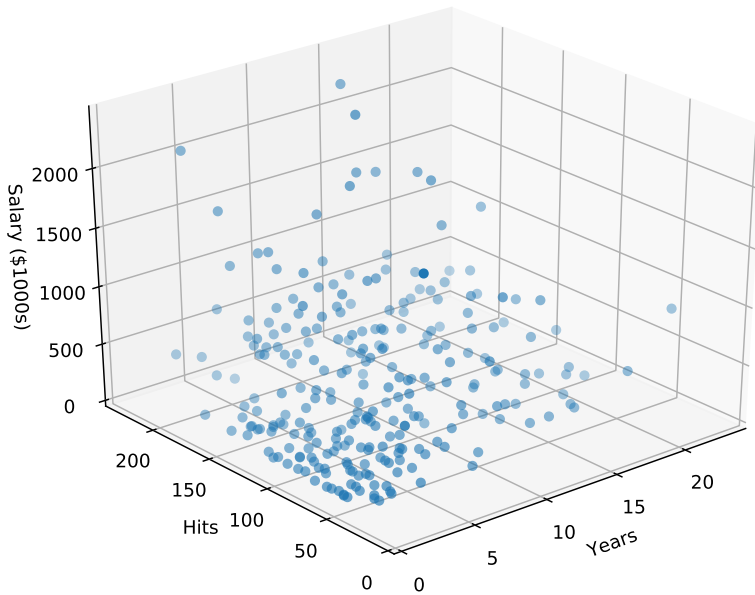
All features

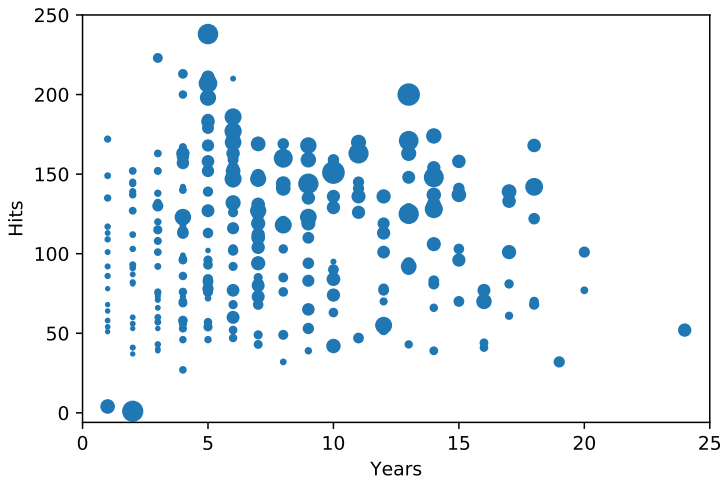


Motivation: Regression

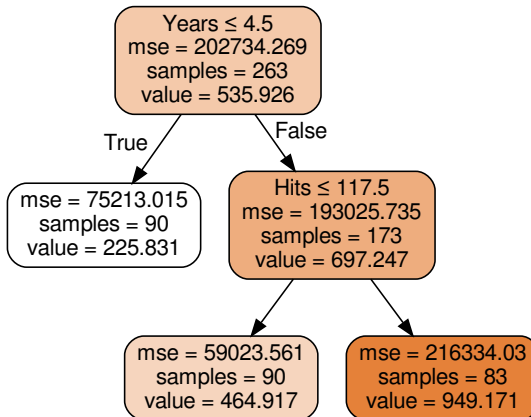
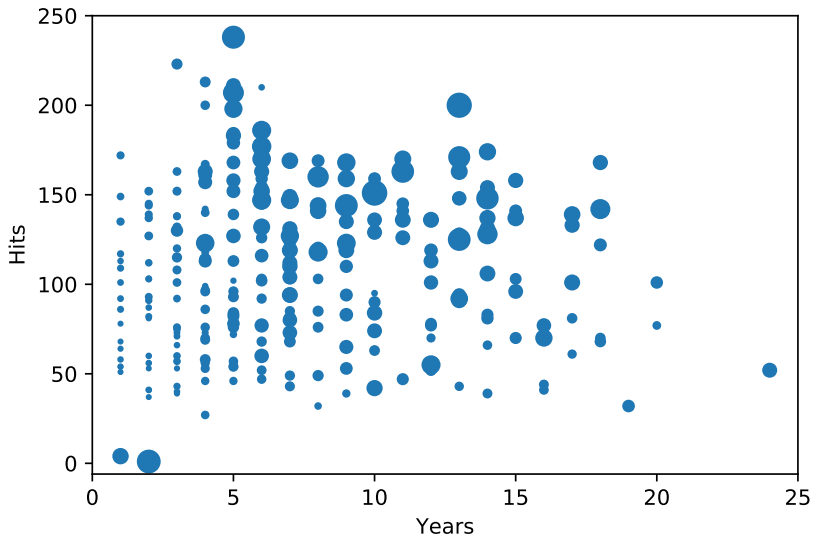
Hitters data: Predicting the salaries of baseball players

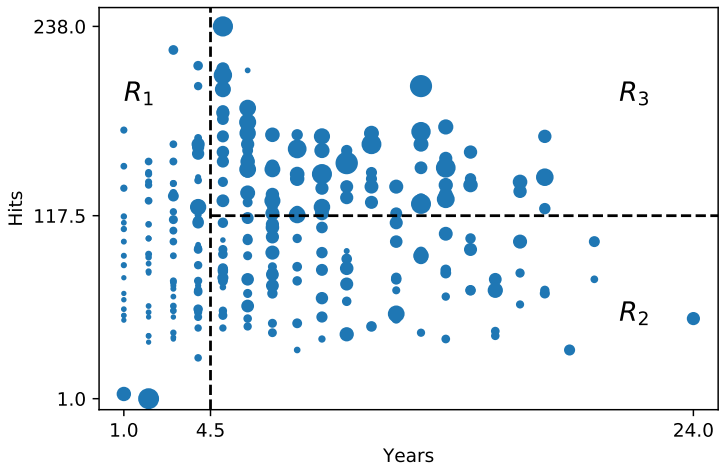
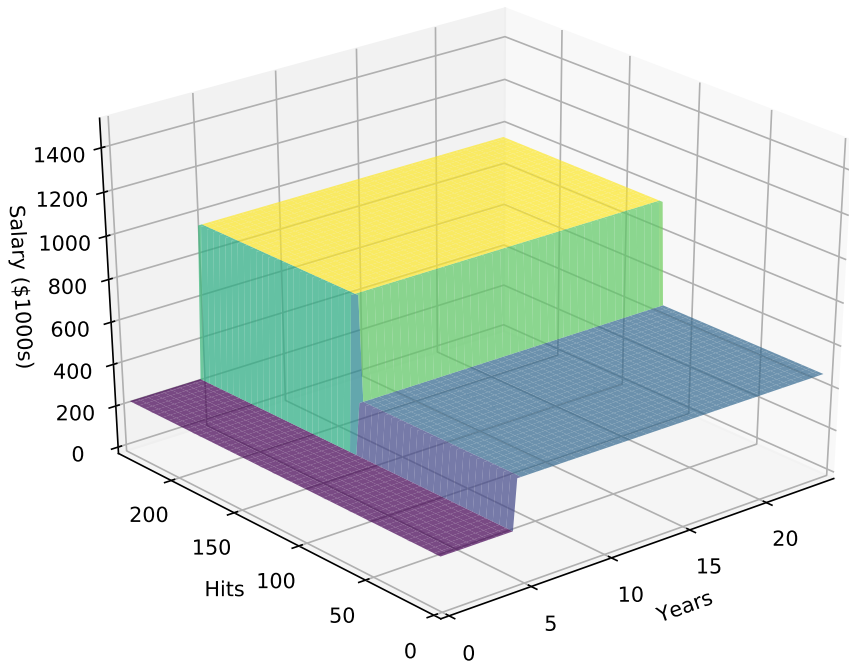
Years	Hits	Salary	
4	25	\$200k	$n = 1$
17	240	\$1900k	$n = 2$
\vdots	\vdots	\vdots	\vdots
			$n = N$





Regression: Regression tree on hitters data





Videos covered in this note

- [Trees 1.1: Intro - Decision trees for classification](#) (10 min)
- [Trees 1.2: Intro - Regression trees](#) (12 min)

Reading

- ISLR 8 intro
- ISLR 8.1 intro