

How it Works: Predictive Analytics

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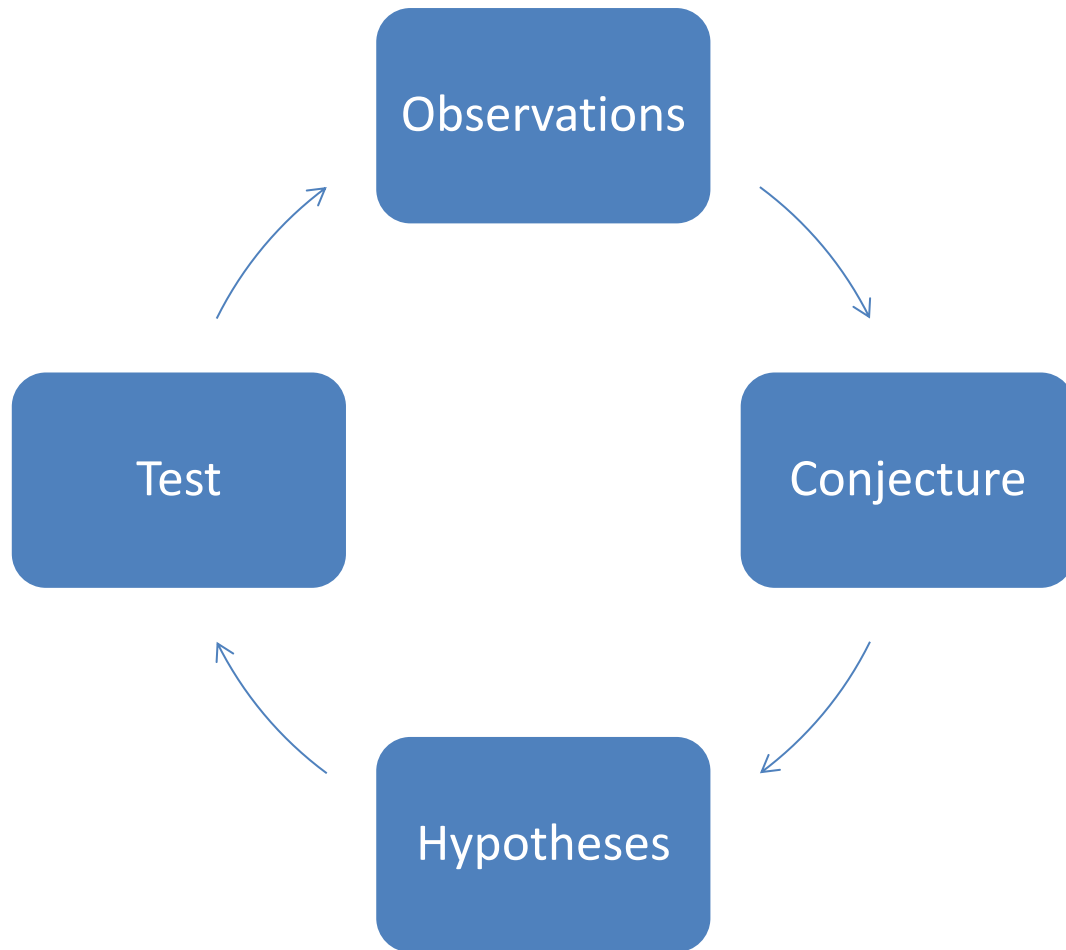
Slight reframing

- Not “Predictive Analytics” as in “Forecasting”..
- But as in..
- “Predictive Analytics and Machine Learning”

Machine Learning ??

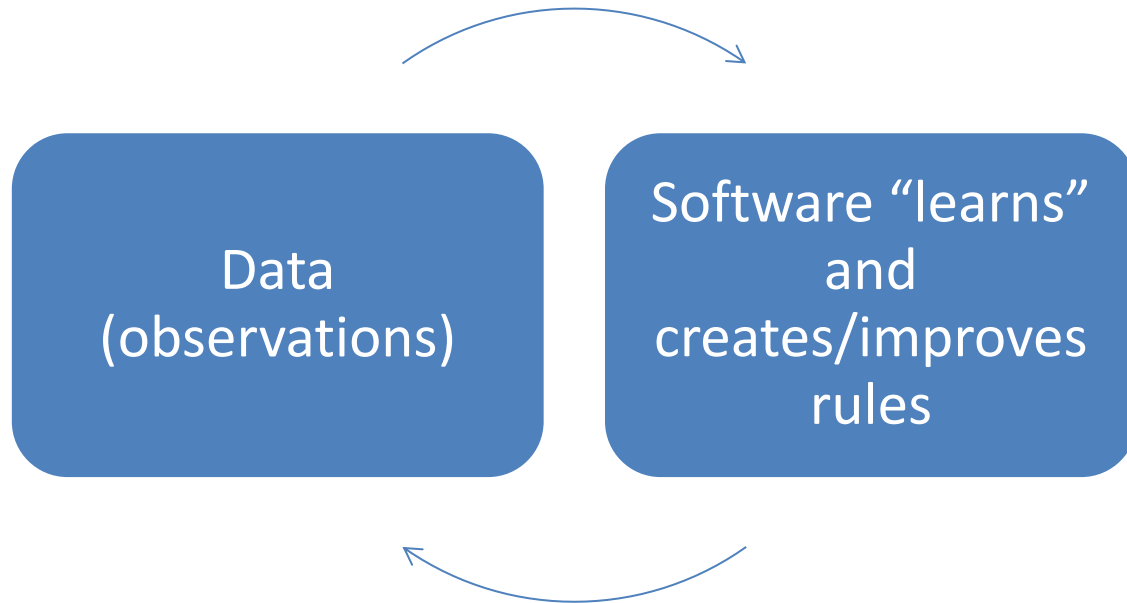
- Catch-all for study and construction of algorithms that can learn from and make predictions on data.

How it used to be



- You make the observation
 - You make the conjecture
 - You make the hypotheses
 - You do the tests
-
- This works really well when
 - Small number of variables
 - Controlled experiments
 - Fairly simple models

Now



- Software analyses data – observations and an outcome (e.g. 1500 observations about an insurance claim and one outcome – fraudulent or not)
- Software creates (1000s of) rules and package it into a model
- Software tests model, adjust rule-set and tests again.
- And does it all in a matter of minutes.

HOW IT WORKS

Flowers

(the most famous in data science)

Iris Setosa



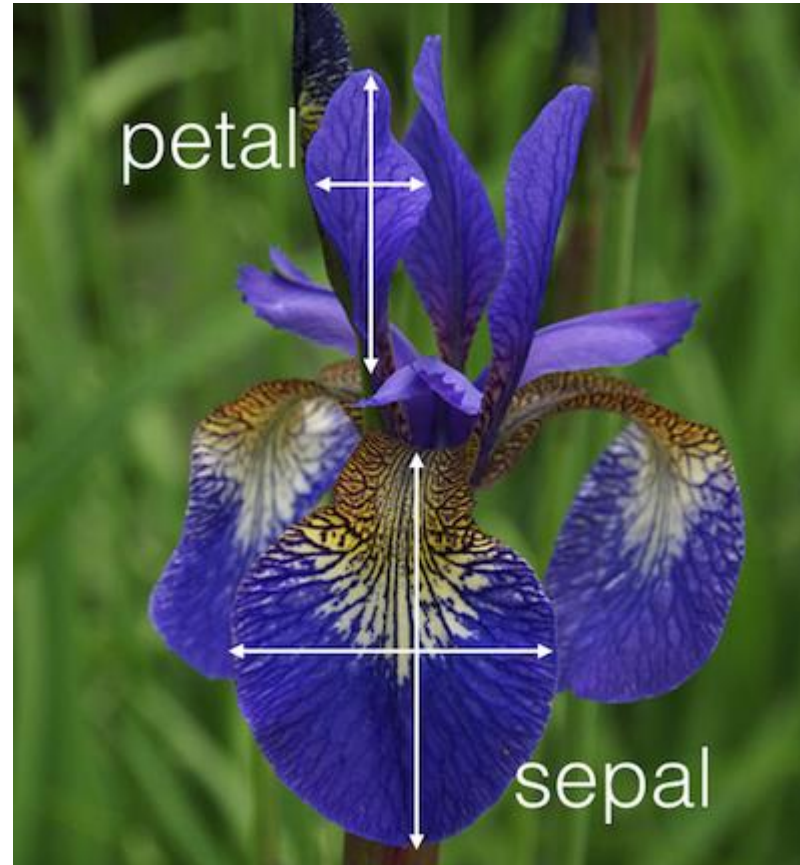
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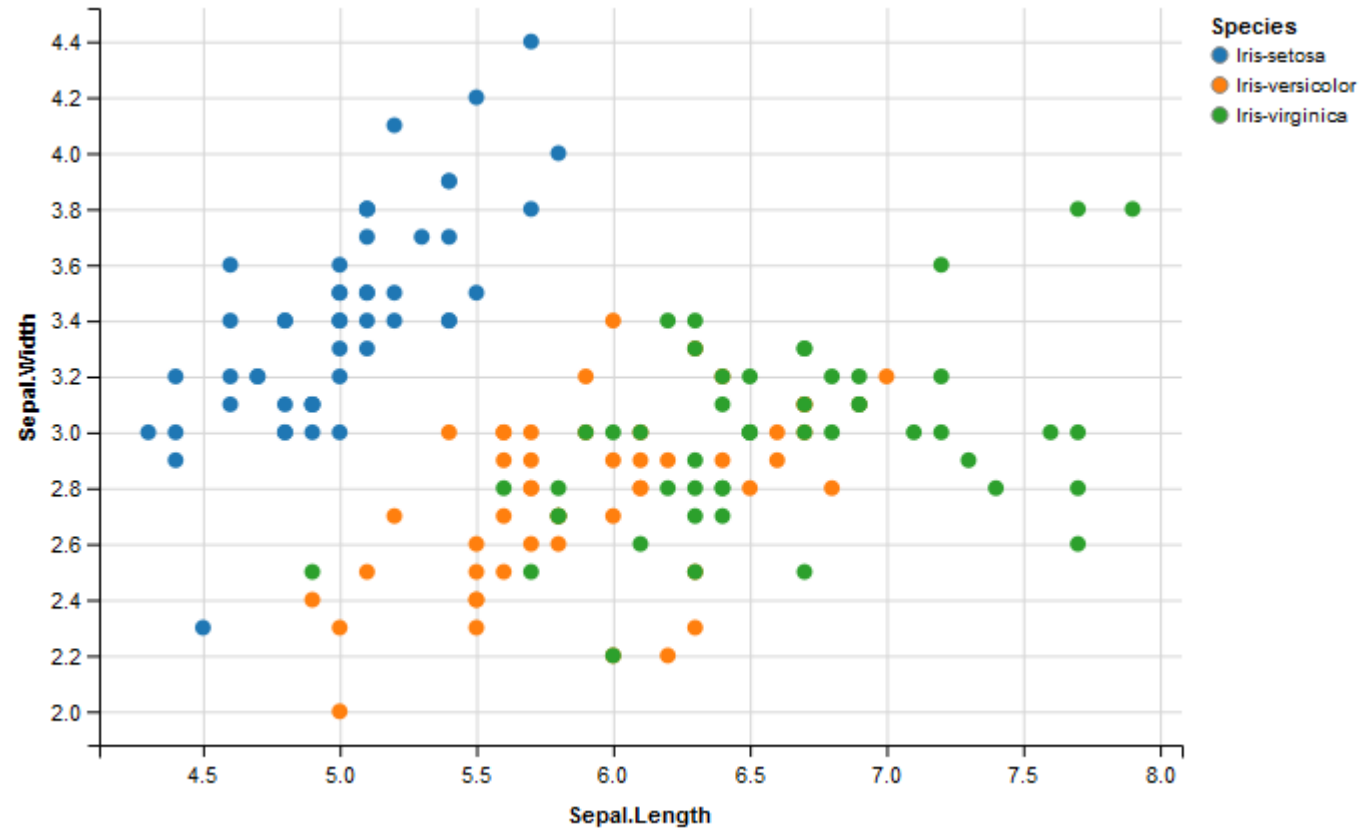
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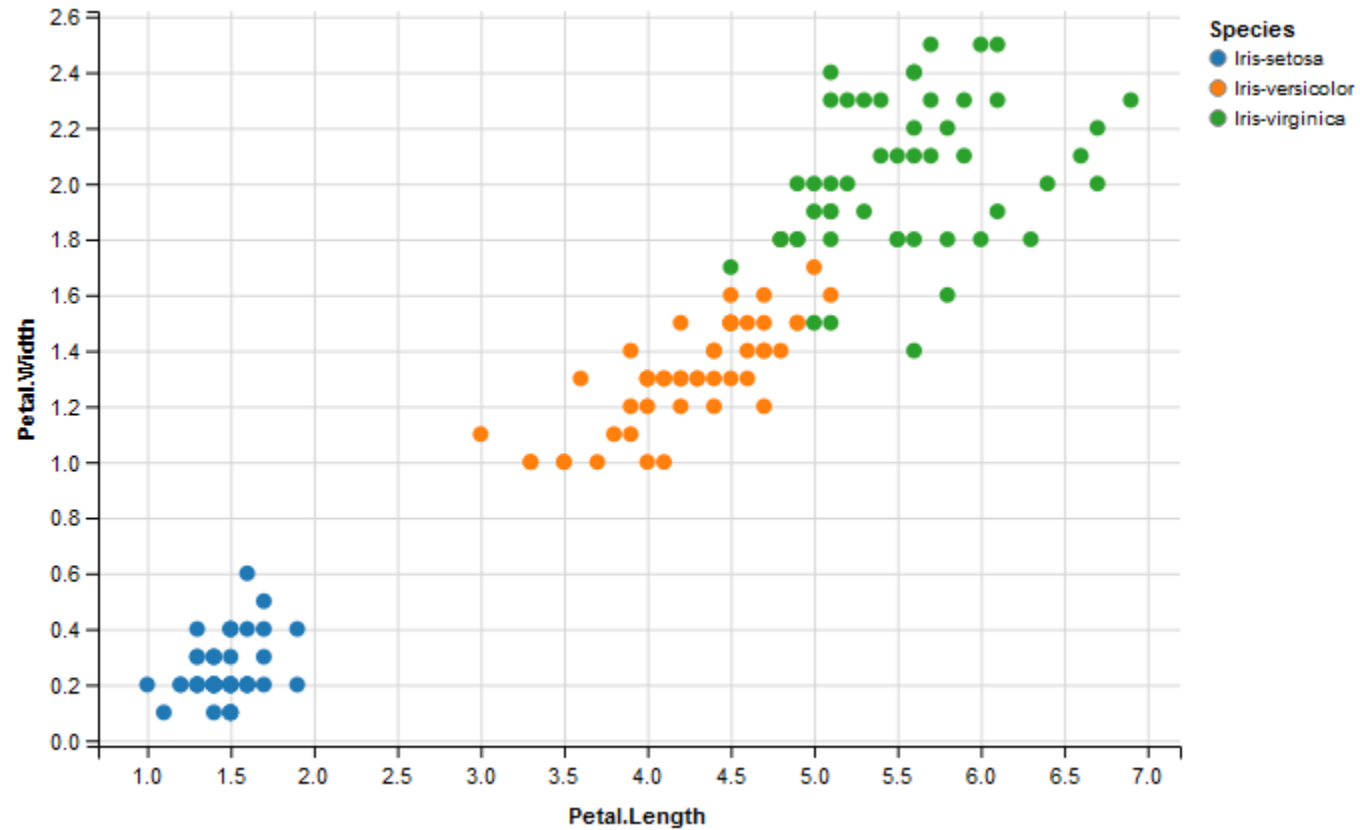
Observations



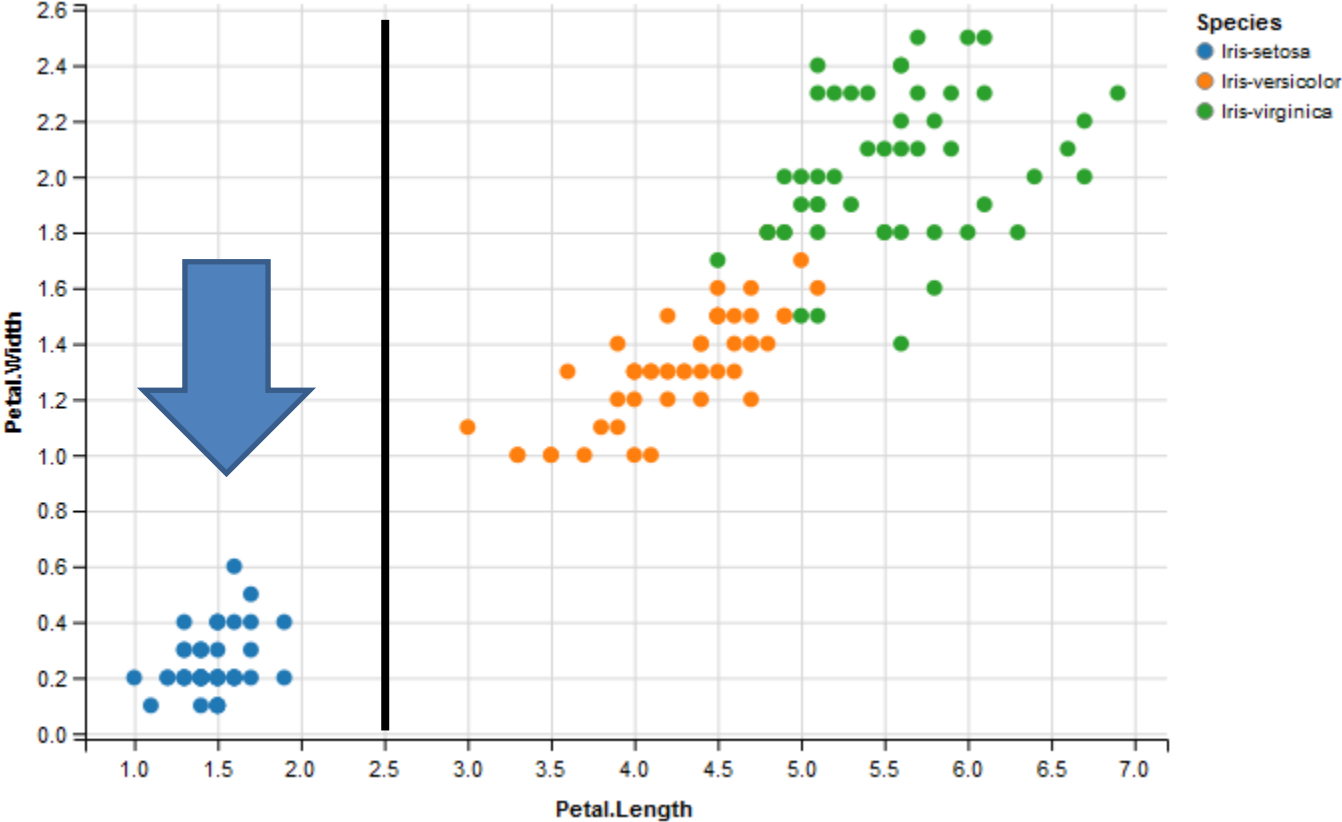
Sepal Width vs Length



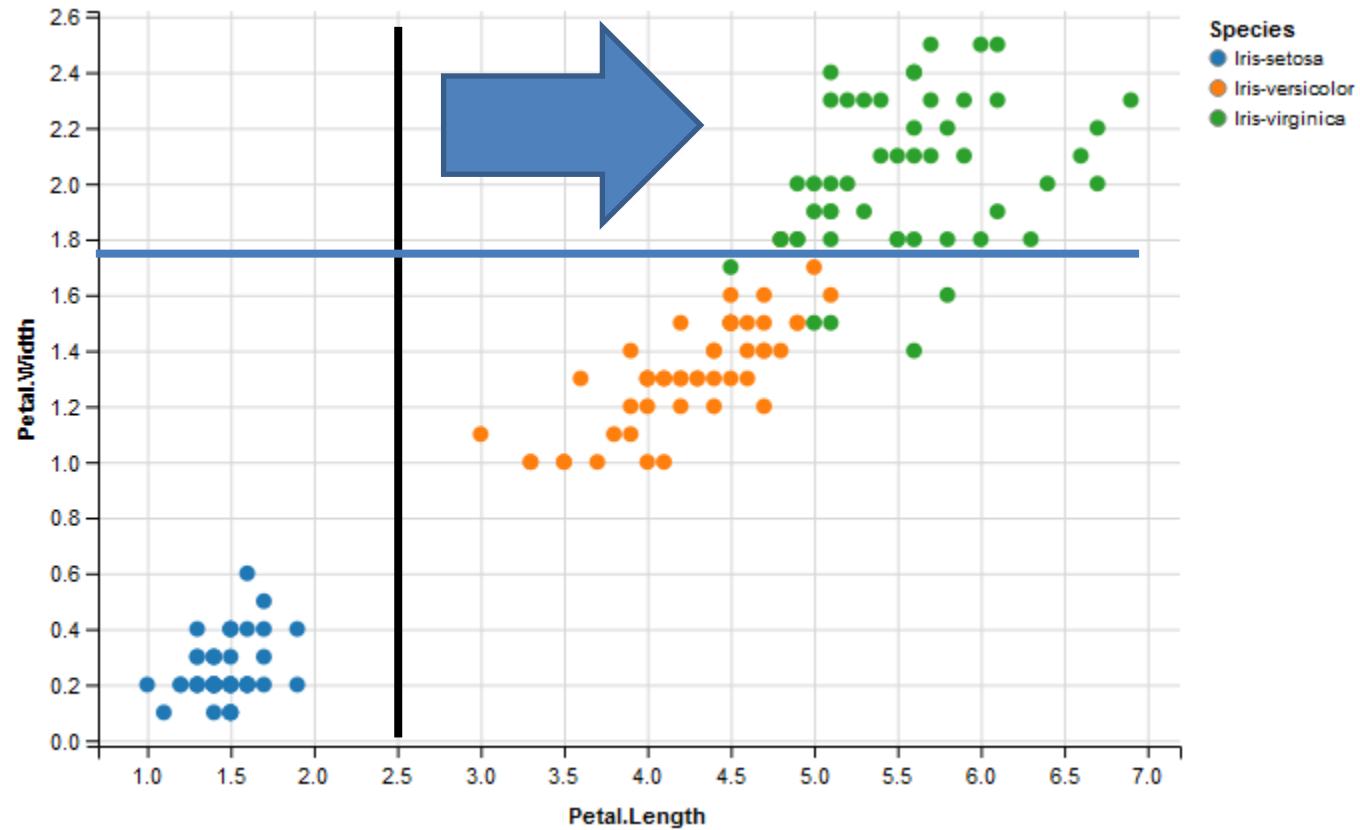
Petal Length vs Width



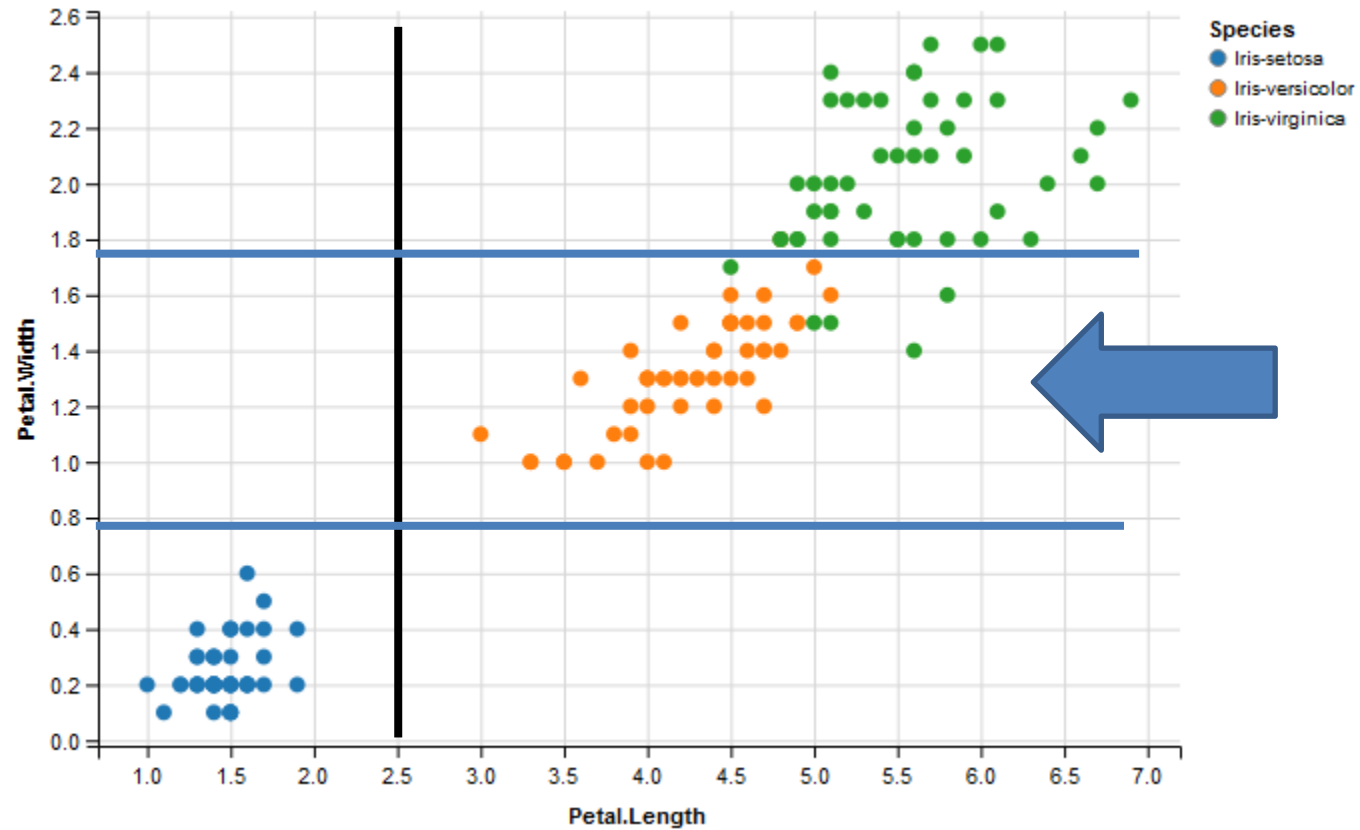
Petal Length vs Width



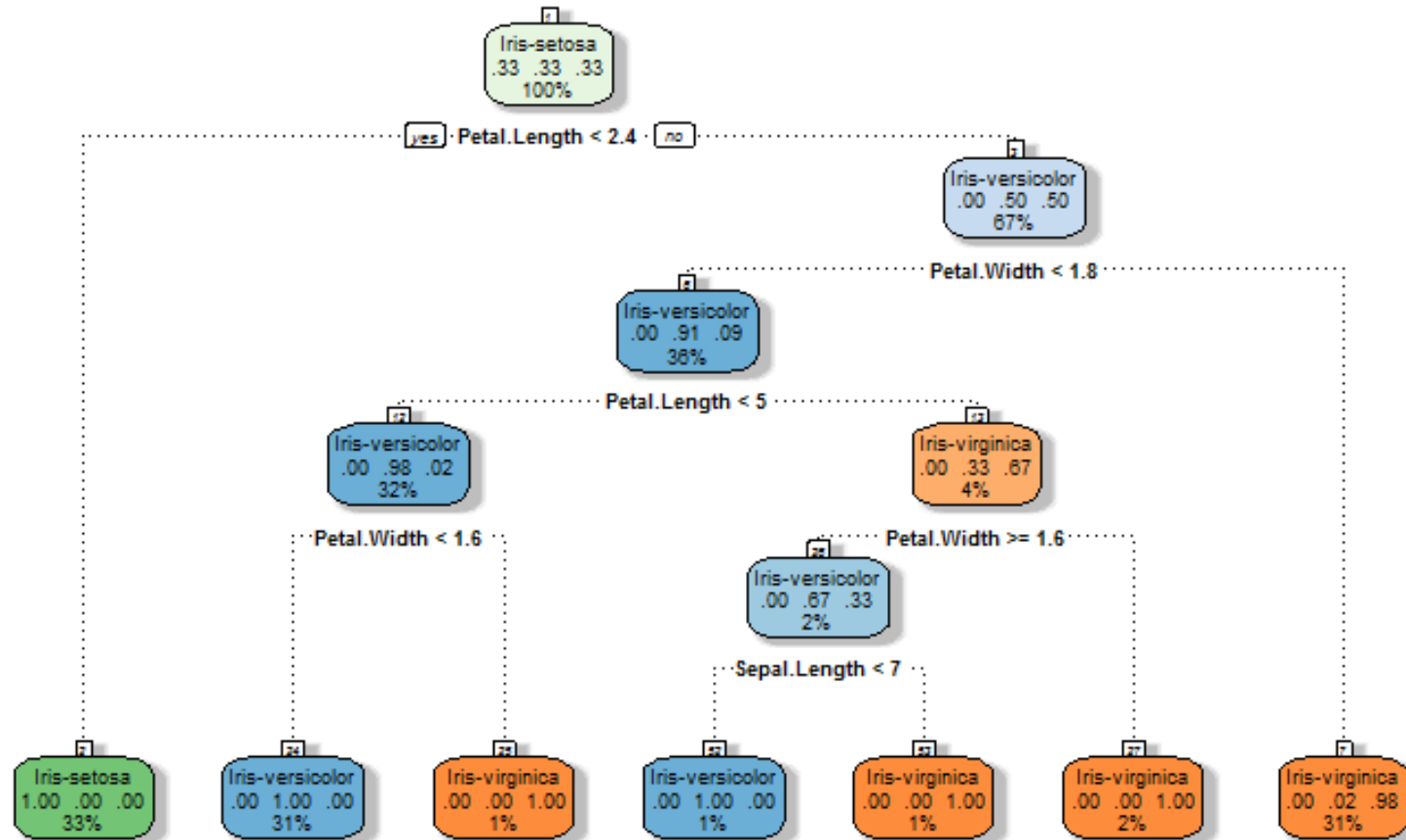
Petal Length vs Width



Petal Length vs Width

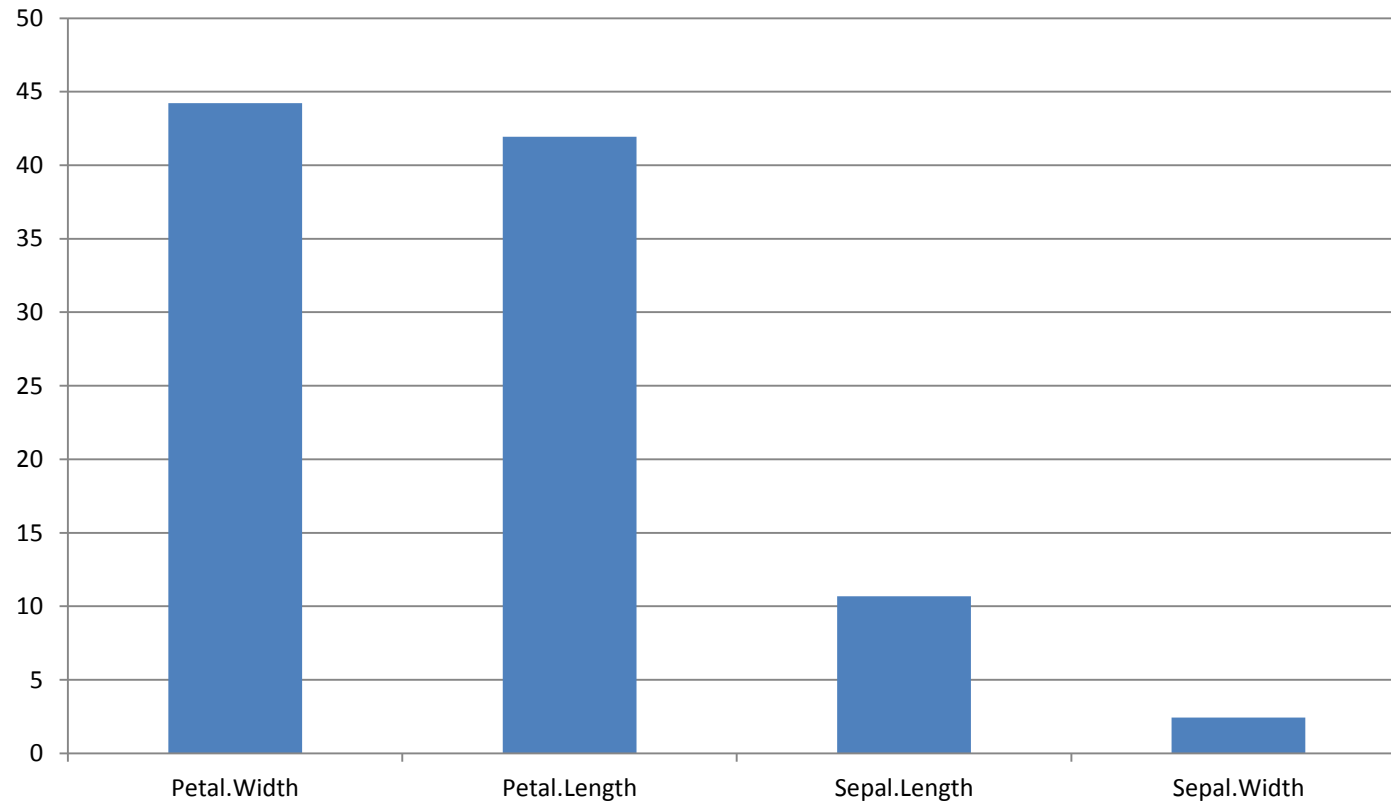


Our Model



Rattle 2016-Feb-23 13:18:41 madsenf

Feature Importance



So the big thing is..

- The computer learns the rules by observing and analysing the data
- It creates a “model”
- We can use the model to make predictions
- We can inspect the model to understand what is driving outcome
- We can now influence these drivers to create a different outcome

Why is it important?

- Predictive Analytics and Machine Learning IS changing every industry.
- All the things you hear about in the news...
 - Self-driving cars, identifying risks in legal documents, managing pensions and investments, identifying diseases, finding cures, improving crop yields, ∞
- And all the “mundane” daily stuff
 - Helping organisations cut costs, be more productive, place the right bets, understand what combination of events drives customer satisfaction, recommendations, sales, etc..... ∞

Case - background

- Insurance company
- 100,000+ claims per month
- 3,000 selected by existing analyses for manual inspection
- £50 to inspect a claim (total £150k/month)
- 24 people inspecting them
- 50% contains errors
- Average recovery ~ £180/claim (total: ~£270k/month)

Case – result

- Machine Learning model trained
- Predicts ~600 of the 1,500 claims with no error (error-rate<1%)
- Remove 600 claims from pool of claims to inspect
- Cost saving option: Cut 5 FTEs

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- Remove 600 claims from pool
- Option: Cut 5 FTEs

- In stead: Another model trained
- Looked at 97,000+ not selected for review before
- Identified 600 claims likely to contain errors
- ~67% of 3,000 now contain errors
- Average recovery ~£300/claim (total ~£600k)
- Cost saving can be used to lower premiums or spend on customer acquisition

Why is it important?

- Predictive Analytics and Machine Learning IS changing every industry and our lives.
- All the things you hear about in the news...
 - Self-driving cars, identifying risks in legal documents, managing pensions and investments, identifying diseases, finding cures, improving crop yields, ∞
- And all the mundane daily stuff
 - Helping organisations cut costs, be more productive, place the right bets, understand what combination of events drives customer satisfaction, recommendations, sales, etc..... ∞
- It's about competitive advantage: Do it, or be the victim of your competitor doing it

THANK YOU