Classification of Cow Behavior

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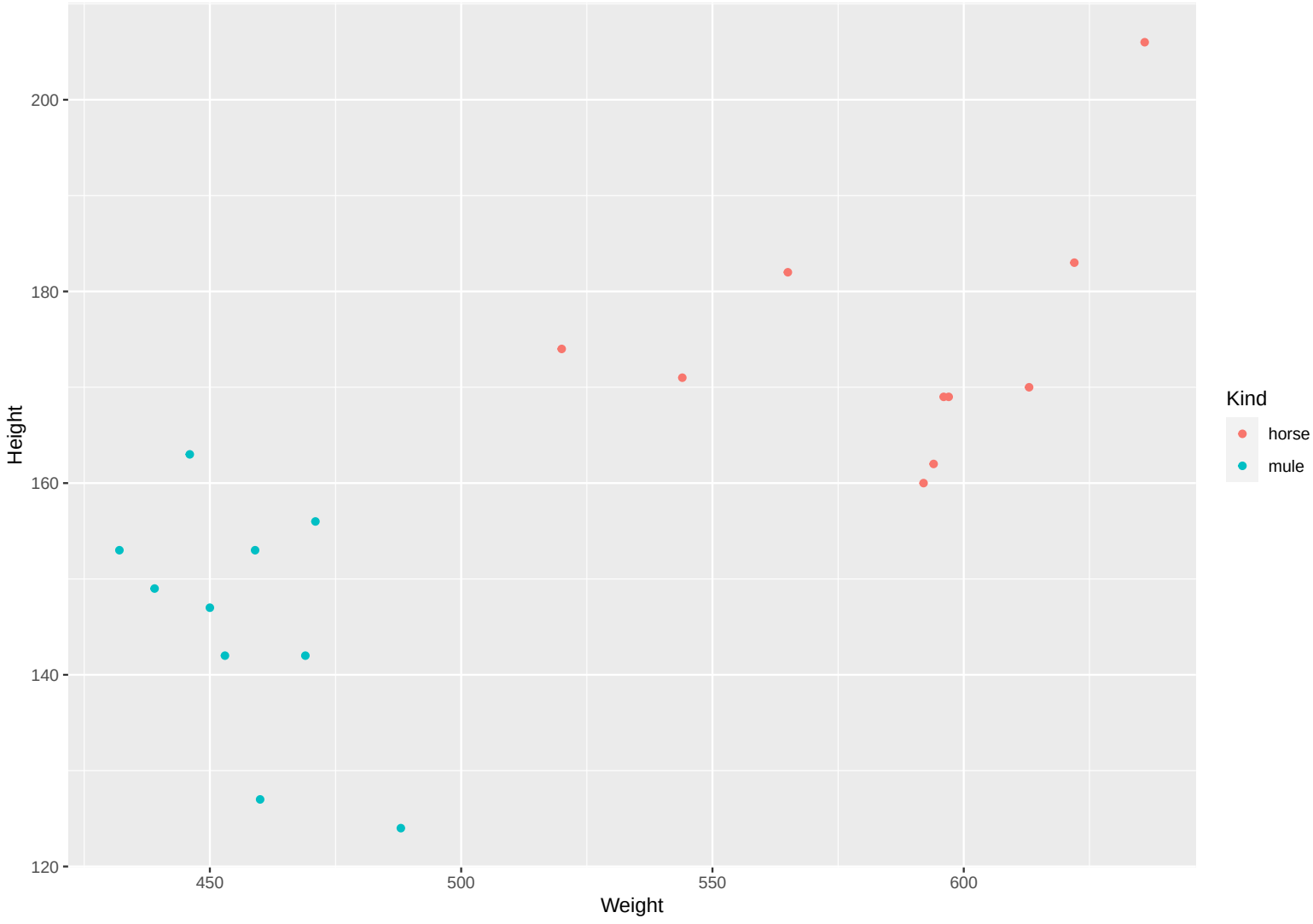
Introduction

- Presentation on first ideas for second level classification
- Simple example data on classification of horses and mules

Animal (double)	Weight (double)	Height (double)	Kind (character)
1	446	163	mule
2	459	153	mule
3	469	142	mule
4	432	153	mule
5	450	147	mule

Plot


Height
200
180
160
140
120
450
500
550
600
Weight
Kind
horse
mule

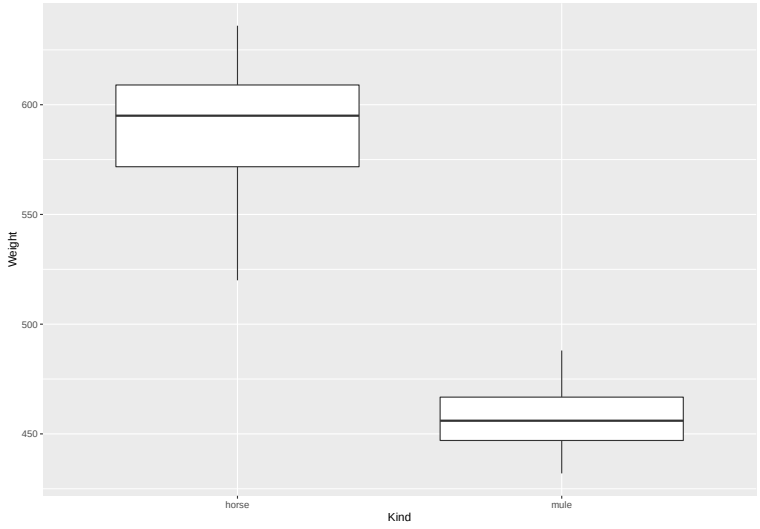
Approaches

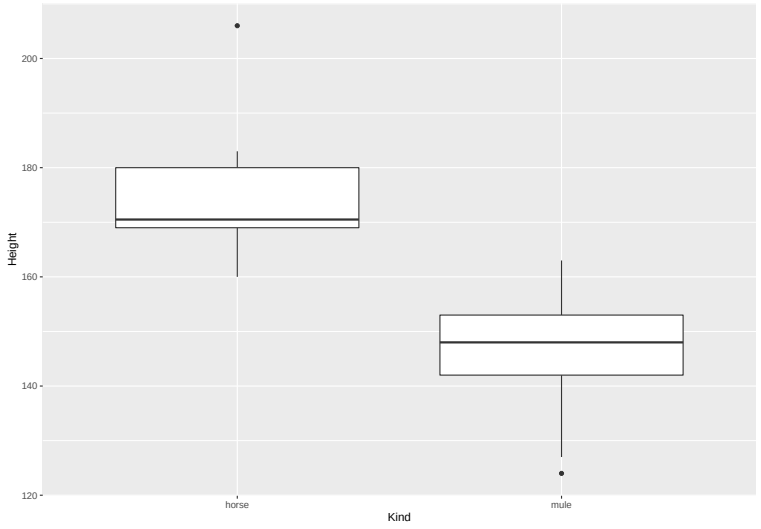
- Descriptive
- Time Series
- Longitudinal Data
- Support Vector Machine (SVM)

Descriptive

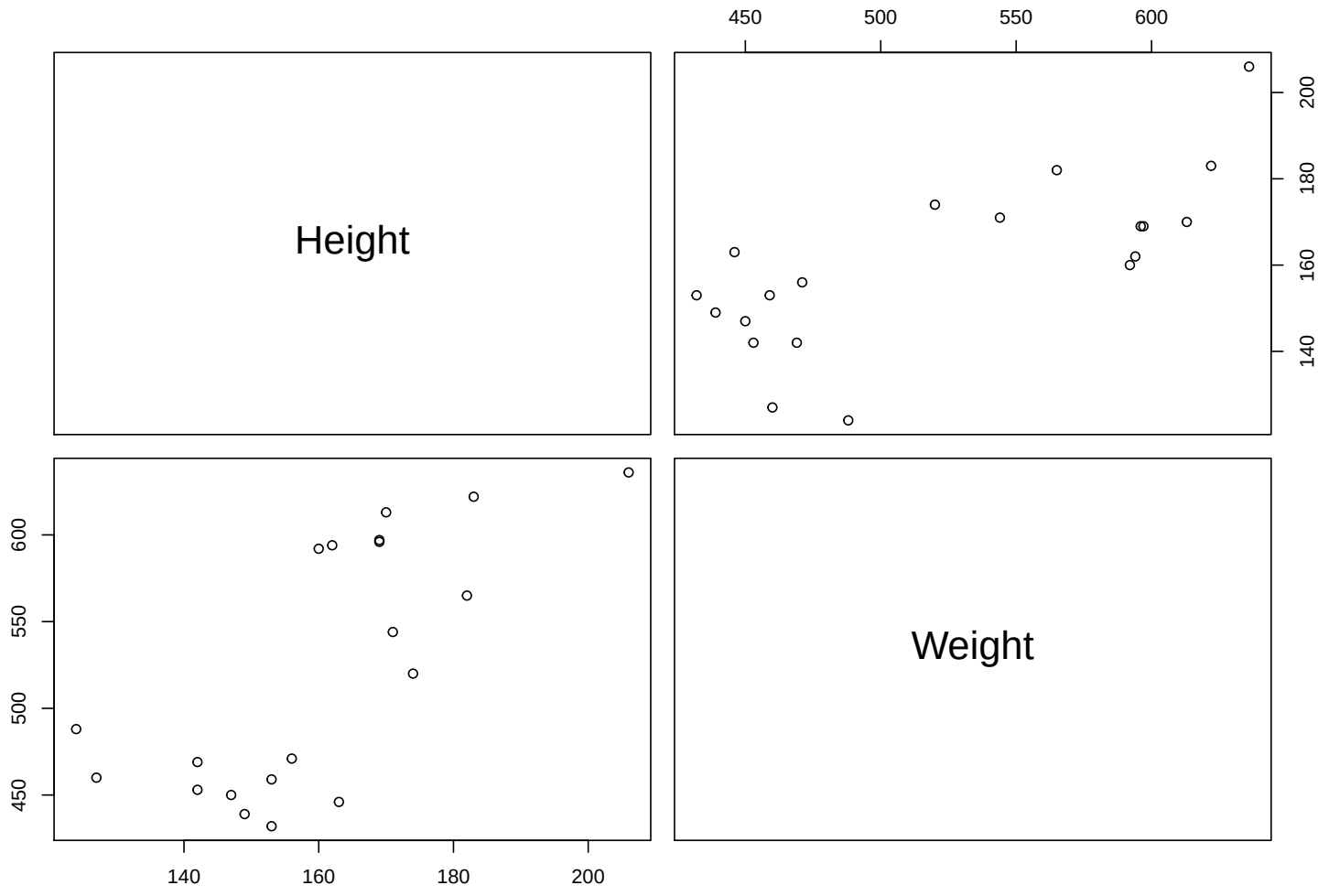
- Compare average behavior times
- Make two classes:
  1. days with reported incidence
  2. days without reported incidence

Boxplot


600
550
500
450
Weight
horse
mule
Kind


200
180
160
140
120
Height
horse
mule
Kind

Pairs Plot



Correlation

```
cor(tbl_animal_data$Height, tbl_animal_data$Weight)
```

```
## [1] 0.7277953
```

Time Series (TS)

- **Definition**: Single set of data whose observations are ordered in time.
- Observations on the same quantity $\rightarrow$ correlated and not independent
- Examples ...

TS Models

- AR: Auto-regressive
- MA: Moving average
- ARMA: combine AR and MA
- ARIMA: allows for non-stationary trends

$\rightarrow$ Determine lag or window size

$\rightarrow$ Use for prediction of missing data

Longitudinal Data

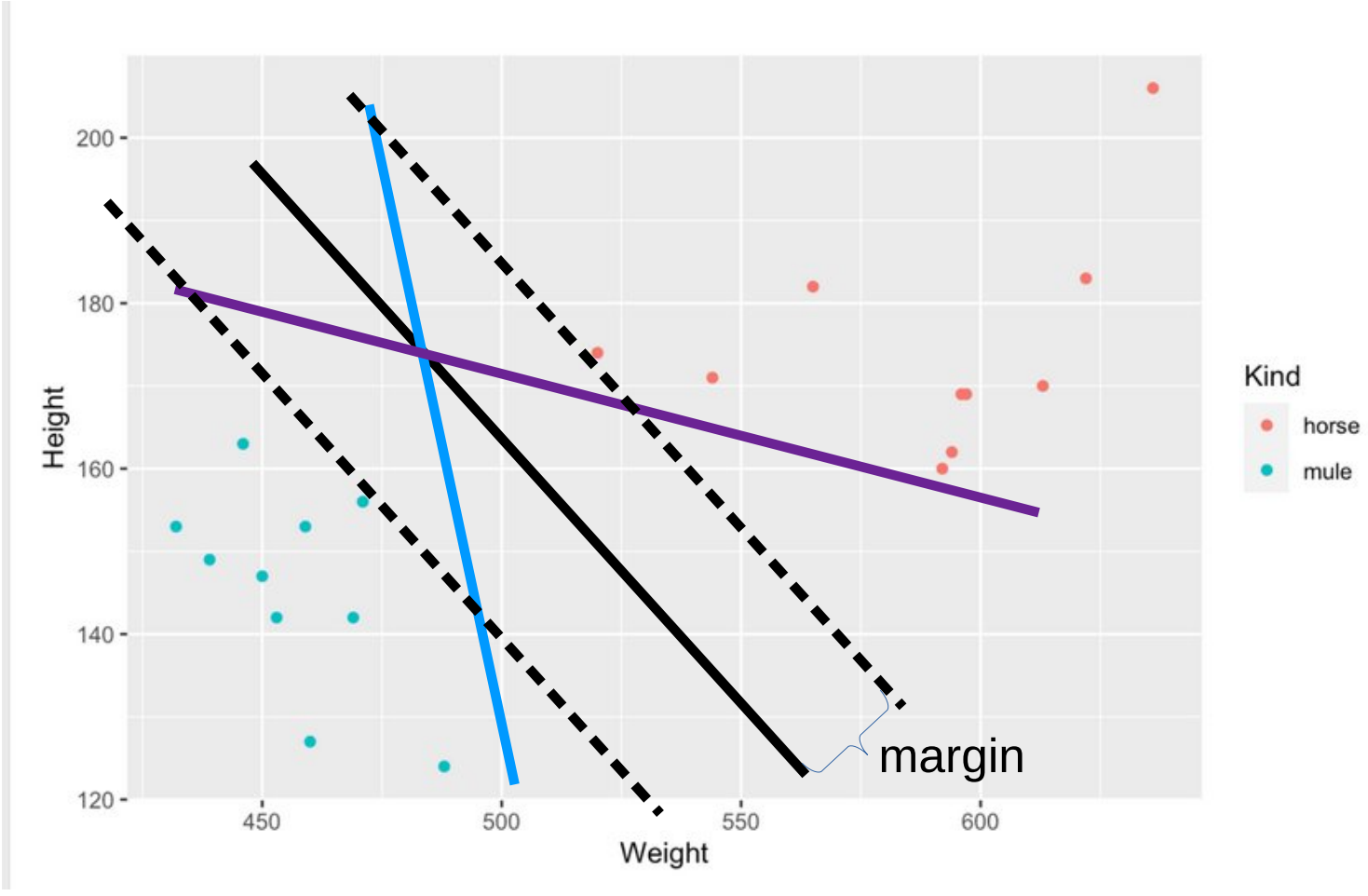
- Traits measured at various times during the life of an animal
- No fixed interval (birth, weaning, slaughter, . . .)
- Every observation is a different trait
- Data analysis via higher-order polynomials

Support Vector Machine (SVM)

- Classification of different events (generic event?)
- Imputation of missing behavior observations using svm regression

Example

- See the notebook



References

References Time Series

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References Imputation

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