Introduction to the bartMachine R package

Saint Louis R User Group

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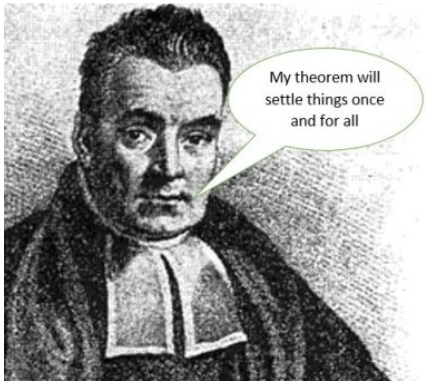
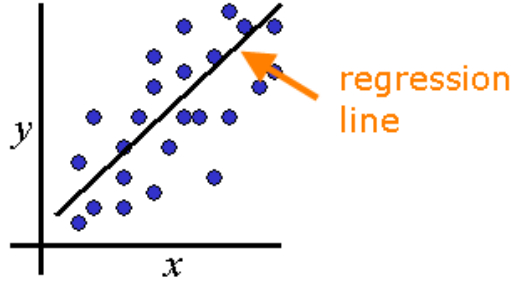
Outline

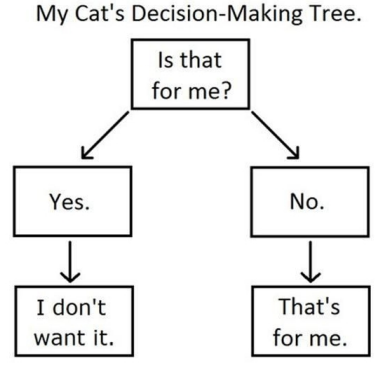
1. Overview of Keras
2. RNN/LSTM
3. Using Generator Functions
4. How to RNN/
5. Temperature Prediction Example (time permitting)
6. Final Thoughts

What is BART?

Bayesian **A**dditive **R**egression **T**rees







Interpretation

- Emsamble method combining many shallow trees
- Bayesian means variation is fully quantified
  - Yay Statistics

Powerful Predictive Performance

- Table with simulation result
- bartMachine is relatively unknown
  - xgboost: ~43k downloads per month
  - randomForest: ~88k downloads per month
  - bartMachine: ~2k downloads per month

Package Features:

- Functions for Cross Validation
- Model fitting:
  - Is done in parallel[1]
  - Can incorporate missing data
- Lots of fun statistical things
  - Credible iterval calculation
  - Diagnostic plots/tests
- Variable selection
- Interaction detection
- Export fit trees

[1] MCMC

Installation and loading steps

1. Google "How to install rJava on [your OS]"
2. Do that
3.

```
install.packages("bartMachine")
```

To load the package with:

- 10GB of memory
- All but one core available for compute

```
options(java.parameters = "-Xmx10g")
library(bartMachine)
numcores <- parallel::detectCores()
set_bart_machine_num_cores(numcores - 1)
```

Code Time

Coding demo

Computational Considerations

- Table with memory/time

John's Final Thought

- BART is a powerful technique which brings many advantages
  - At the expense of computational efficiency.
- Good results with removing expected variation and feeding residuals into BART.