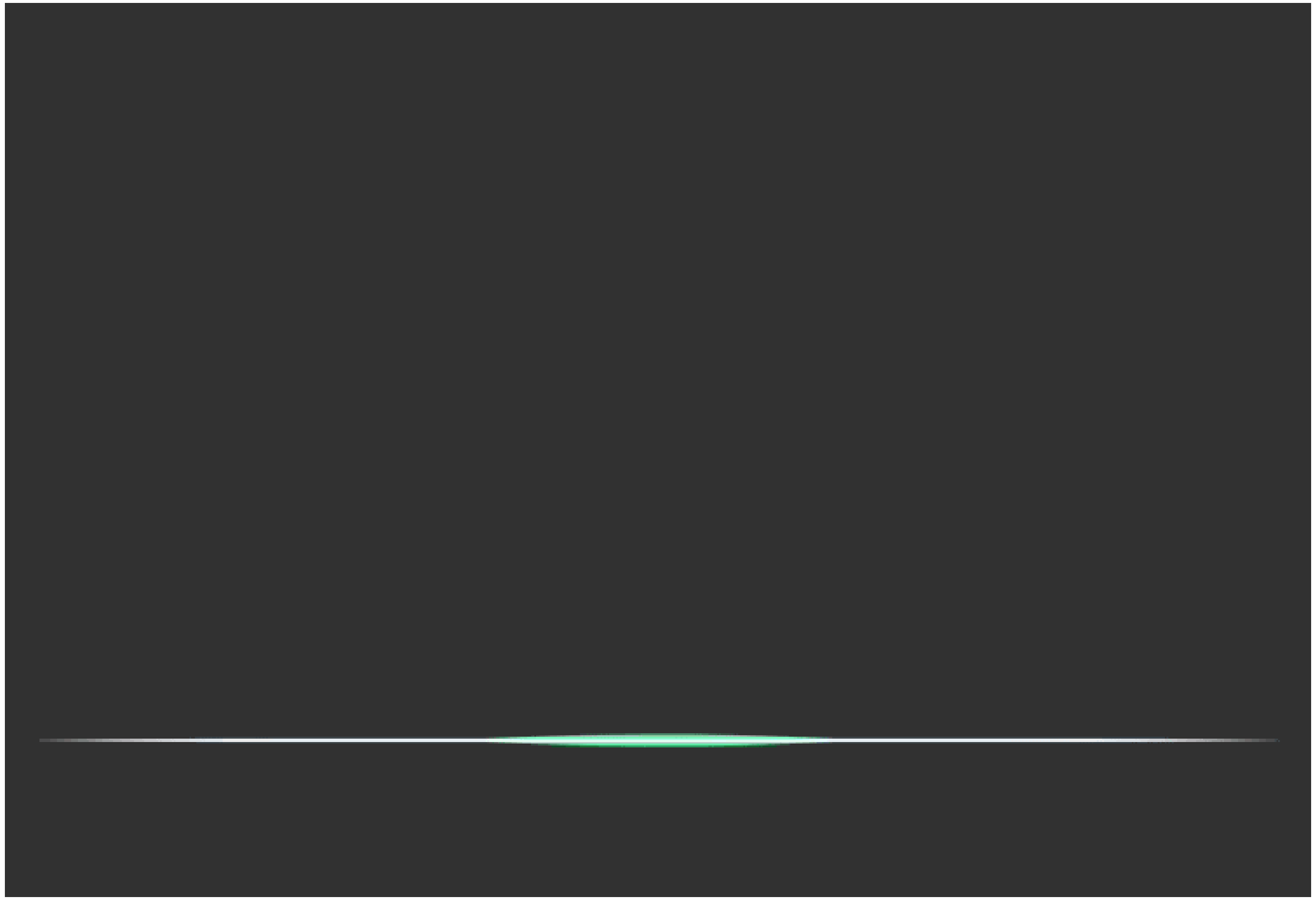

# The bots are here!

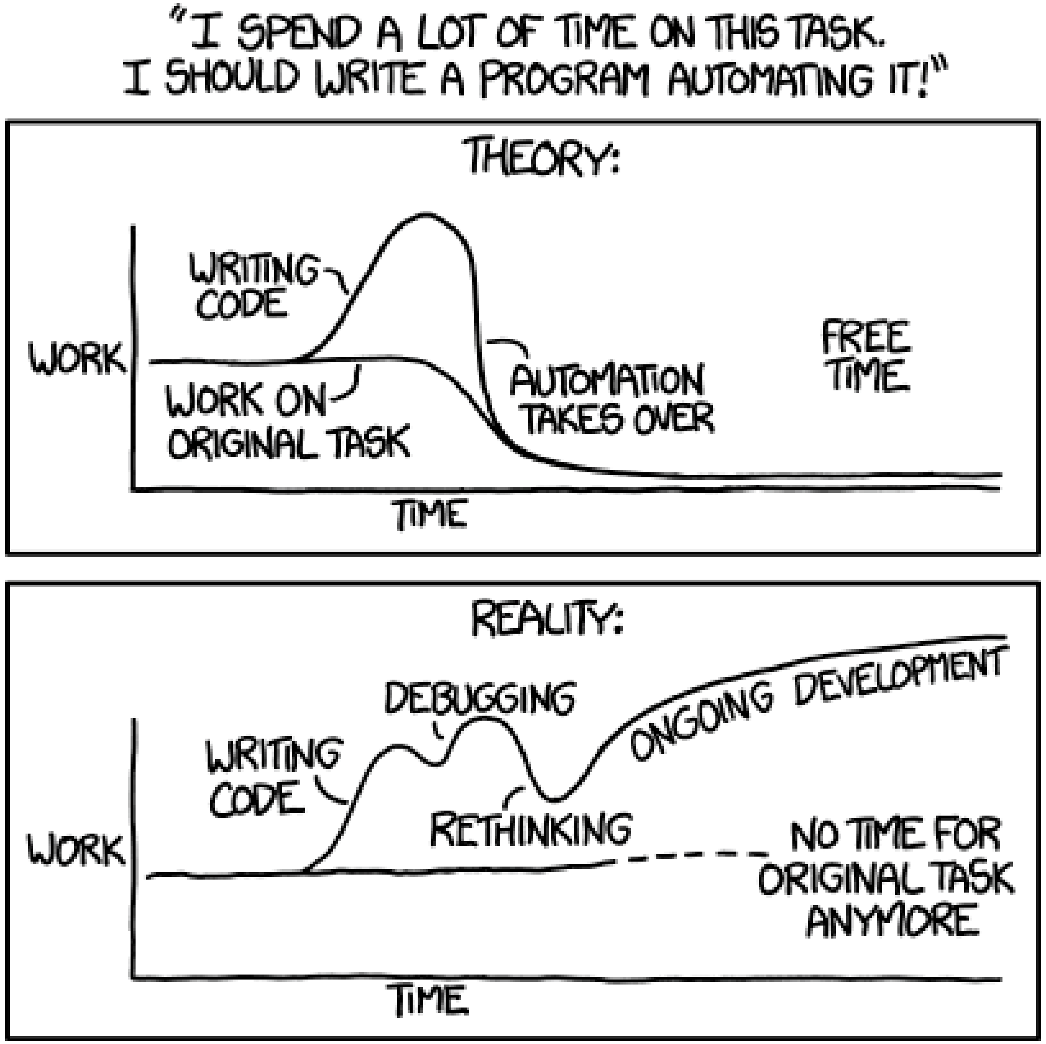
Analytics & Automation in Life Insurance Pricing

Louis Rossouw
Siri (a.k.a. Lauren Lanz)

# Siri



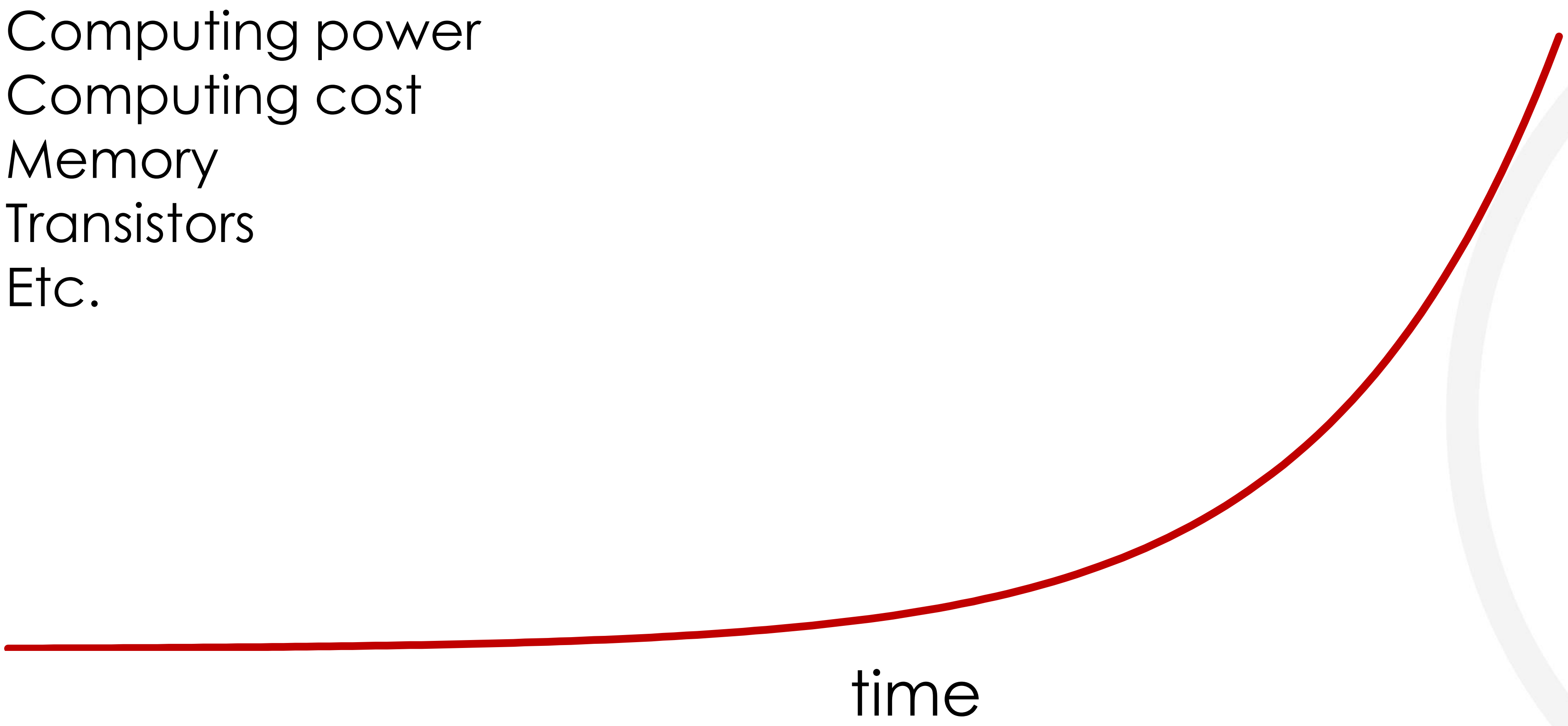
# Automation


"I SPEND A LOT OF TIME ON THIS TASK.
I SHOULD WRITE A PROGRAM AUTOMATING IT!"
THEORY:
WRITING CODE
WORK
WORK ON ORIGINAL TASK
AUTOMATION TAKES OVER
FREE TIME
TIME
REALITY:
DEBUGGING
WRITING CODE
ONGOING DEVELOPMENT
WORK
RETHINKING
NO TIME FOR ORIGINAL TASK ANYMORE
TIME

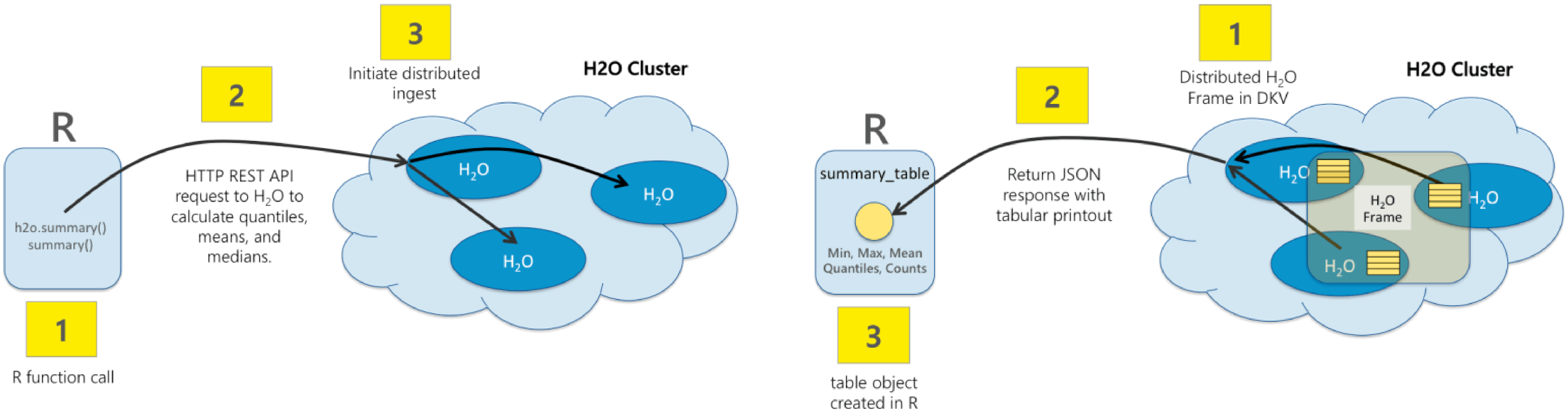
# Four V’s of Data




# Exponential Computing



# On demand & distributed computing




Work is sent to multiple (on-demand) computers and analysis is done when any single computer could not do this analysis

# Defined methods for different systems, processes or software components to share information

**Application programming interface**

- Query data sources directly
- No manual processes in between
- Pricing process reads directly
  - From data warehouse
  - Excel files
  - Internet
  - Etc.


```
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"user" : {
  "id" : 12 ,
  "id_str" : "12" ,
  "name" : "Jack Dorsey" ,
  "screen_name" : "jack" ,
  "location" : "California" ,
  "description" : "" ,
  "url" : null ,
  "entities" : {
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      "urls" : []
    }
  },
  "protected" : false ,
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  "friends_count" : 1085 ,
  "listed_count" : 23163 ,
  "created_at" : "Tue Mar 21 20:50:14 +0000 2006" ,
  "favourites_count" : 2449 ,
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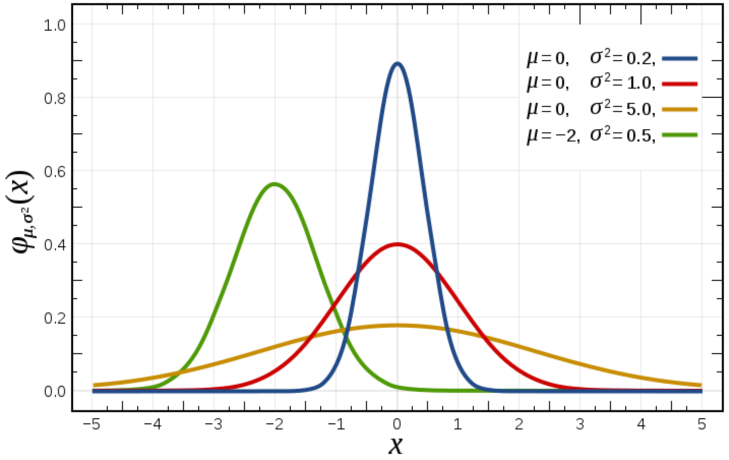
# Advances Statistics and Machine Learning

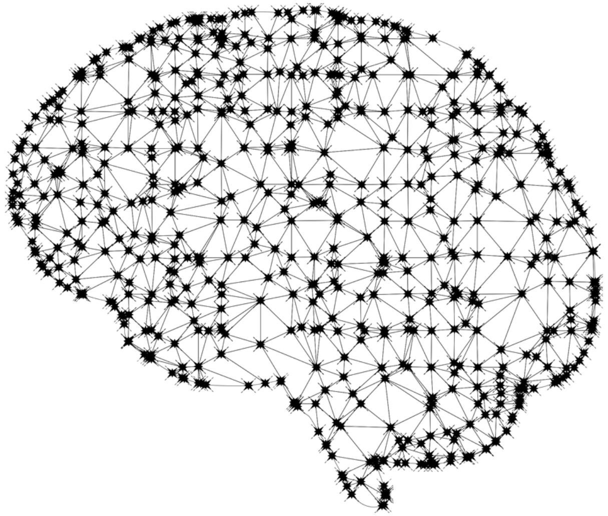
## Statistical Models

- Generalised Linear Models
- General Additive Models
- Penalised Regressions

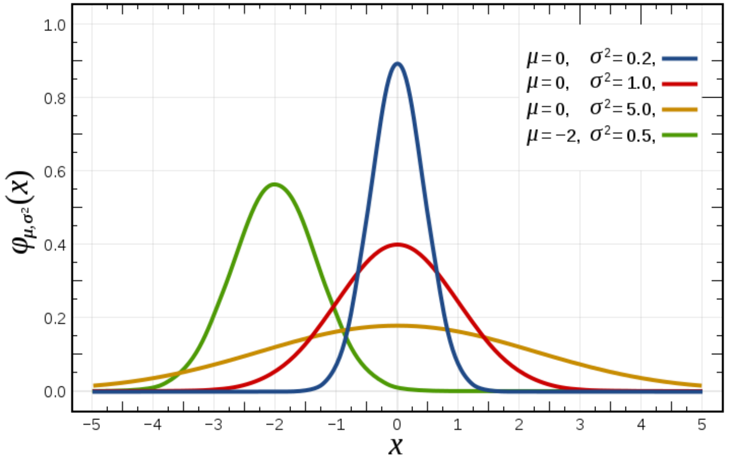



## Machine Learning

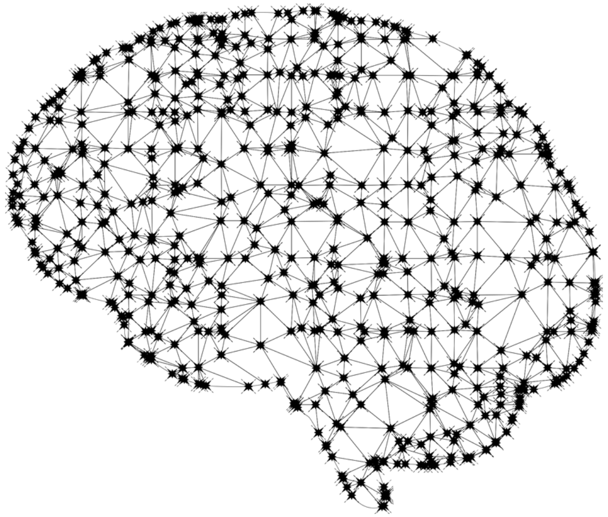
- Decision Trees
- Random Forrest
- Gradient Boosting
- (Deep) Neural Networks



# Statistical Models vs. Machine Learning




- Statistical / mathematical origins
- Statistical Models take account of uncertainty explicitly
- Structured (additive) predictor effects
- Can allow for complexity



- Programming / Computer Science origins
- Algorithmic with no predefined relationships
- Cannot isolate effect of variables
- Easily deal with complexity

http://www.fharrell.com/post/stat-ml/

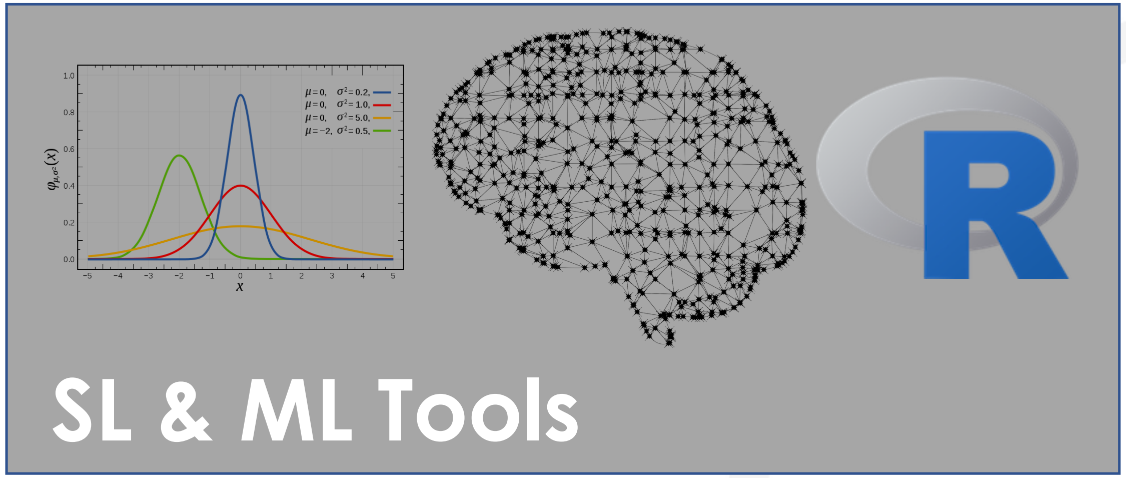
# Open Source



- Advanced research
- Often open source
- Opens the door for innovation
- Brings accessibility

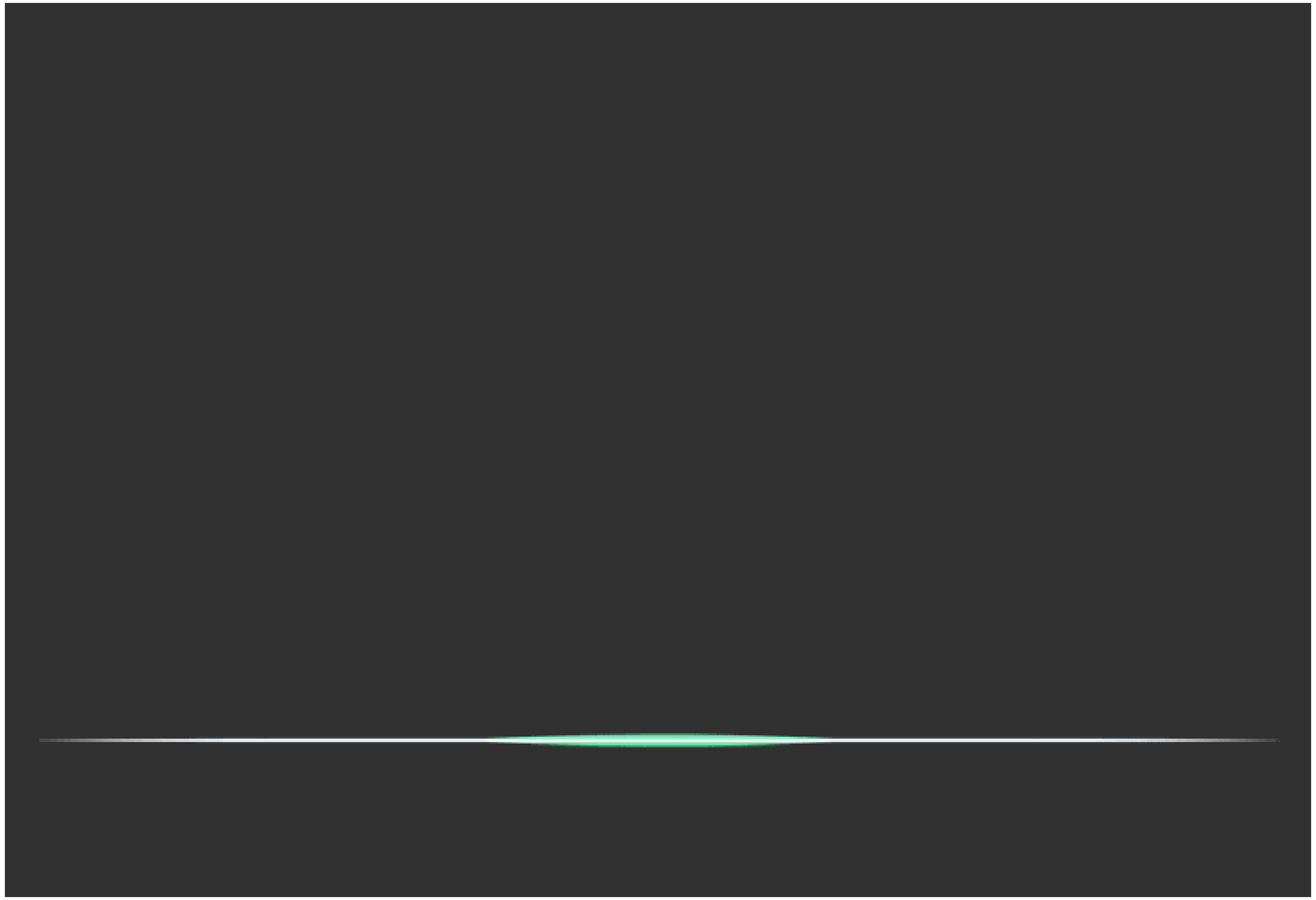
# Colliding Exponentials

# So how?

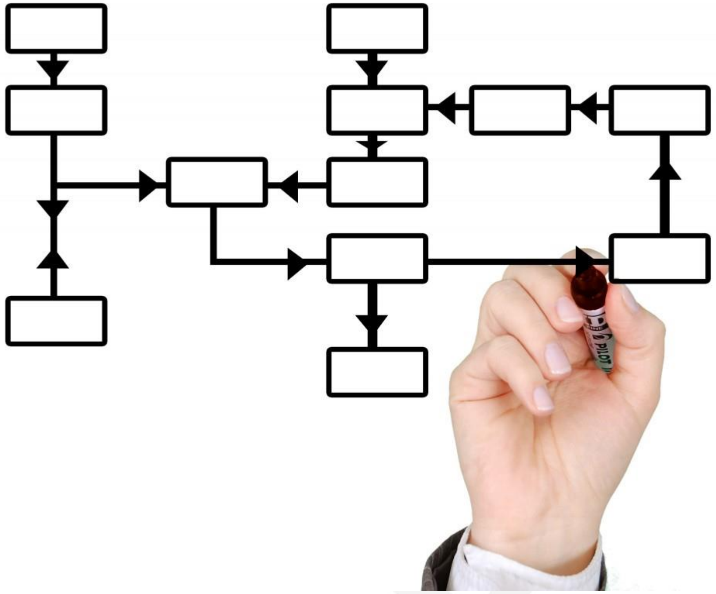


# Siri



# The future

1. Automatically pull in required data using direct calls
2. Automate all steps of data preparation
3. Employ advanced modeling methods
4. Automatic goodness of fit results
5. Documentation & Reporting
6. Change tracking
7. Rinse and repeat…



# The bots are here… to stay…

## Continued automation of processes

- Including the pricing process
- Automating the process improves quality, consistency & reproducibility
- Improves response time
- Removes subjectivity
- “What ifs” are quicker to answer

## How will pricing respond?

- Think more about the data?
- Actuarial skills
  - Data
  - Analytics
  - Programming