Coursera - Data Science & R Course

Daniel O.

15/12/2020

Types of Data Science Questions

Descriptive

Goal: To describe or summarize a set of data

- Early analysis when receiving new data
- Generate simple summaries about the samples and their measurements
- **Not** for generalizing the results of the analysis to a larger population

Exploratory

Goal: To examine the data and find relationships that weren't previously known

- Explore how different variables might be related
- Useful for discovering new connections
- Help to formulate hypotheses and drive the design of future studies and data collection

Inferential

Goal: Use a relatively small sample of data to say something about the population at large

- Provide your estimate of the variable for the population and provide your uncertainty about your estimate
- Ability to accurately infer information about the larger population depends heavily on sampling scheme

Predictive

Goal: Use current and historical data to make predictions about future data

- Accuracy in predictions is dependent on measuring the right variables
- Many ways to build up prediction models with some being better or worse for specific cases

Causal

Goal: See what happens to one variable when we manipulate another variable

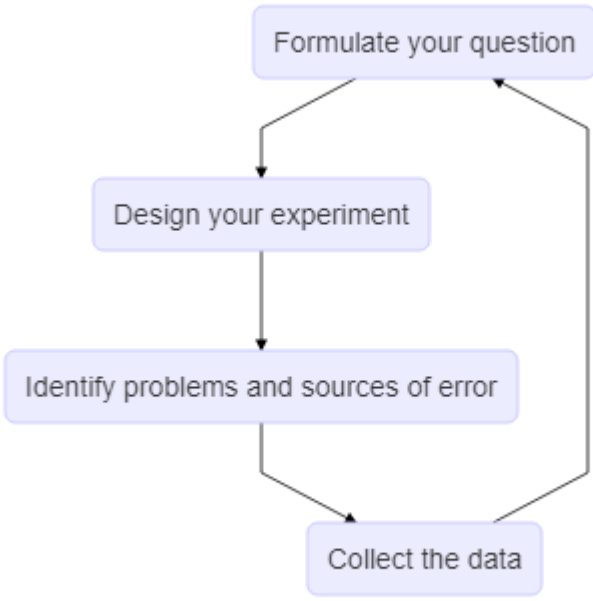
- Gold standard in data analysis
- Often applied to the results on randomized studies that were designed to identify causation
- Usually analyzed in aggregate and observed relationships are usually average effects

Mechanistic

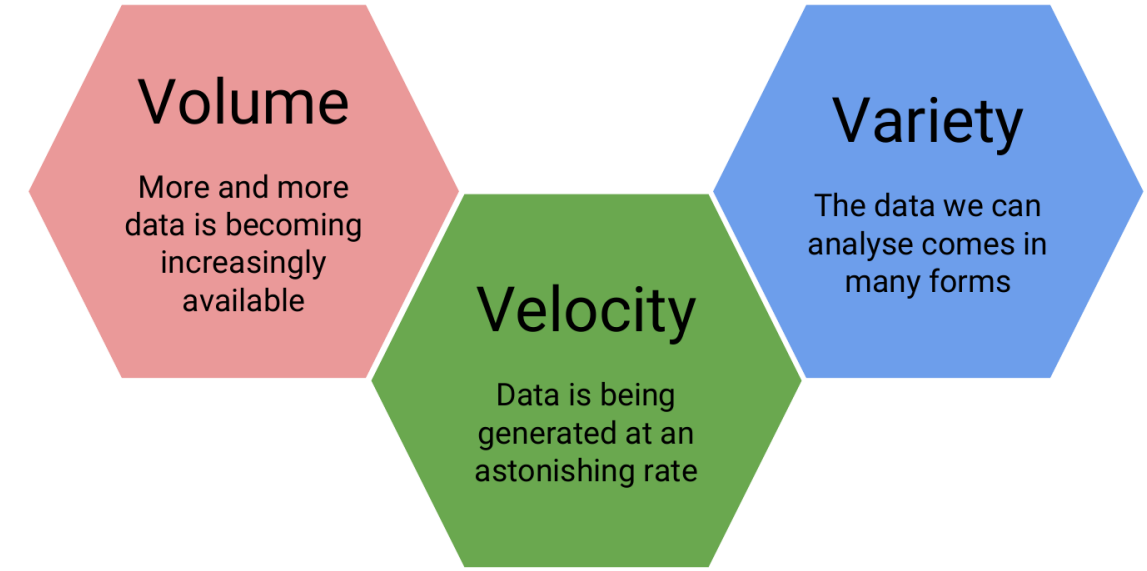
Goal: Understand the exact changes in variables that lead to exact changes in other variables

- Applied to simple situations or those that are nicely modeled by deterministic equations
- Commonly applied to physical or engineering sciences
- Often, the only noise in the data is measurement error

Experimental design



Big Data



Practical R Exercises in swirl

install.packages("swirl")

library(swirl)

install_from_swirl("R Programming")

swirl()

getwd()

setwd()

ls()

dir()

dir.create()

file.create()

file.exists()

file.infor()

file.path()

file.rename()

file.copy()

–

length(x)

x <- dim(x,y) » Creates matrix

attributes(x)

–

matrix(data, nrow,ncol)

cbind({vector with row names}, matrix) » Combine columns

colnames(data.frame) = {vector with column names} » Names of columns

data.frame({vector with row names}, matrix) » Allows Text and Numbers

Types of Data Science Questions

Control Structures - if/else

if() { } else() { }

–

if() { { else if() { } else { }

Control Structures - for loop

for(i in){ [i] }

Control Structures - while

while(){ }

Control Structures - repeat, next, break, return

`repeat` is a construct that basically initiates an infinite loop. The only way to exit a `repeat` loop is to call `break`

`next` is basically used in any time of looping construct when you want to skip an iteration.

`return` signals that a function should exit and and return a given value