

Coursera - Data Science & R Course

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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

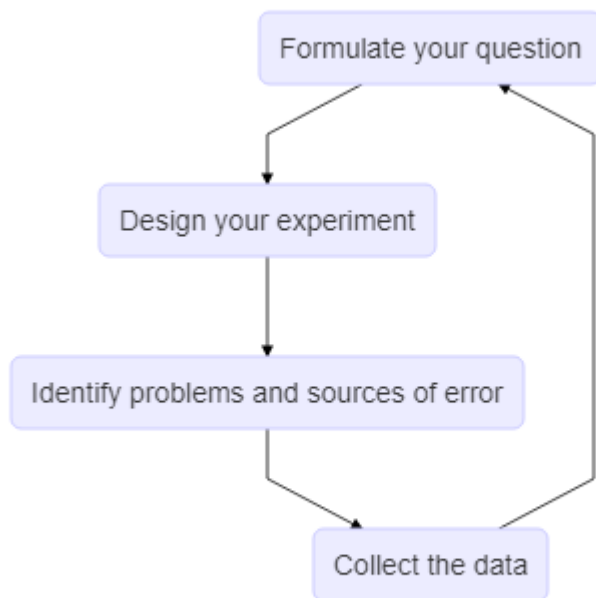
- Gold standard in data analysis
- Often applied to the results on randomized studies that were designed to identify causation
- Usually analyzed in aggregate and observed relationships are usually average effects

Mechanistic

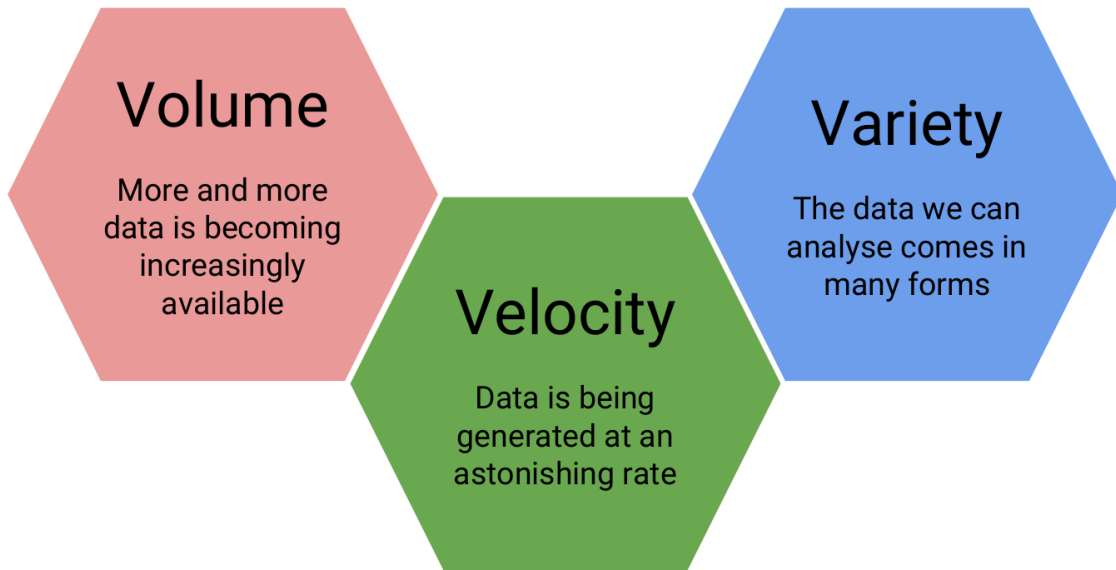
Goal: Understand the exact changes in variables that lead to exact changes in other variables

- 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()
```