TUTORIAL: IBM Watson Dashboard

With the analytics dashboard, you can

- build sophisticated visualizations of your analytics results
- communicate the insights that you've discovered in your data on the dashboard
- share the dashboard with others

The visualizations can tell the story of an investigative process or they can be made to summarize and communicate data in a way that is difficult to do with simple plots.

Hypothesis Testing

- Statistical inference and hypothesis testing can be used together to carry out investigations into the data
- When carrying out a hypothesis test, the central question, null hypothesis and alternative hypothesis should be stated **before** the data are collected
- Simulation based hypothesis testing like permutation tests provide a flexible alternative to more classical approaches
- The bootstrap can be used to quantify the uncertainty around a parameter estimate and the two combined can be used as an investigative tool
- Bayesian methods bring to the table a number of way to think differently about hypothesis testing. They generally require more time to implement, but the quantification of uncertainty can be useful when making important business decisions.
- The t-test is a simple way to care out 1 or 2 sample hypothesis tests.
- There are a number of variants on the t-test, but the unequal variances t-test is commonly used.
- The t-test and ANOVA (more than two groups) test whether group means have differences between each other

CASE STUDY: Multiple comparisons

- *p*-values themselves are not a source of ground truth, but they are nonetheless quite useful if used appropriately.
- There are a number of ways hack your way to significant results using *p*-values
- Running more than one hypothesis test, on the same data, results in the multiple comparisons problem.
- Multiple comparisons are an issue because there is an expected false positive rate for running one test, and if we run multiple tests say using different combinations of features this expected rate should be higher.
- The Bonferroni correction is commonly used to mitigate the multiple comparisons problem, but it is generally too conservative for large data sets.
- A number of other methods are available including the Benjamini/Hochberg correction that is based on the **false discovery rate**.
- Permutation experiments are offer an additional method to correct for multiple comparisons that require fewer assumptions.