

The Data-Shack workshop: W2. Intermediate Analytics (2 days)

Relationships in data & process optimisation

Prerequisite

Introductory analytics (2 days)

Objectives

Introducing delegates to:

- analysis of variance (ANOVA), and provide a good understanding of the two most commonly used types of ANOVA
- multiple linear regression and the techniques of stepwise regression
- design of experiments (DOE), and demonstrate the incredible power of structured experiments for efficient process optimisation

Description

This two-day workshop will enable delegates to undertake analyses that seek to establish relations between variables, using ANOVA and/or multiple linear regression. These are essential building blocks to understand the incredibly powerful and useful optimisation technique of “design of experiments” (DOE).

Outcome

Delegates will leave the workshop with an excellent understanding of theory and practice of Intermediate Analytics Techniques used in industry to describe, analyse, model and optimise operational processes.

DOE is used extensively in process optimisation methodologies (e.g. 6σ DMAIC) to enable the rapid and efficient attainment of optimal settings for processes, in order to deliver on-target outputs.

Once you understand DOE, you will never look back, and the road to optimally tuned processes will be that much smoother.

Topics*

1. Differences between multiple groups
 - 1.1. Objective and applications
 - 1.2. Types of ANOVA
 - 1.3. 1-way ANOVA
 - 1.4. Main effects and interactions
 - 1.5. Multi-way ANOVA
 - 1.6. Repeated measures ANOVA
2. Correlational models using continuous predictors
 - 2.1. Objective and applications
 - 2.2. Multiple linear regression
 - 2.3. All effects
 - 2.4. Forward stepwise regression
 - 2.5. Backward stepwise regression
3. Cause-and-effect modelling & optimisation
 - 3.1. Design of Experiments (DOE)
 - 3.2. Concepts and terminology
 - 3.3. Types of DOE
 - 3.4. Full factorial designs (2-level & 3-level)
 - 3.5. Main effects, interactions & curvature
 - 3.6. Central composite designs (CCD's)

* Note that the list of topics covered may vary slightly depending on the nature of the business questions to be answered, and the content of the supporting data supplied by the delegates

Timing

- 10:00 – 11:00 Session 1 (1 Hour)
- 11:00 – 11:15 Break (15 min)
- 11:15 – 12:15 Session 1 (1 Hour)
- 12:15 – 12:45 Lunch (30 min)
- 12:45 – 13:45 Session 1 (1 Hour)
- 13:45 – 14:00 Break (15 min)
- 14:00 – 15:00 Session 1 (1 Hour)