Practice

Code

- I have a datafile called 'data.csv'. It contains four columns of data and 20 rows. Each row contains a subgroup. Can you write **R** code to monitor the mean of each subgroup with a Shewhart control chart?
- Can you use another approach in R besides 'qcc'?
- Can you use the `bigfish` dataset from the qcc library in R to create a control chart?

Explanation

- Can you explain the difference between phase 1 and phase 2 control charting applications in statistical process monitoring?
- Can you explain the zero-state ARL?
- When should I use a univariate, multivariate and profile monitoring approach?

Knowledge Creation

- Can you create a framework for using statistical process monitoring methods in my company?
- Generate a template that I can use for the DMAIC process for a project
- How would I explain a control chart with a signal on it to my boss?

Learning

Code

- Can you please explain the following code? (We provide an uncommented code snippet that is modified based on the first research code question)
- Can you rewrite the code above using base R only?
- Can you please rewrite the code below in Python? (We paste the uncommented code from the first research question)

Explanation

- How many phases are there in statistical process control charts?

Knowledge Creation

- Generate a course syllabus for a statistical process control for undergraduate students. The students have already completed two statistics courses. The course is a 3-credit hour course and is offered for 15 weeks.

Research

Code

- Calculate the zero-state ARL of an EWMA control chart with smoothing constant 0.1 and control limit factor 3 in the in-control case. The data is normally distributed. Use Monte Carlo sim.
- Explain this R function for approximating the ARL of a two-sided EWMA. What is the mathematical method underlying the function ewma.arl()?"
- Use the function to get the control limit factor cE for in-control ARL= 500

Explanation

- Explain the practitioner-to-practitioner variability for setting up a control chart.
- What is the general principle of a functional control chart?
- Is the synthetic chart just another runs-rule chart?

Knowledge Creation

- What are open issues in SPC research?
- Which methods could be applied for calculating the average run length of a control chart?
- Is there an explicit or analytical solution for the ARL of a two-sided EWMA control chart for exponentially distributed data?