Graphical Methods

Become Future Fit

Canopus
Business Management Group

You will learn

Importance of graphical methods

& types of graphical tools

Level of Difficulty

Low

Importance of Graphical methods

- To preliminary analysis
- Narrow down to hypothesis
- Quick & fast method
- Easy to interpret & share

1 & 2 Variables

1. Dot Plot
2. *Box Plot*
3. Interval Plot
4. *Stem-and-Leaf Plot*
5. Time Series & Run Chart
6. *Scatter Plot*
7. Marginal Plot

- *Red – Covered in Basic/Foundation Course*
- *Black – Will be covered in this course*

3 Variables

1. Contour Plot
2. 3D scatter Plot
3. 3D Surface Plot

> 3 Variables

1. Matrix Plot

2. Multi Vary Chart

Dot Plots, Box Plots & Interval Plots

Become Future Fit

You will learn

Learn how to create and interpret Dot Plots,

Box Plots & Interval Plots

Level of Difficulty

Low

Dot Plot

- Used to assess and compare sample data distributions
- Each dot can be a data point or group of data points
- Useful when sample size is small (n< 50)

Interval Plot

- An interval plot shows a 95% confidence interval for the mean of each group
- Best when sample size for each group is >10
- For useful when sample size is very large

Time Series & Run Chart

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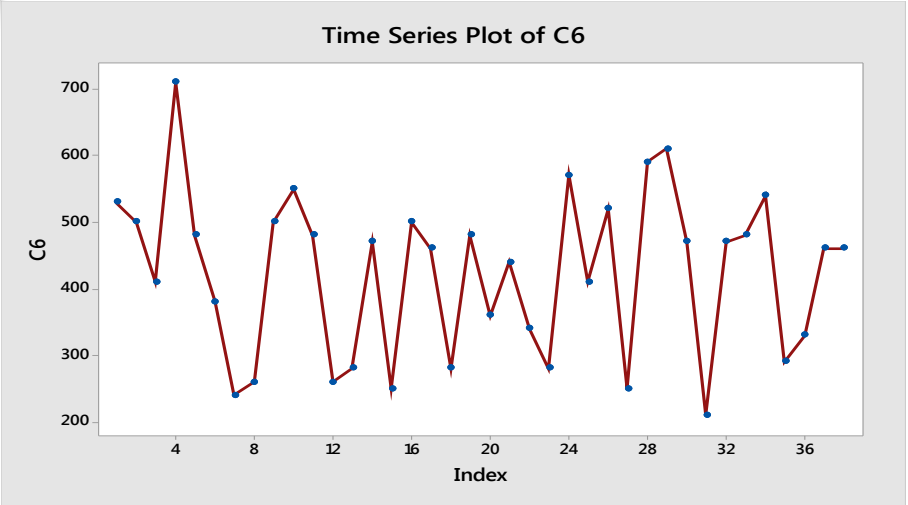
You will learn

Learn how to create and interpret Time Series Charts & Run Charts in Minitab

Level of Difficulty

Low

Time Series Plot



1. Used to identify patterns in **data over time**, such as trends or seasonal patterns
2. Can be used to depict data showing different stages

Time Series Modelling

1. Linear
2. Quadratic
3. Exponential
4. S Curve

Time Series Modelling

Model Selection Criteria

- Visual Fit
- Lowest Accuracy Measures (MAPE, MAD, and MSD)

Theory of Scatter Plots

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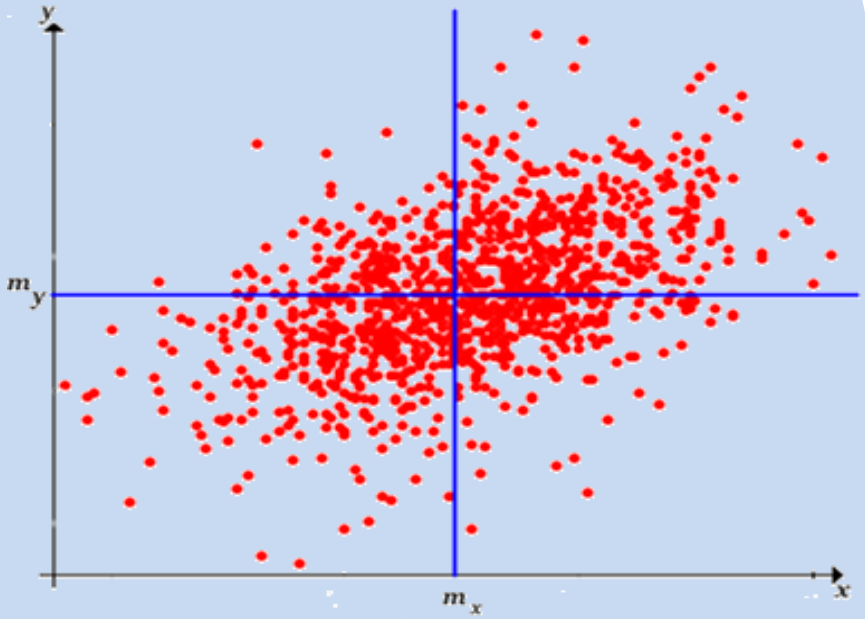
You will learn

Learn about the theory behind Scatter Plots

& the origin of ‘r’ value

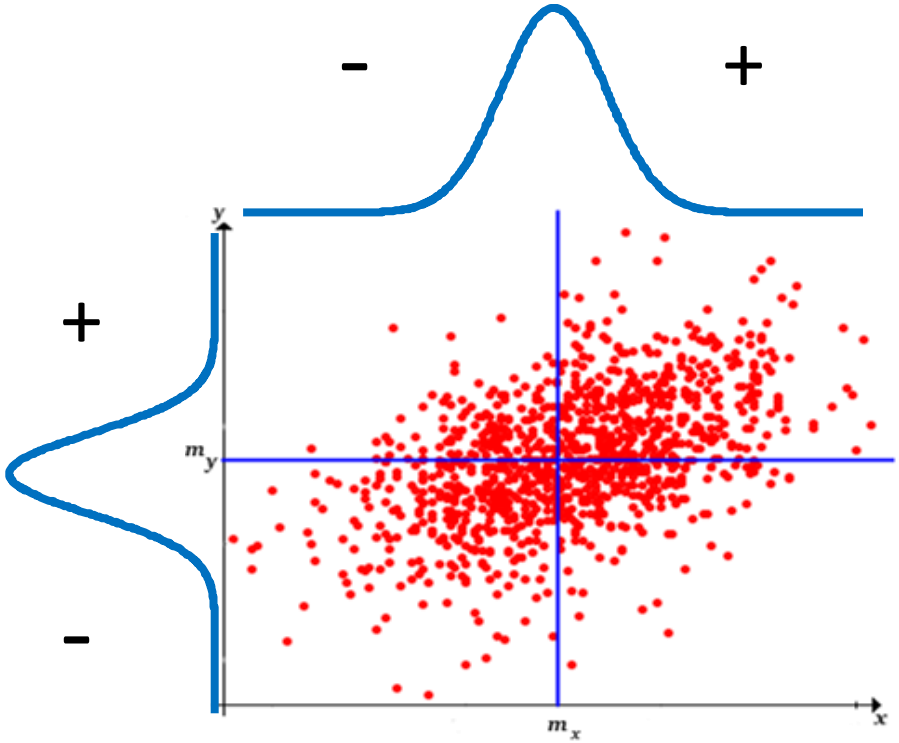
Level of Difficulty

Low



Theory of ‘r’

Theory of ‘r’



Correlation coefficient

The z-score for the X value

The z-score for the Y value

$$r = \frac{\sum (z_x z_y)}{n}$$

n — The number of pairs of scores

$$r = \frac{1}{n-1} \sum_{i=1}^{n} \frac{(x_i - \bar{x})}{s_x} \frac{(y_i - \bar{y})}{s_y}$$

Spearson’s rho

Used to study non-linear relationships between continuous or ordinal variables

3D Plots

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You will learn

Learn about 3D Plots such as Scatter Plots, Contour Plots & Surface Plots

Level of Difficulty

Medium

Surface Plot

- 3D Scatter Plot
- Contour Plot
- Surface Plot

3D Plots

- Study the relationship between 3 factors

  – For Ex: 1 Y and 2 Xs

- Gives good representation of the

  complexity of relationships

- Generally X & Y axis contain Causes and

  Z axis is used for CTQ

- Can be rotated

Non-linear Correlation

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You will learn

Learn about how to study and interpret non-linear correlation using Spearman's Rho

Level of Difficulty

Low

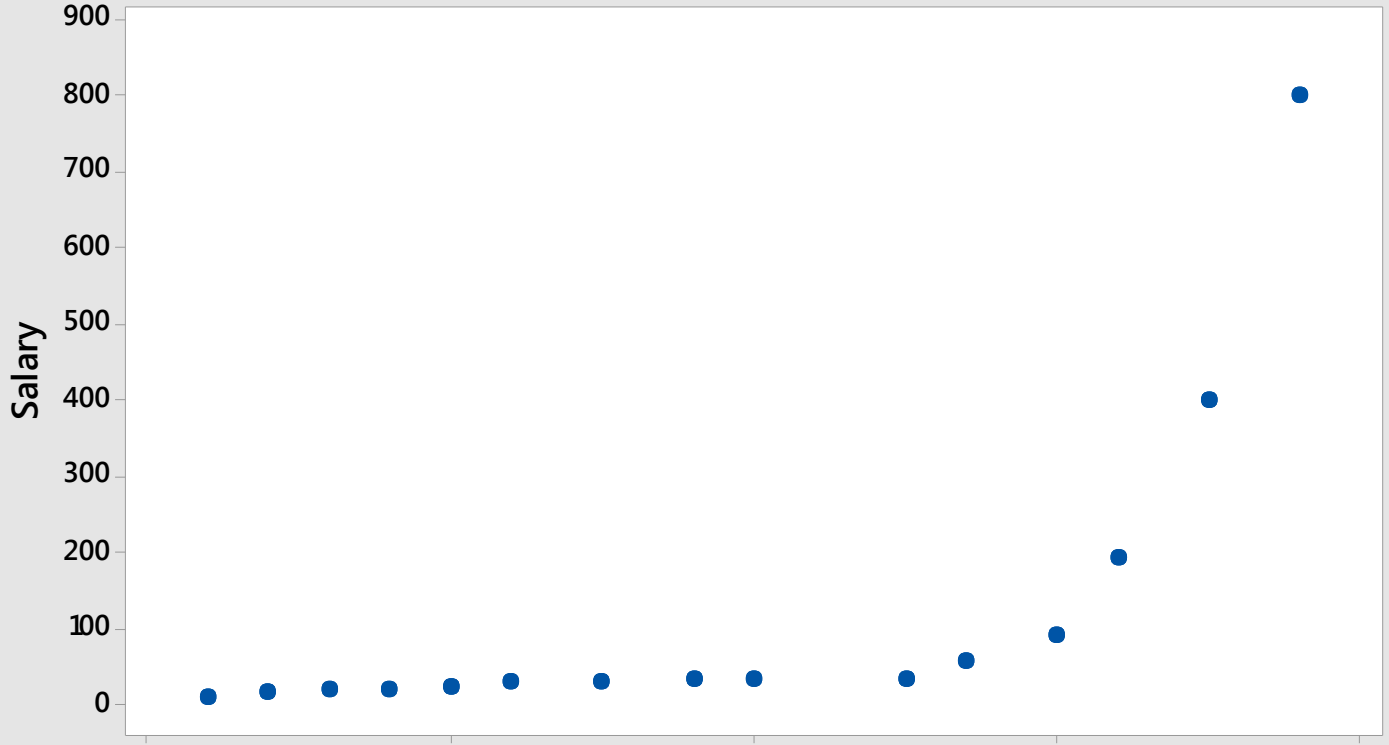
Establishing Relationship

Is there a relation between

Salary and Experience?

Spearman's rho

Used to study non-linear relationships between continuous or ordinal (rank) variables



Multi-Vary Charts

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Learn to create and interpret Multi-vary charts

Level of Difficulty

Medium

Factors Impacting Sales

In a sales process that happens through branches, 5 different sales man and their performance index(a composite measure) in different branches has been collected. The manager suspects that branch is a source for variation for salesmen performance than the salesmen itself. Is that true?

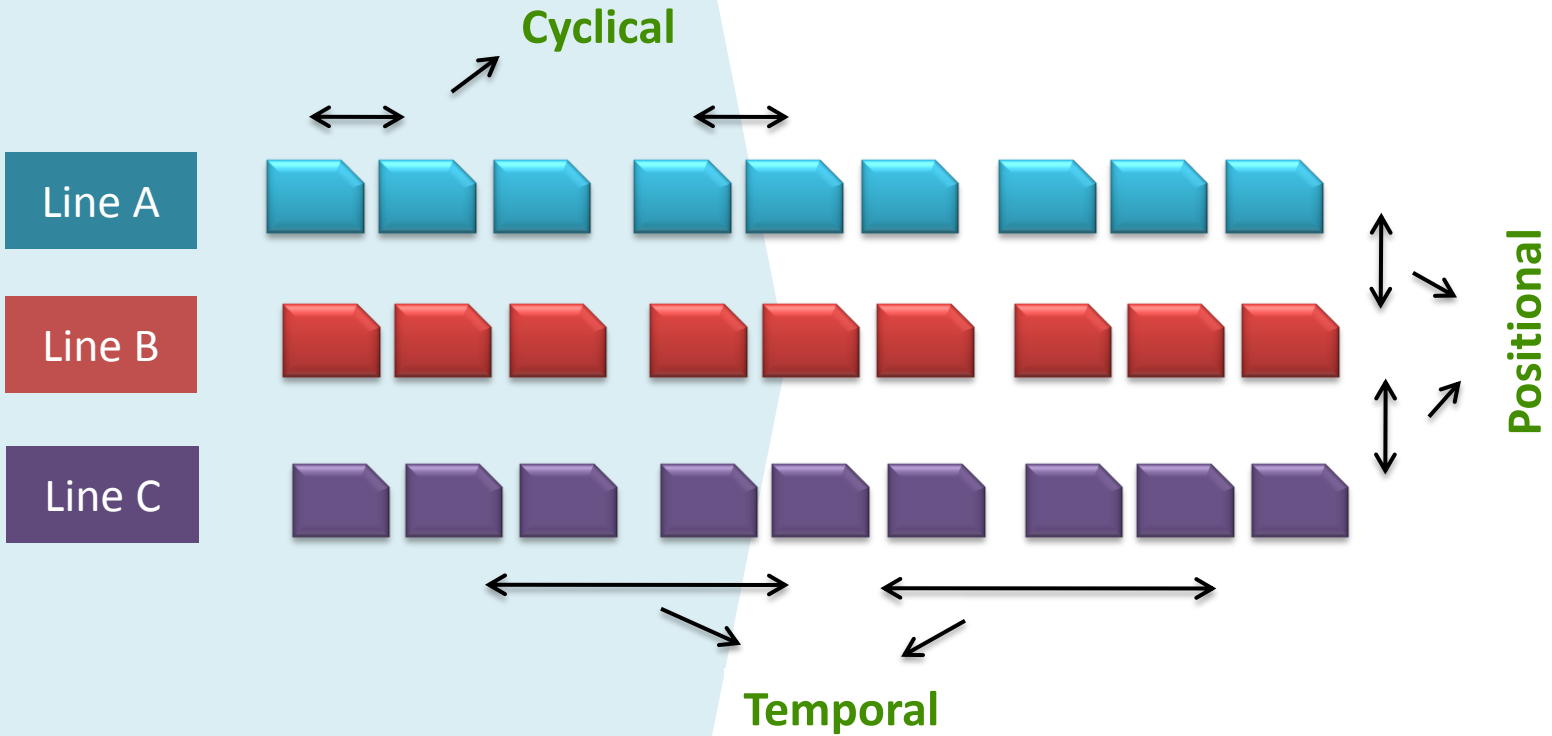
Multi-Vari Chart

- Seder (1950) of Gillette Safety Razor company introduced the multi-Vari chart
- It provides a graphical display of behavior of a CTQ in a running process

Multi-Vari Chart

- Detect variance components and suspicious patterns
- Reduce the number of X's to a vital few
- Y data must be continuous & X data must be categorical

Types of Variation



Types of Variation

Positional Variation : Between different types of transactions or different teams of operators or different machines

Cyclical Variation : Variation between consecutive outputs

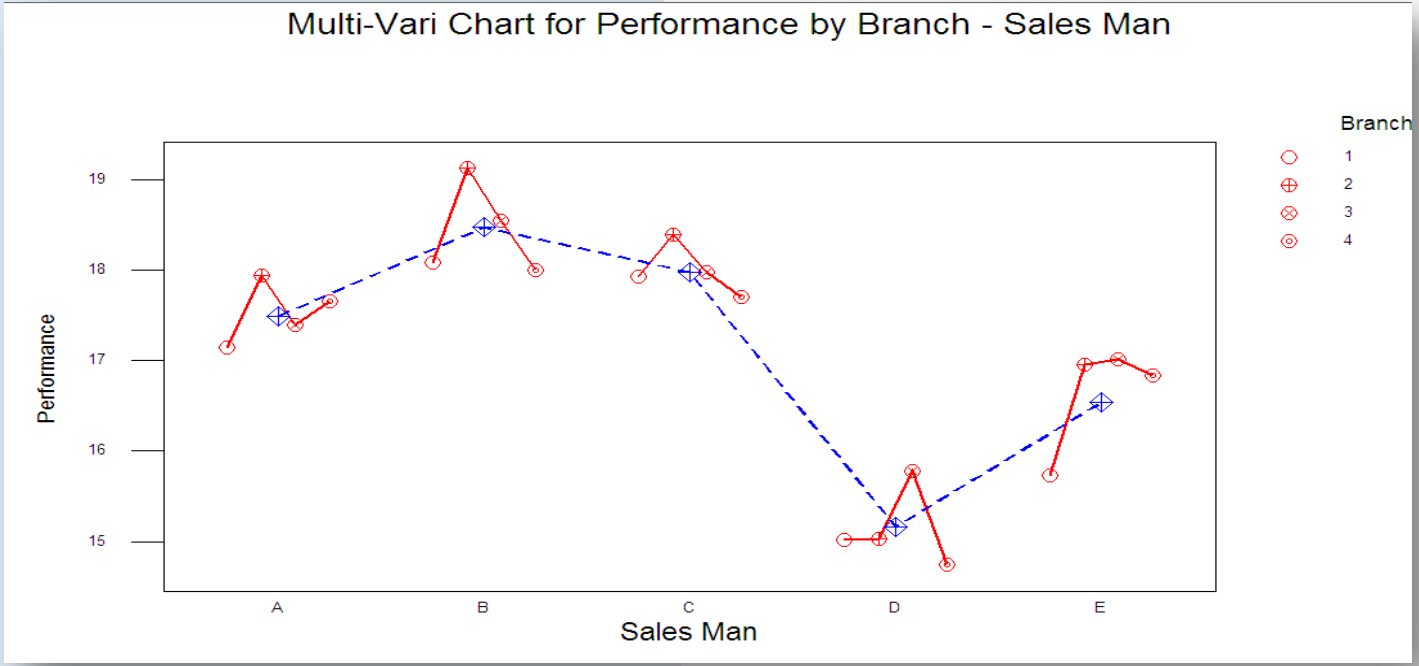
Temporal Variation: Variation over time.

Analysis Approach

Reorganize in such a way that

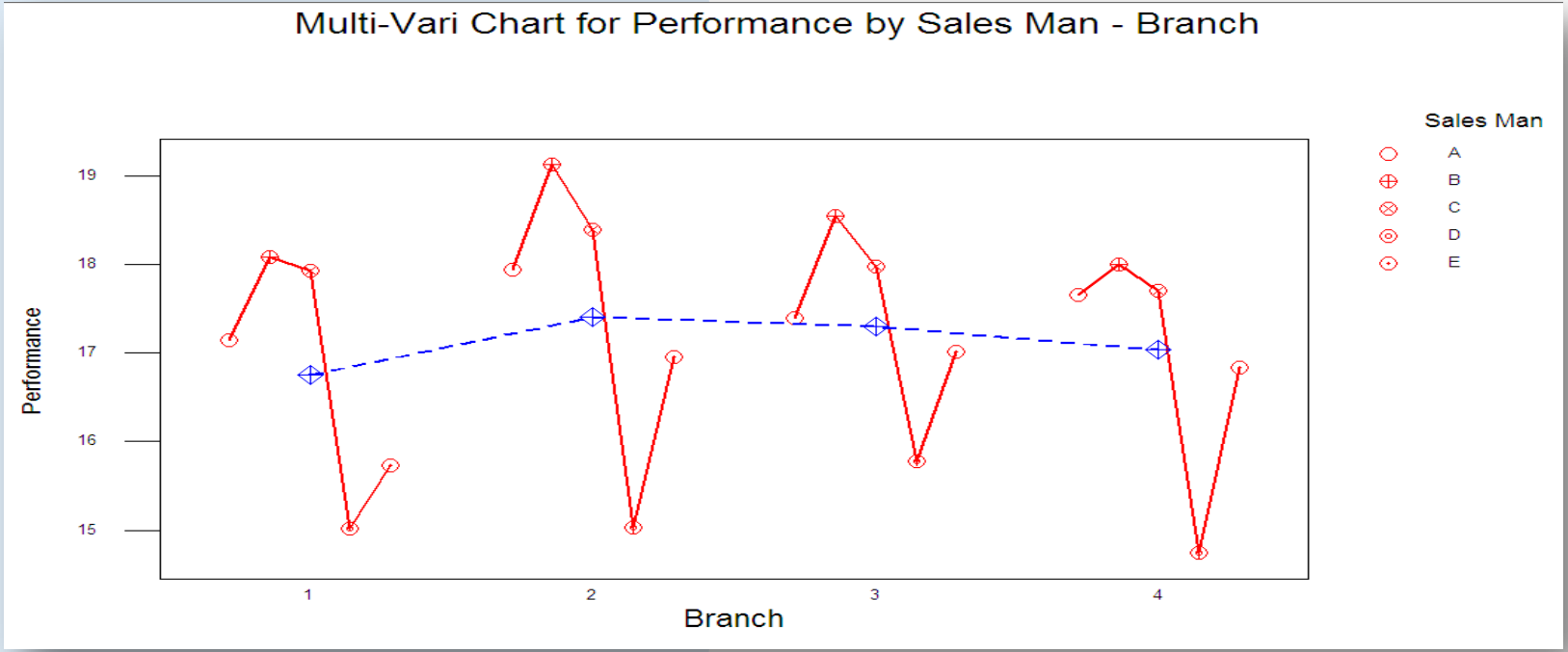
Variations in the variable on X-

axis is minimum!



What are the sources of variation?

Another Representation (same data)



How does your conclusions change now?

Marginal Plots

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Learn how to create and interpret Marginal Plots

Level of Difficulty

Low

Marginal Plots

Study relationship between two variables & along side compare that with their spread/dispersion