The Relation between Efficiency and Tempreture Degrees

O & M Analytics

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Introduction

As an Electrical Engineer had worked for a private company in the Project of Health Facilities 'O & M' aka Operation and Maintenance. He faced a high-temperature problem inside Medical Laboratories and especially in Summer with outside temperatures reach 50 C. He teamed up with 5 people to solve this problem and was of Business requirements, calculating Efficiency for each Temperature Degree. Based on his knowledge in Math, he created a new formula to calculate the Efficiency of Temperature Degrees which based on it can measuring quality.

Target

Calculating Efficiency of the Internal Temperature Degrees for Medical Laboratories in The Regional Laboratory and Central Blood Bank. Finding a Relation between Temperature Degrees as 'Independent Variable', Efficiency Rates and Quality as 'Dependent Variable'.

Discovering and Manipulating the Data

- Importing Libraries
- Reading the Data
- Checking count of Rows and Columns
- Checking types of data for each column
- Rearranging The Columns
- Renaming the Columns

Calculating the Efficiency for each Temperature Degree

- Set Ideal
- Actual and Breakdown
- Temperature Degrees
- Create a Formula for calculating Actual Efficiency
- Create New Column is called Efficiency
- Creating a new column is called Quality which gives value 'good' if Efficiency greater than or equal 70 otherwise 'bad'.

All Temperature Degree in Celsius.

Ideal Tempreture Degree

- Ideal_deg = 22 C

Actual Tempreture Degrees

- Actual_deg = [28.3, 27.55, 28.42, 26.81, 25.6 , 28.07, 28.24, 29.15, 28.29,27.65, 24.35, 26.93, 27.04, 26.06, 23.12, 26.06, 22.18, 24.78, 26.34]

Ideal Efficincy percent

- Ideal_eff = 100 %

One Temperature Degree Equal 10 percent from Efficiency

- one_deg = 10 %

Actual Efficiency percent

- actual_eff = ideal_eff - (actual_temp_deg -ideal_temp_deg) * one_deg

Breakdown Tempreture Degree

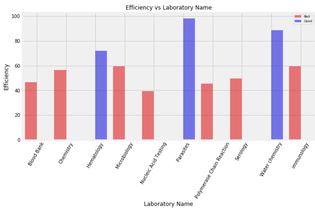
- Break_temp_deg = ideal_temp_deg + 10 = 22 + 10 = 32 C

Descriptive Statistics

- Describing Statistics for Categorical and Numerical Columns.
- The Average, Middle Value, Most Common Value, Minimum and Maximumn values of Temperature Degrees and Efficiency

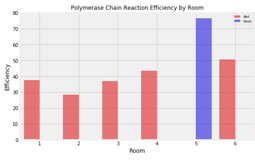
Visualizing the Data

In the Regional Laboratory, there are 70% of laboratories assort as Bad Efficiency and 30% as Good Efficiency.If Efficiency less than 70% the Quality becomes Bad otherwise Good.

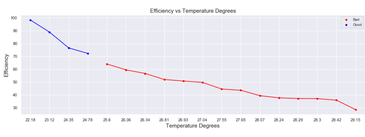


In Blood Bank, All Rooms assort as Bad Efficiency.

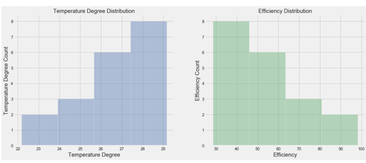
In Ploymerase Chain Reaction Laboratory, there are five Rooms assort as Bad Efficiency and one as Good Efficiency.



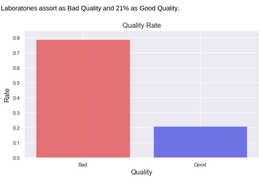
Overall, the Efficiency Rates are decreased with increasing the Temperature Degrees and when a Degree exceeds 25 C the Efficiency Rates are within Bad Rates.



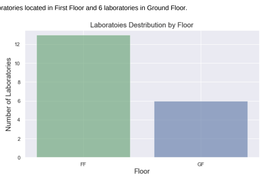
The Blue Graph is represented as Temperature Degree Distribution and the *Green Graph* is represented as Efficiency Distribution. Each Temperature Degree is identified with a certain Efficiency Rate. The highest frequency Degrees are in range 27.35 to 29.15 with Efficiency in range 28.50 to 45.00 and the lowest frequency Efficiency in range 22. to 23.95 with Efficiency in range 81.00 to 98.20.



There are 79% of Laboratories assort as Bad Quality and 21% as Good Quality.



There are 13 laboratories located in First Floor and 6 laboratories in Ground Floor.



Conclusion

- There is an **inversely relational** between Efficiency rates and Temperature Degrees.
- Good Efficiency Rates when Temperature Degrees are less than or equal **25 C.**
- There are **13** laboratories have bad Efficiency Rates and **6** Laboratories have good Efficiency Rates.
- **68%** of laboratories are located on First Floor and **32%** in Ground Floor.
- The Temperature Degrees average is about **26.42 C** with Efficiency Rate of **54.24%**, this refers to a Bad Rate.