Analytics Evaluation

Instructions :

- **Q1 & Q2 are mandatory, Q3 is bonus if attempted.**
- **Do the analytics in cloud where possible (free trial versions).**
- **Other methods are also acceptable.**
- **Do include documentations.**

Azure : https://studio.azureml.net/

IBM Cognos : https://www.ibm.com/products/cognos-analytics

1. A customer informed their consultant that they have developed several formulations of petrol that gives different characteristics of burning pattern. The formulations are obtaining by adding varying levels of additives that, for example, prevent engine knocking, gum prevention, stability in storage, and etc. However, a third party certification organisation would like to verify if the formulations are significantly different, and request for both physical and statistical proof. Since the formulations are confidential information, they are not named in the dataset.

   Please assist the consultant in the area of statistical analysis by doing this;

   a. A descriptive analysis of the additives (columns named as "a" to "i"), which must include summaries of findings (parametric/non-parametric). Correlation and ANOVA, if applicable, is a must.

   b. A graphical analysis of the additives, including a distribution study.

   c. A clustering test of your choice (unsupervised learning), to determine the distinctive number of formulations present in the dataset.

(refer attachment : ingredients.csv)

2. A team of plantation planners are concerned about the yield of oil palm trees, which seems to fluctuate. They have collected a set of data and needed help in analysing on how external factors influence fresh fruit bunch (FFB) yield. Some experts are of opinion that the flowering of oil palm tree determines the FFB yield, and are linked to the external factors. Perform the analysis, which requires some study on the background of oil palm tree physiology.

   (refer attachment palm_ffb.csv)

3. Feed the following paragraph into your favourite data analytics tool, and answer the following;

    a. What is the probability of the word “data” occurring in each line ?

    b. What is the distribution of distinct word counts across all the lines ?

    c. What is the probability of the word “analytics” occurring after the word “data” ?

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As a term, data analytics predominantly refers to an assortment of applications, from basic business intelligence (BI), reporting and online analytical processing (OLAP) to various forms of advanced analytics. In that sense, it's similar in nature to business analytics, another umbrella term for approaches to analyzing data -- with the difference that the latter is oriented to business uses, while data analytics has a broader focus. The expansive view of the term isn't universal, though: In some cases, people use data analytics specifically to mean advanced analytics, treating BI as a separate category. Data analytics initiatives can help businesses increase revenues, improve operational efficiency, optimize marketing campaigns and customer service efforts, respond more quickly to emerging market trends and gain a competitive edge over rivals -- all with the ultimate goal of boosting business performance. Depending on the particular application, the data that's analyzed can consist of either historical records or new information that has been processed for real-time analytics uses. In addition, it can come from a mix of internal systems and external data sources. At a high level, data analytics methodologies include exploratory data analysis (EDA), which aims to find patterns and relationships in data, and confirmatory data analysis (CDA), which applies statistical techniques to determine whether hypotheses about a data set are true or false. EDA is often compared to detective work, while CDA is akin to the work of a judge or jury during a court trial -- a distinction first drawn by statistician John W. Tukey in his 1977 book Exploratory Data Analysis. Data analytics can also be separated into quantitative data analysis and qualitative data analysis. The former involves analysis of numerical data with quantifiable variables that can be compared or measured statistically. The qualitative approach is more interpretive -- it focuses on understanding the content of non-numerical data like text, images, audio and video, including common phrases, themes and points of view.