



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

**SECP1513-07 TEKNOLOGI DAN SISTEM
MAKLUMAT**

ASSIGNMENT 04

(Data Analytics)

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Introduction

In this 21st century, there are many data around our daily lives, like utility usage, healthcare, etc. So, to easily manage and interpret the data, we can produce data analytics. Data analytics is a set of strategies for extracting relevant and useful information from large and diverse quantities of data acquired from many sources and of various sizes.

In addition, data analytics are used in many sectors, not only in the healthcare sectors, services sectors. It is also used in the transportation sector like the operator can know the peak hour for the services and improve it to give the better and better services, especially for the LRT, MRT and transit bus services. So that the operator can increase the frequency during the peak hour to minimise the risk of having the Covid-19 virus. From the industrial talk, we learned how to use Microsoft Power BI to present our data in many data types like line graphs, bar chart graphs, pie chart graphs and more. I learned how to interpret my data in more graphics and more efficiently to let my readers know about my data from the talk.

Narrative Analytics

- **Case Study + Question**

From 2014 to 2016, water is the most important thing in our daily lives; we cannot do anything without water. But, some places in Malaysia cannot enjoy the privilege of water in their daily lives due to some reasons, especially in the rural area. So, **was the percentage of water served in the rural area higher than in the urban area according to each year? (Question 1)**

Besides that, 13 states, including the federal territories (Selangor, Kuala Lumpur and Putrajaya will be assumed as one – Klang Valley). The population in each state is different from one to one, and then the water usage also will be different in each state. **Prove that the percentage of water served in the state is affected by its population? (Question 2)**

Reflection on Industrial Talk #7: Introduction to Data Visualization (iCEP)

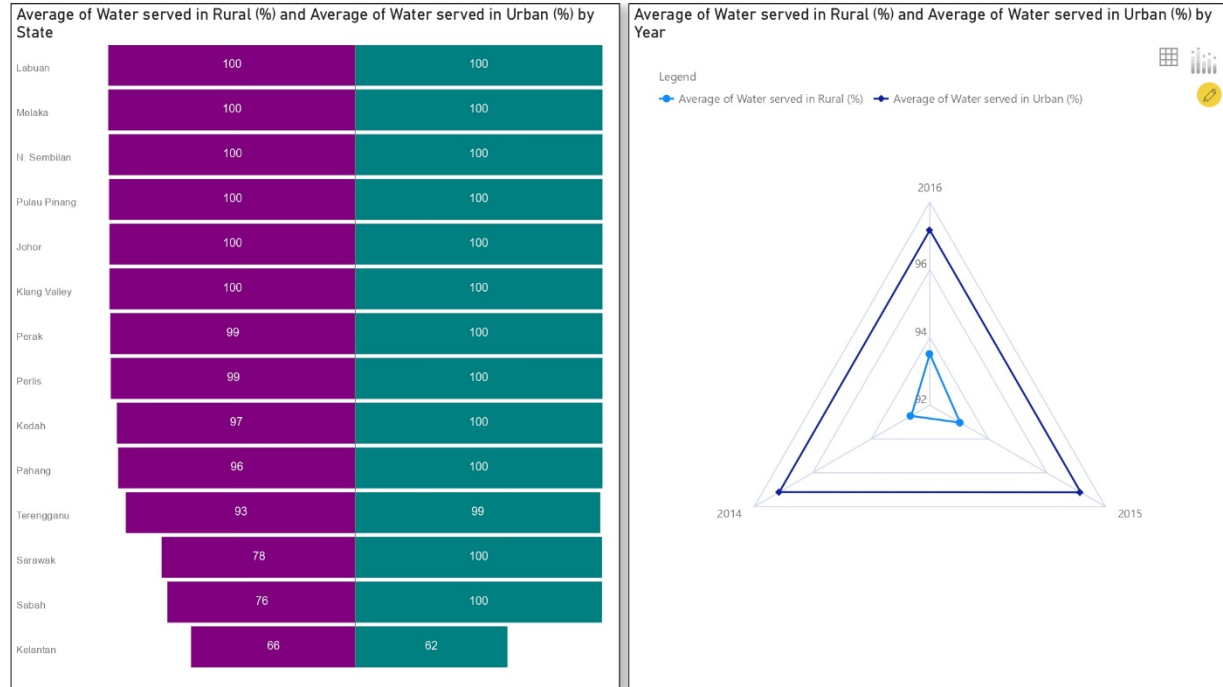
In this digitalised world, data play a vital role in our everyday lives. It is constantly changing the world we live in, and basically, everything we can see relies on data. To simplify, data is the collection of information such as numbers, measurements and even facts. At some point, we can think of data as knowledge. We can make informed decisions, identify problems, and even develop accurate theories with data. We are introduced to a new concept known as data visualisation through the talk. It is the graphical representation of data using visual elements such as graphs, histograms, charts etc. Visualising the data is expected to arrange the data into a form that is easier to understand and interpret. Instead of lengthy paragraphs, data visualisation highlights useful information by providing visual context, giving the viewers a clear and convincing overall view. Data visualisation is one of the most crucial steps in data analytics, ensuring the identification of data trends and patterns.

Raw and unorganised data create a mess and causes data findings a complicated and troublesome job. As an alternative, data visualisation plays as a tool to explicit the data in a meaningful way; it can also give perspective to the information or storyline. There are many ways to visualise a data set, and different sparks and ideas can be created depending on the type of data relationship. Before visualising our data, it is necessary to know the data and their relationship to implement the correct visual presentation. Examples of data relationships include nominal comparison, time series, correlation, etc. The decision of data relationship is important to minimise redundant data and guarantee a reliable connection between the data sets. For example, the time-series data relationship is meant to track changes of values over time. It presents trends and systemic patterns and allows easier analysis of the data set. Thus, it is very important to select the correct data relationship before determining the visualised form of the data set. There are also various chart types to illustrate the dataset. The statistics, together with variables and transformation, are the persuasive elements in data visualisation.

Data visualisation continues to be of great importance due to its exploration of patterns and trends. It can be used in every field and sector. The implementation of data visualisation allows viewers to easily quantify vast amounts of data while bringing in necessary insights.

Analytics Output

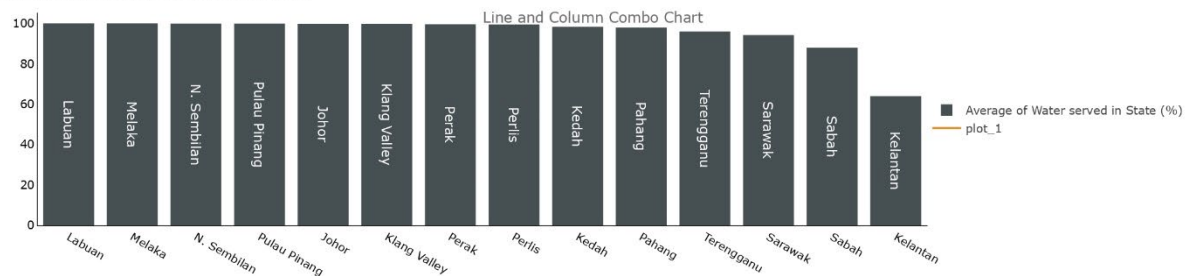
Data Source: https://bit.ly/DataSource_Group4



Average of State Population by State



Average of Water served in State (%) by State



To get more clear graphics: click https://bit.ly/PowerBIGraphics_Group4

Description of Data Visualisation

Our portfolio is related to the research of water served in Malaysia states. Four graphs may be related to our research, providing solid data and statistics. By using Microsoft BI, we can perform data visualisation easily and effectively. This process of translating large data sets into graphs, charts and other visuals makes it easier for the readers to gain new insights into the data and information. In our description of data visualisation, we will present descriptive analytics to examine the data and content while gathering and summarising the visualised data for easier interpretation.

In our first visualised data of an average of water served by percentage. The data are presented to compare the water service percentage in rural and urban areas of the states. It clearly presents that water served in urban areas has a higher percentage than in rural areas, especially in Sabah and Sarawak. This indirectly answers our first question in our case study as well. This is mainly because the water management system in the rural areas in Sabah and Sarawak is underdeveloped and not efficient enough. The government cannot supply clean water to every area in the two states due to their large land area. As a result, the residents in rural areas face water disruptions and shortage problems. The annual floods also negatively impact the areas, leading to the pollution of their water system. However, in the urban areas, advanced and organised water management can support the consumption of water usage of urbanites. For the state of Kelantan, both the percentage of water served in the urban and rural areas is low. The main cause of this phenomenon will be the annual occurrence of floods. Polluted water with untreated waste and harmful contaminants overload natural rivers and artificial reservoirs. Water contamination occurs all over the state of Kelantan. By observing Sabah and Sarawak, we can conclude that **water served in urban is higher than in rural**. The second graph of visualised data shows that in the years 2014, 2015 and 2016, the average percentage of water served in urban is greater than in rural areas. This further solidifies the above statement.

For our third graph, the line and column combo chart show the average of water served in the state by percentage (%). There is a strong contradiction between the 11 states with a water service percentage of 95% and above with the three states of Sarawak, Sabah and Kelantan. The respective average water service percentage in Sarawak, Sabah and Kelantan are 94,23%, 87,93% and 63.97%. This data tells us that these states are facing water services issues. It is linked with our

fourth visualised data of the average state population shown in a world map. We can see that there are 14 blue dots, each representing a state in Malaysia. The purpose of presenting this visualised data is to show the relationship of the population in states and the percentage of water served in states, as mentioned in Question 2. The size of the blue dots depends on the population of the state. In other words, the greater the population of the state, the larger the blue circle, and vice versa. With data from Microsoft BI, we get to confirm that Sarawak, Sabah, and Kelantan are states with a high population and face a water service shortage. Through comparison with the other states, **we can conclude that the higher population states have a lower percentage of average water service.** The reason that may explain this situation is that a great human population also means large usage of water services. This results in the increased demand for water for domestic, industrial, and even agriculture needs. Without proper water resource management, the high population states cannot support the great consumption of water by the residents.

Conclusion

Data visualisation is a powerful tool that provides a quick and effective way of conveying complex ideas and information. Using Microsoft Power BI for our case study related to the investigation of water served in Malaysia states, we translated data information and large data sets to make data easier to interpret and extract insights by presenting it in a visual context such as maps, charts, and graphs. We can answer our questions in the case study and conclude by analysing the data collected.

As a result of using Microsoft Power BI in our case study, which is related to the research of water supply in states, we can conclude that the data presented from our first visualised data of the average of water served in rural and urban areas in the year 2014 to the year 2016 is shown that the percentage of water served in cities has a larger proportion than in rural areas, especially in East Malaysia (Sabah and Sarawak). Due to the huge geographical size of East Malaysia, the government is unable to provide water supply to every part of the two states. Therefore, inhabitants in rural regions are experiencing water outages and shortages. The proportion of water provided in urban dan rural regions in Kelantan is low. The yearly recurrence of floods will be the primary cause of this occurrence. Polluted water contaminated by domestic sewage and harmful contaminants overflows natural rivers and artificial rivers causes water pollution in Kelantan. **By**

observing the second graph of visualised data that presented the average percentage of water served in urban and rural regions by year, we can conclude that the percentage of water served in urban regions was higher than in rural regions each year.

The third graph of visualised data, the line and column combo chart, showed the average of water served in the state by state in percentage. The size of the blue dot in the map showed a state's population. Sarawak, Sabah, and Kelantan have average utility service percentages of 94.23%, 87.93%, and 63.97%, which contradict other states. This data indicates that Sabah, Sarawak, and Kelantan have problems with utility services. This situation is connected to our fourth visualised data set, which illustrates the average state population by state. Malaysia's capital Kuala Lumpur and Selangor state is the country's industrial core and home to over half of Malaysia's population. The metropolitan area's ongoing expansion raises its water supply requirements. **From the third and fourth graphs of visualised data, we may conclude that Sabah, Sarawak, and Kelantan, with the larger population, have a lower proportion of average water services. In contrast, Kuala Lumpur and Selangor have a high proportion of average water services. This data clearly indicates that the percentage of water served in the state is not affected by the number of populations.**

Online Dashboard link: <https://mazejun.wordpress.com/2022/01/13/tis-group-4/>