**CHAPTER 6**

**CONCLUSION**

This chapter concludes the report and describes about the recommendation for future work on this project. The findings through background studies, literature reviews and methodologies had been the major contribution towards the development and completion of this project.

**6.1 Conclusion**

The aim of this project is to create a data visualization system by using the hexagon tiled map to visualize the Malaysian 14th General Election data. This system is developed to help its viewer to understand the election result faster and easier. Besides, it helps the viewer to understand the election result without prior knowledge of data analytics through a simple representation of hexagon tiled map data visualization instead of conventional tabular data format. There are a total of three objectives for this project to solve these problems and fulfill the aim of this project.

**6.1.1 Identify a suitable data visualization technique**

The first objective of this project is to identify a suitable data visualization technique for Malaysian Election Data. This process involves finding the literatute about current Malaysian election data representation and how other countries had presented their election data. From the studies, the problem statement is identified, which is the trouble of the viewer to interpret conventional tabular data format and process of interpreting the data without a prior analytic skill set. From those problem statements, literature reviews had been done in to find the solution for that problem.

The research had been done in the field of map data visualization because it is the common data visualization for other countries during their general election. Then, a list of map data visualization had been researched to find the best possible representation for Malaysian election data visualization. As a result, the choropleth map and hexagon tiled grid map are two popular formats for election data. From these maps, the hexagon tiled grid map has been chosen to be implemented in this project because this project’s scope is the election data for each parliament in Malaysia and not its states. For this purpose, hexagon tiled grid map is the best option as it could visualize each parliament one-by-one regardless of their location and this project focuses on the parliaments’ result, not the location of the parliaments.

**6.1.2 Construct system based on chosen technique**

Moreover, the second objective is to construct the system based on the chosen data visualization technique. Before the development begins, the methodology of the development is stated to make the process of the development smoother. The conventional Waterfall model from Software Development Life Cycle (SDLC) had been chosen for this project. This is because Waterfall model is a step-by-step software development model, the system needs to be developed in an orderly fashion. For example, the system should be completed first before it is being evaluated and deployed. However, this project does not include “maintenance” as one of its process as stated in Waterfall model because it will cost a lot of time to maintain the system after deployment.

The system is developed by using a list of technologies such as HTML, CSS, Javascript, D3.js library, JSON data file for data storage and this project also utilizes PHP server scripting language to develop administration which was used to make data entry process easier and faster.

**6.1.3 Validate the accuracy of the system**

Lastly, the last objective of this project is to validate the accuracy of the output hexagon tiled grid map data visualization with a given set of input data. This process is the evaluation part of the system and the main objective of this process is to validate the accuracy of the data populated in the visualization with the given dataset which are stored inside the JSON data file. The actual election datasets from The Star Online GE14 is used to validate the accuracy of the system. The result between the input data and the populated output data is compared to validate the system.

**6.2 Recommendations**

There are some problems and features that this project is not able to implement. From these problems, there is a lot of improvement that could be done for this project to make it more advances. Some recommendations for future work on this project are explained in this sub-topic.

**6.2.1 Flat-top hexagon**

The flat-top hexagon tile is a 90 degree rotated version of the pointy-top hexagon tile. This project implemented the hexagon tiled grid map data visualization by using the pointy-top hexagon tile, but instead of using the flat-top hexagon tile. The flat-top hexagon tile will provides better visualization for real Malaysia map. Even though the location of each parliament is still the same, the flat-top hexagon tiled grid map data visualization will make the map looked flatter compared to pointy-top hexagon tile which will cause the map looked more upright. By using flat-top hexagon tiled grip, it helps the viewer in distinguishing the states in the map much easier because the visualization result will look more alike to the actual Malaysian map.

**6.2.2 Visualizing border line between states**

The border line between states is a line that could be shown around each state in the map to help the viewer to distinguish between the states. Currently, the system is only able to implement different color of states, but without border lines between them. The border line is able to portray the boundaries of each state clearly rather than using different colors. Other than that, colors sometimes could be deceiving if put together closely as human brains could not distinguish a slight different between colors as mentioned in Chapter 2. For example, a red and magenta color will look alike if putting them side by side. With the addition of the border line around the state, the system does not need to implement different colors for each state because it will help the viewer to distinguish them.

**6.3 Summary**

This chapter concludes this project and shows some recommendation to be improved for the future development. The conclusion of this project is based on the achievement of each objective. Then, the process of the development was briefly explained, and it touches the methodology of this project and the technologies used to develop the system. After that, it shows the way on how the evaluation process to validate the accuracy of the system. There are two recommendations to improve this project, which are using flat-top hexagon instead of pointy-top hexagon tiled grid map to visualize the actual Malaysia map; and the other recommendation is to produce a border line between each state to improve the readability of the viewer so that they can distinguish between each state more easily.