Individual Project Visualization

Semester 4 HMI

HMI Challenge

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Acronyms

Acronym	*Meaning*
HMI	→ Human-machine Interaction and Control
SQL	→ Structured Query Language

Table 1 – List of acronyms used throughout the report.

Introduction

The assignment on which this document presents a small challenge of HMI subject. HMI also known as Human-machine Interaction and Control is a subject for semester 4 where we learn how to develop modules which humans are using to either interact, monitor and/or control a machine, process, data, etc. These are then displayed in a dashboard to create an insight of what is happening in a smart industry. In the following sections will provide the procedure and conclusion of the assignment.

Procedure

In this assignment, we have to create a proper visualization of a chosen dataset and the relation between them, and any other information about the dataset aims to communicate to a certain target group of users. The main goal is to exercise of what we want to represent and how can we visualize the data in the best way possible.

The dataset that I have chosen is a historical population data for every country/territory in the world by different parameters like area size of the country/territory, continent, capital, population growth rate, density, ranking based on population, world population percentage etc. Our goal is to target users who are curious about the country population or how many people live in the world. It is also important for users to know the growth rate of each country for their own research purposes. Governments also use these data to keep count the population in their country as it can affect the economy or prevent overpopulation due to immigrants.

There are several tools where we can visualize the dataset and after experimenting with available tools, I decided that Grafana is perfect due to the UI is easy to learn and it is popular in smart industries. To be able to use the dataset, we needed to install a data source for fetch the data. In Grafana, there multiple data sources you can use to obtain and manage the dataset. I chose MySQL since I have used it in the past before and have some knowledge in creating queries. We needed to configure the local host and set the correct database in order fetch the data in SQL. (See figure 1)

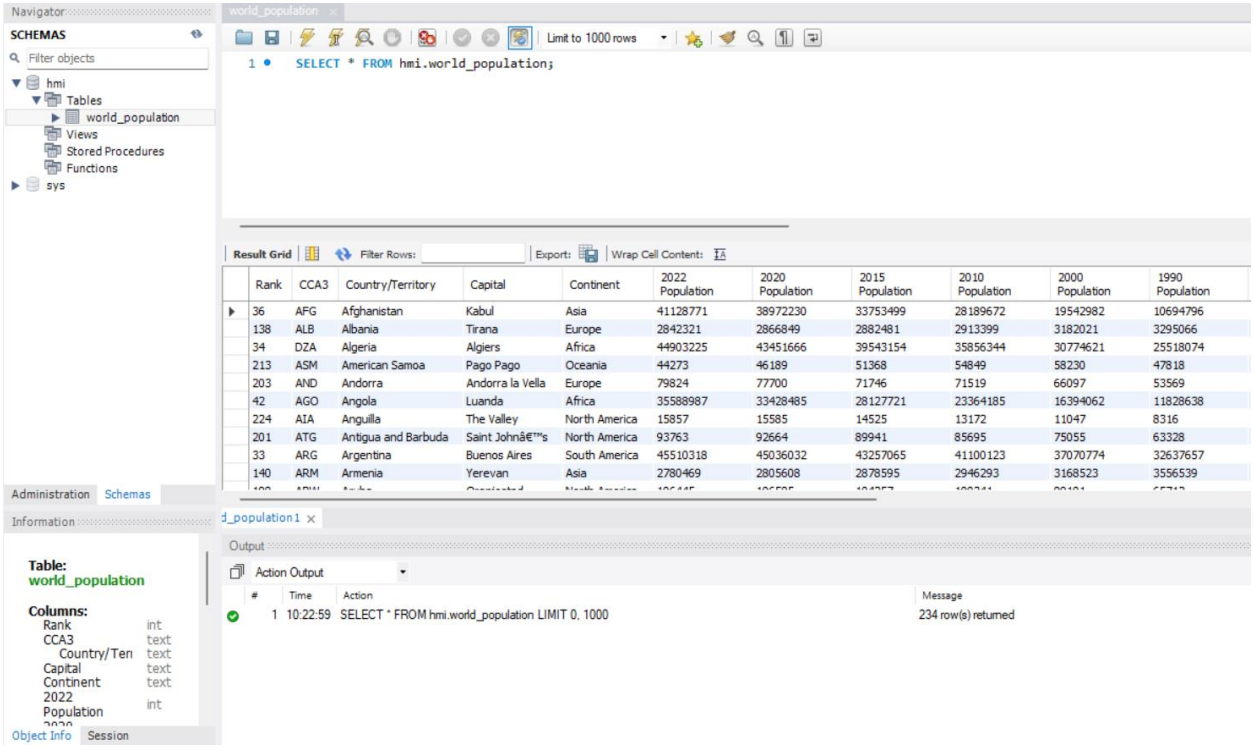

Figure 1 MySQL Database

I connected my local SQL server to Grafana and created visualizations for the world population dataset. (See figure 2)

Figure 2 Grafana dashboard

In the figure above, I chose tables and bar charts for visualization since it is a huge dataset and these are more relevant for these types of datasets. I also made it interactive so it can show population for each year and you can select a country to view its growth rate. (See figure 3)

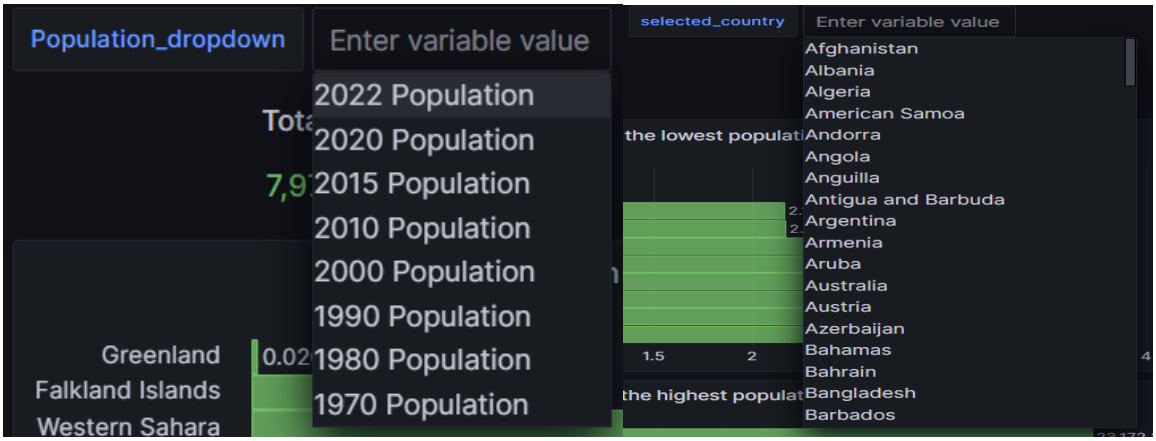

Figure 3 Dashboard Interactive setting

Conclusion

To conclude this assignment, I have gained knowledge with different dashboard tools as I researched which is easier to use due to most of them has advance UI. Grafana really made visualization easier and there is a huge selection of data sources. I also had problems with choosing the data source to fetch the data because I tried to use Google Sheets as a data source and I have to use an API key which is straightforward but later in the assignment, I realized that I can't manipulate the columns to my preference and migrate my dataset to SQL. The final product is a success and I manage to visualize and display the important data to the targeted users. With all things considered, I have learned how to give what the users want to see displayed in a dashboard with interactive features and I hope I can use this knowledge in future projects.

Reference

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