The Development of Covid-19 Dashboard Application for Monitoring the Covid-19 Infections in Indonesia

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ABSTRACT: In this Era where global pandemic is rampant, there is a need for accurate and up-to-date information for people to know, understand and monitor the movement of the virus. This abstract will explain about COVID-19 Dashboard app design to visualize the COVID-19 infection data, this dashboard can be used to monitor and also analyze pandemic impact in Indonesia. This app uses COVID-19 csv data sourced from trusted Indonesian Organization to present reliable data so the app can present statistical data such as the number of confirmed cases, deaths, recoveries, and other insight related to pandemics. By using interactive sidebars users can explore the data or change the type of graphs. This app aims to be able to help individuals, travelers, healthcare professionals, and others to gain insight regarding pandemic situations in Indonesia and also hopefully increase the situational awareness of each individual.

Keywords: Covid-19; Monitor Dashboard; Paper; Journal; Liaison Journal of Engineering; International University Liaison Indonesia

1. INTRODUCTION

In this era where an unprecedented global pandemic is occurring and spreading very quickly. There is a need for fast and accurate information, because it is very important so that people can understand and fight the spread of COVID-19. When the world is faced with the nature of COVID-19 viruses that are fast spread and fast evolving, data visualization is needed as a tool to monitor, analyze and communicate important information to the public. One possible solution is to create a COVID-19 data dashboard, an interactive platform that displays large amounts of data and presents it in a comprehensive and easy-to-use manner.

This article aims to explain the value that can be provided by COVID-19 dashboards, which have become an indispensable source of information for individuals, travelers, business/instances and many others to know the COVID-19 infection information in Indonesia. By using the data visualization, this dashboard offers an intuitive and accessible way to track the number of infected individuals, monitor the number of people recovered, and monitor the number of people dead from the virus.

Using Python technologies coupled with other open source libraries such as Pandas, Streamlit, Plotly and other libraries. This platform can aggregate, process and analyze data, and present it in the form of charts, graphs and other visual representations. The result is a comprehensive picture of the Indonesian COVID-19 situation that users can use to spot data, patterns, and differences across provinces and regions.

In this era, information is very important, moreover what we are facing is a virus that has not been identified and there is no treatment or vaccine to overcome this. Therefore, it is hoped that the development of the COVID-19 application can help the public to better avoid being exposed to the virus by reading the data displayed on the COVID-19 dashboard.

2. LITERATURE REVIEW

This chapter is used to explain brief descriptions of tools, modules, and theory that are related to the articles.

2.1. Covid-19

Coronavirus disease(COVID-19) is an infectious disease that is caused by SARS-CoV-2 virus (John Hopkins Medicine, 2022). Research evidence suggests that SARS-CoV and MERS-CoV originated in bats, then the virus evolved to infect people through some unidentified animal hosts (National Institute of Allergy and Infectious Diseases, 2022). COVID-19 can be severe if the infected individuals are

older adults or individuals with bad health status for example cardiovascular disease, diabetes, chronic respiratory disease, or cancer. It's important to note that COVID-19 can still infect people regardless of age, and can also cause mild to severe illness including death.

2.2. Python

Python programming language is a popular general purpose, high level programming language. It was created in 1991 by Guido van Rossum (Pramanick, 2022). There are several reasons that python can be so popular, firstly because python has simple syntax, it is versatile, beginner friendly, open source, has an archive of modules and libraries, and python also has a large active community (Coursera, 2023).

2.3. Streamlit

Streamlit is a python library that is specially designed for machine learning engineers. By using Streamlit library developers can create an application with just a few lines of code (Datacamp, 2021). Here is the Streamlit key feature: Streamlit is simple, provides interactive widgets, integrated with popular python data visualization libraries, easy deployment, and integrated with machine learning libraries.

2.4. Plotly

Plotly is an open source python library that supports over 40 types of charts. There are several key features that Plotly offers such as: interactive visualization, expressive syntax, multiple output formats and integrations with other libraries (*Getting Started With Plotly in Python*, n.d.). In this project processed data will be displayed with Plotly graph and later will be displayed in the Streamlit application.

2.5. Pandas

Pandas is an open source python library that is developed mainly for working with relational or labeled data both easily and intuitively. This library was developed by Wes McKinnney in 2008. These are the advantages of Pandas library, that is Pandas is fast and efficient in manipulating and analyzing data, import data from other objects is supported by the library, easily handle missing data, data merging and joining, flexible data reshaping and many more (Aggarwal, 2023). In this project Pandas is used to preprocess data from csv objects.

2.6. Unified Modeling Language

Unified Modeling Language(UML) is a general purpose modeling language. The purpose of UML is to visualize, design and document a system (Geekforgeeks, 2022). UML was developed in mid 1990 by Grady Booch, Ivar Jacobson, and James Rumbaugh. UML diagrams are divided into two types, the structure diagram to explain the object within the system and the behavioral diagram to explain what happened within the system. Here is a few types of UML diagram:

a. Class Diagram (Structure diagram)
b. Component Diagram (Structure diagram)
c. State Machine Diagram (Behavioral diagram)
d. Use Case Diagram (Behavioral diagram)

3. METHODOLOGY

The research methodology is research effort planning for studying the outcome of each unique problem with the intention of being able to answer questions of the current problem going on. Framework used to explain research techniques. following technique used in application development this research:

a. Study of literature

To conduct a literature study, references were collected from books, articles, papers, journals, papers, and websites.

b. Data Analysis

To determine and understand algorithms to be used and data will be processed in making the application recommendations, currently being analyzed to the findings of the literature study.

4. RESULT

This chapter will explain about the design and implementation of the app. This chapter also shows the diagram design of the app and also shows the interface of the application.

4.1. Design and Implementation

The research material is divided into several sections, starting with the application design section and application implementation section. Using UML Diagrams such as Flowchart diagram, and Use Case diagram to help develop the

application. In this application users can filter the data based on the selected data and the user can also change the type of graph to display the data.

4.2. Application Flowchart

Flowchart is a kind of diagram that is used to explain the flow, process, or sequence in the system (Lucidchart, n.d.). Figure 1 shows the general flowchart about how the application will work. Figure 2 shows the flow of the system for filtering the data.

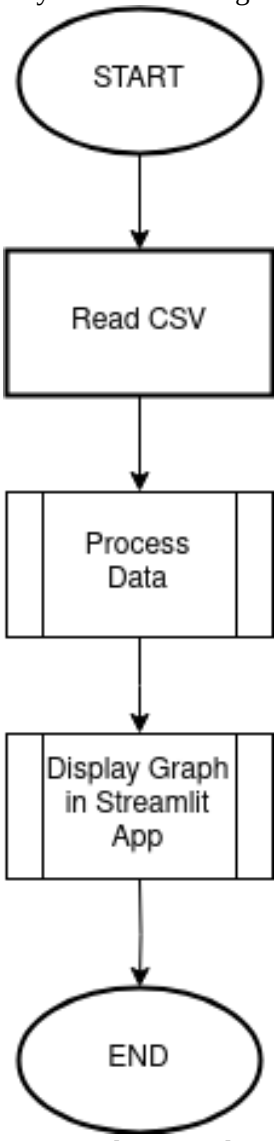

Figure 1. Application Flowchart

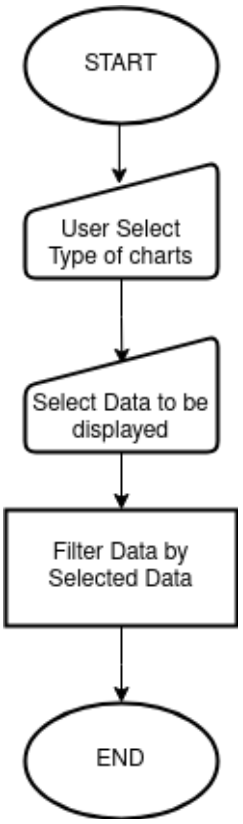

Figure 2. Process Data Flowchart

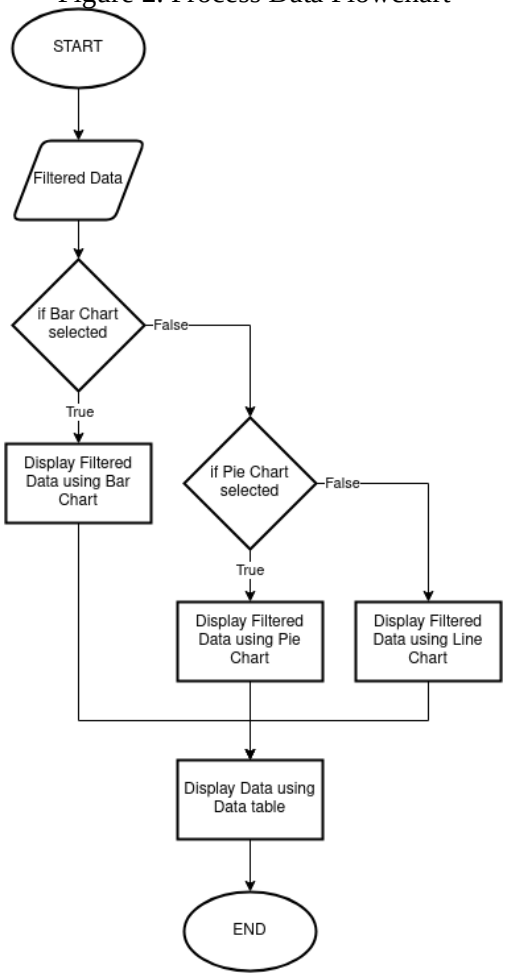

Figure 3. Display Graph in Streamlit App Flowchart

4.3. Application Use Case Diagram

Use Case diagram is a part of behavioral UML diagram. This diagram is used to explain interaction between the user and the system (Dicoding, 2021). Figure 3 below will explain about the use case diagram:

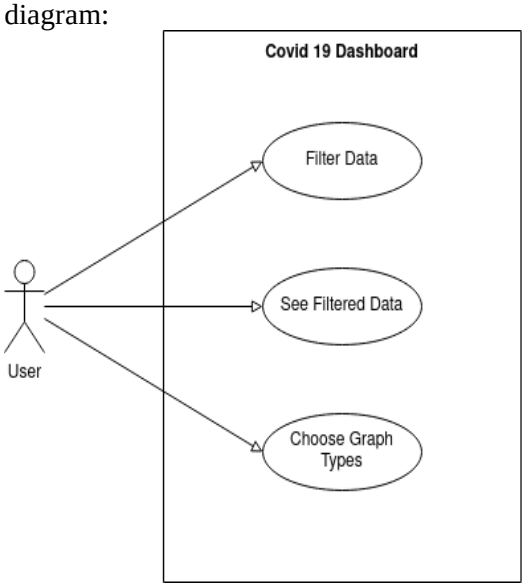

Figure 4. COVID19 Dashboard Use Case Diagram

4.4. Application Interface

This Section will display the screenshot of the application. On Figure 4, we can see what the dashboard looks like. On the sidebar is used by the user to filter the data or change graphs type. On the right of the sidebar is used to display the graph and data table. On Figure 5, we can see how the data is displayed on the data table.

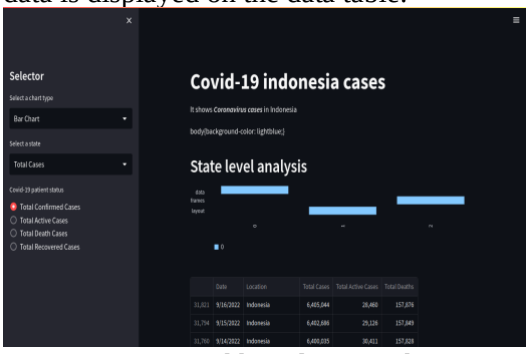

Figure 5. Dashboard Screenshot

	Date	Location	Total Cases	Total Active Cases	Total Deaths
31,821	9/16/2022	Indonesia	6,405,044	28,460	157,876
31,794	9/15/2022	Indonesia	6,402,686	29,126	157,849
31,760	9/14/2022	Indonesia	6,400,035	30,411	157,828
31,725	9/13/2022	Indonesia	6,397,236	31,571	157,807
31,690	9/12/2022	Indonesia	6,394,340	32,312	157,787
31,655	9/11/2022	Indonesia	6,392,492	33,946	157,770
31,620	9/10/2022	Indonesia	6,390,553	34,745	157,757
31,585	9/9/2022	Indonesia	6,387,944	35,250	157,741
31,550	9/8/2022	Indonesia	6,385,140	37,804	157,729
31,515	9/7/2022	Indonesia	6,382,002	38,119	157,717

Figure 6. Data Table Screenshot

5. CONCLUSION

The COVID-19 dashboard app is a valuable tool when fighting against global pandemics. By providing information and data, common people can easily know the pandemic situation in their regions / provinces. Through interactive sidebars users can easily get the data they wanna know and they can also change the type of graphs so they can absorb the information better by their preferred graphs. By knowing the pandemic situation in their regions / provinces, people can handle the situation better and this application can also be used by travelers, businessmen and policy makers so they can know the pandemic situation in Indonesia before deciding to travel, invest or create policy in each region in Indonesia.

5.1. Recommendation

This application that has been built in this articles still has many shortcomings that can be further improved in the future works, here are the points that are needed to be improved:

a. This application needs to add more features, for example: virus trends analysis or give more information by giving maps graphs for better information absorptions.
b. This application can be used to monitor global pandemic situations not just limited to indonesian.

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