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COVID-19 Vaccination Geographic Information System Application

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Abstract. COVID-19 is an infectious disease that was first discovered in Wuhan. This virus is transmitted through physical contact between humans. However, the government found a way to protect people against this virus, which is through vaccination. This geographic information system application for COVID-19 vaccination was created with the aim of providing important information to the public regarding the dangers of the COVID-19 virus, from its variants, to how it spreads. This website provides important information about vaccinations as well as vaccine information that has been provided to the public which is presented using GIS maps. This website also shows data from hospitals that provide vaccinations. All of this is provided so that the public gets access to important information about vaccinations and also COVID-19. The area limitation of this application is in DKI Jakarta and the vaccination data is from June 2021 to November 2021.
Keywords: COVID-19, website, geographic information system, vaccination

INTRODUCTION

Severe Acute Respiratory Syndrome CoronaVirus (SARS-CoV) or better known as the corona virus or COVID-19 is a new type of virus that is transmitted to humans. This virus was first reported to be discovered in the city of Wuhan, China at the end of December 2019 [1]. Because this virus not only causes health problems, but also has an impact on the social and economic conditions of the society. The government has found a way to minimize the spread and pain when exposed to the virus, that is through vaccination. Vaccines are biological products that contain antigens in the form of microorganisms or substances that are produced and processed in such a way that they are safe, which, when given, will cause the body to become actively immune to a particular disease. There are still many people who do not know important information about COVID and vaccination. Information technology is currently a tool in solving the problems encountered and can provide implications for better performance [2]. By using current information technology, people will find it easier to find the information needed, especially for vaccination [3]. This geographic information system application aims to provide important information regarding vaccinations and also about COVID-19.

METHOD AND MATERIALS

Data Collecting Method

The research method was chosen to analyze journals or websites that have the same method of presenting information as the planned application program. The method used in collecting data for the application is a fact-finding method.

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System Development Method

The Waterfall method is a classical model that is systematic, sequential, and builds software with complete system integration and testing so that it meets good software requirements [4] [5]. The name of this method is “Linear Sequential model”. This method is often also called the "Classic Life Cycle".

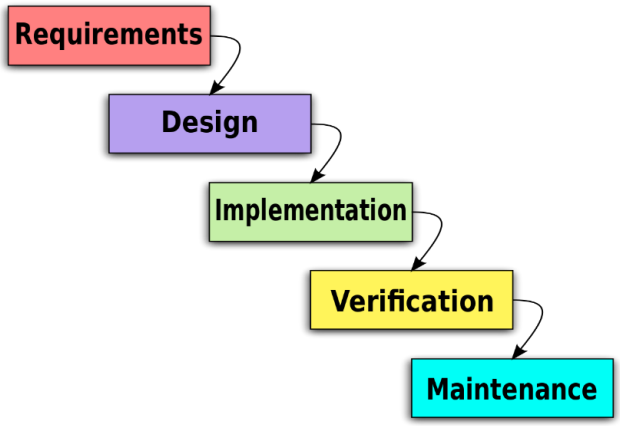

FIGURE 1. Waterfall Method Stagel [6]

Materials

To develop a geographic information system application, several data were collected regarding hospital data and vaccination data in the DKI Jakarta area. The data is in the form of information regarding the latitude-longitude coordinates of the hospital sub-district, the address of the hospital, the number of vaccinations, the sub-district where the vaccine is located, the month, and so on.

LITERATURE REVIEW

Geographic information system or also known as GIS (Geographic information system) is a term in the field of mapping that has the scope of how a system can connect geographic objects with information. The system is a computer system that is used to collect, examine, integrate, and analyze information related to the earth's surface [7]. For system development, the use of the Waterfall method can take a systematic and sequential approach. It is referred to as Waterfall because the stages must be completed sequentially [6]. There are several previous studies that have presented GIS-based applications with various purposes. An example would be the GIS distribution of post offices in the city of Semarang, searching for the location of coal mines in Bengkulu, even searching for health centers and car repair shops in the Lampung area [8] [9] [10] [11].

RESULT AND DISCUSSION

The result of making a geographic information system application for COVID-19 vaccination aims to provide important information for the public about the dangers of the COVID-19 virus and the usefulness of this vaccination. Users can log in by accessing the link http://gisvaksinasi.xyz/ and will be directed to a website containing information. The home screen on the website is shown in Figure 2. The menu component is located at the top of the website to select which section users wish to view.

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FIGURE 2. Main page on the website

For example, the Covid page will display information about how COVID is spread and the various types of COVID as shown in Figure 3.

FIGURE 3. The covid feature page

This application also displays a map that is connected via a leaflet on the Hospital menu. This map is used to show the location of hospitals that provide vaccines in DKI Jakarta. The map display is shown in Figure 4. In addition, this page also displays hospital table data at the bottom as shown in Figure 5.

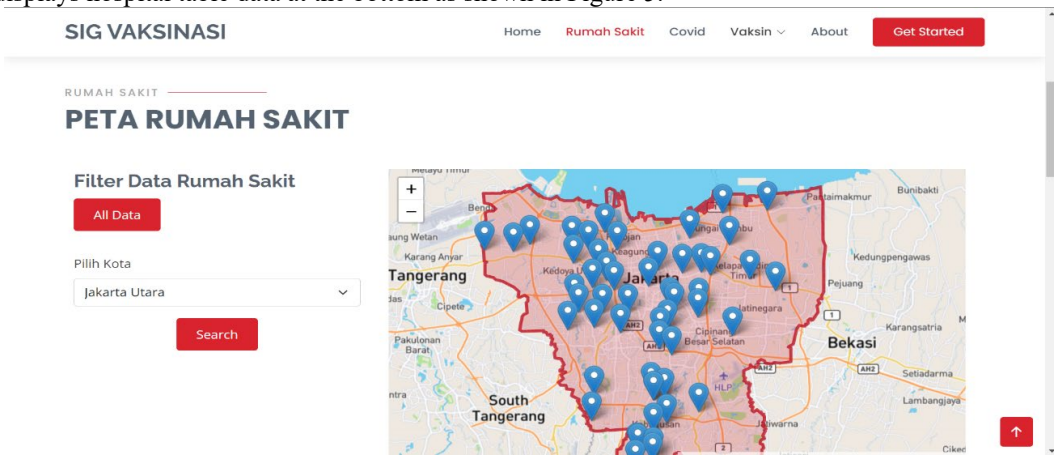

FIGURE 4. Hospital map page

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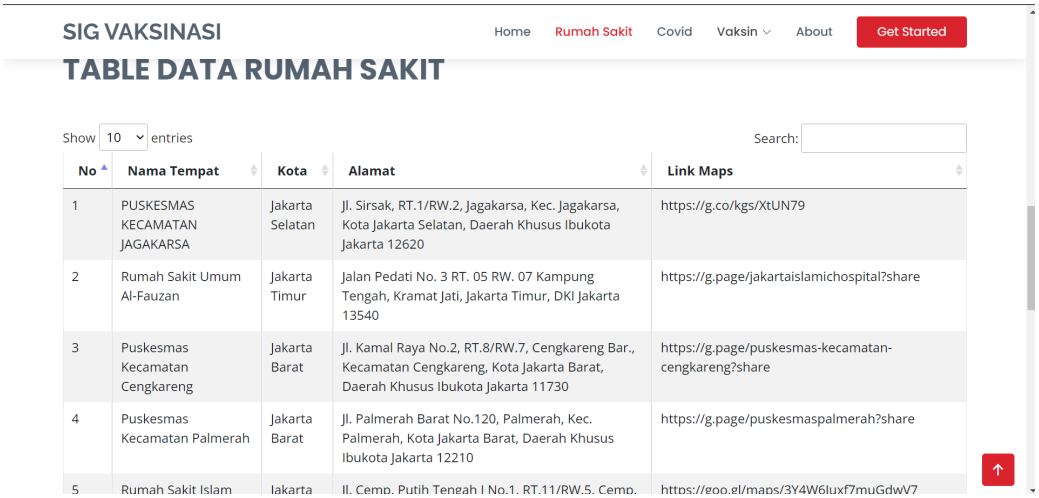

FIGURE 5. Pages showing hospital data

The Vaccine menu in this application display information about vaccines from the various vaccines available. There is a map showing the number of people who have been vaccinated in DKI Jakarta every month starting from June to November 2021. The page views can be seen in Figure 6. and Figure 7.

FIGURE 6. Display of a page containing vaccine types

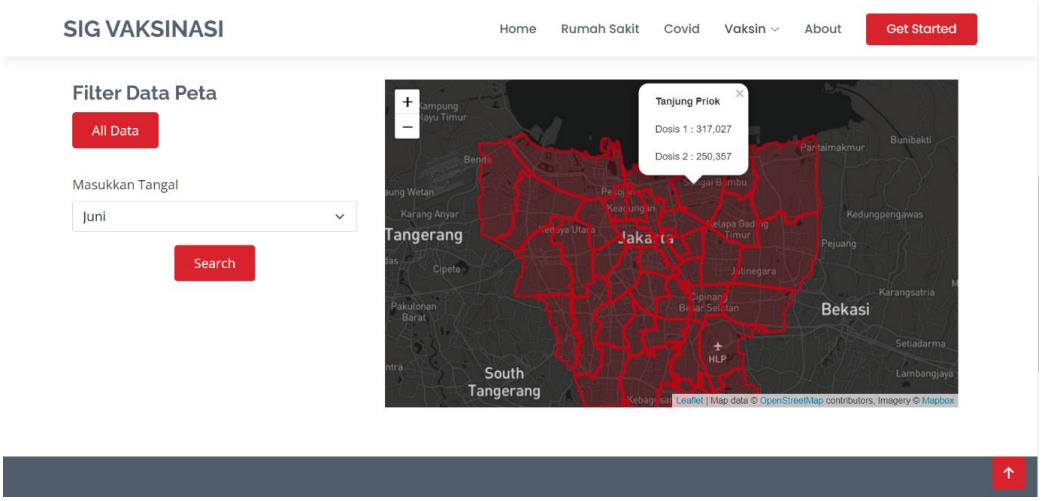

FIGURE 7. Community vaccination map

This application also has an About us menu where users who visit the website can provide criticism and suggestions to improve the website which can be seen in Figure 8.

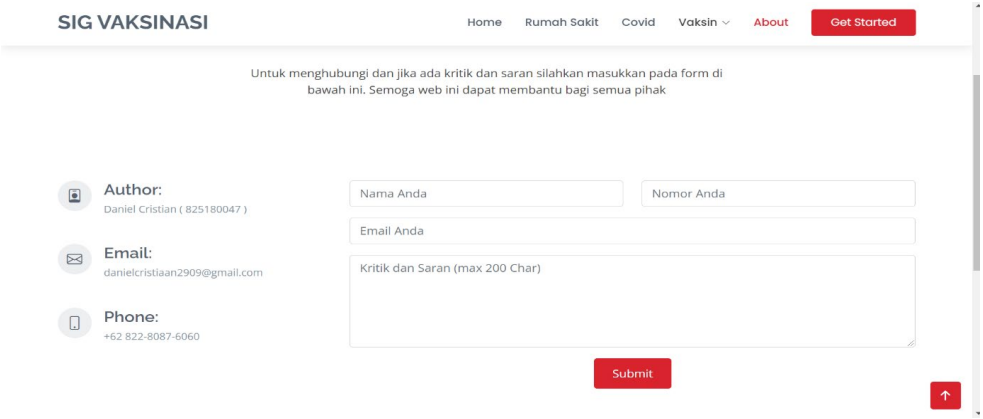

FIGURE 8. About us feature page

CONCLUSION

The results of this study are the creation of a geographic information system application for COVID-19 vaccination that helps the public in obtaining important information about the COVID virus. This website-based application contains information on how the outbreak spreads, variants of the COVID-19 virus, the use of various types of vaccines, as well as maps showing data on people who have received first dose and second dose vaccines by district. In addition, the application also provides features that can help the public to obtain information about hospitals that provide vaccines. Thus, this application is expected to be useful for the community, especially in the DKI Jakarta area.

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