Proceeding
International Conference
on Social, Sciences and Information Technology
Kisaran, August 19th, 2020, hlm. 7 - 12
DOI: https://doi.org/10.33330/icossit.v1i1.820
Available online at https://jurnal.stmikroyal.ac.id/index.php/ICdoSSIT

ISSN 2723-4509 (Online)

GEOGRAPHIC INFORMATION SYSTEM MAPPING SPREAD OF COVID-19 WITH FRAMEWORK CODEIGNITER

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Keywords:
codeigniter
covid-19
geographic information system
leaflet
mapping

ABSTRACT

China is facing an outbreak of a virus known officially as the 2019 Novel Coronavirus (abbreviated 2019-nCoV). This newly identified type of coronavirus was first detected in Wuhan, China. Coronavirus is a family of viruses that cause diseases of the respiratory tract. Between 15% - 30% of cases of common influenza are thought to be caused by a coronavirus. MERS and SARS outbreaks are also caused by a coronavirus. Coronavirus problems continue to grow day by day, even faster development. The public needs to understand the situation and know the development of coronavirus at this time, therefore it is necessary to build a web-based information system with a CodeIgniter framework and leaflets to facilitate monitoring of the development of coronavirus in various countries in real-time.

INTRODUCTION

Covid-19, better known and often referred to as the Coronavirus, this virus is a new type of virus from the coronavirus that is transmitted to humans, can attack anyone, whether babies, children, adults, the elderly, pregnant women, or breastfeeding mothers. Covid-19 was first discovered in the city of Wuhan, China, at the end of December 2019. This virus spread quickly and has spread to other regions in China and several countries, including Indonesia. A coronavirus is a group of viruses that cause disease in mammals and birds. In humans, the coronavirus causes usually mild respiratory infections, such as some cases of the common cold (among other causes, especially rhinoviruses), although the less frequent forms can be deadly, such as SARS, MERS, and COVID-19. There is no vaccine or antiviral drug to prevent or treat human coronavirus infection. Various efforts are still being made to monitor developments related to the virus.[1], [2].

In today's internet era, one of the supporting technologies to find out information on the development of the spread of the coronavirus is a geographical information system that can provide information in the form of mapping to the public in realtime. The information provided can be in the form of the number of infected, cured patients, death victims and which countries have or are currently infected with the coronavirus in the form of global mapping, especially Indonesia.

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Geographic Information System (Geographic Information System abbreviated as GIS) is a special information system for managing data that has spatial information (referenced spatial). Understanding geographical information is information about the place or location, where an object is located on the surface of the earth and information about the object where the geographical location is to be analyzed in decision making. Mostly to process data in the form of data.[3]–[8].

METHOD

The methodology used by the author to analyze, work on and overcome the problems encountered. In building the mapping deployment covid-19 here the author uses several supporting software :

1. Codeigniter Framework

Codeigniter is a PHP framework that uses Open-Source which is widely used by developers in developing dynamic websites. CodeIgniter becomes a PHP framework with an MVC model (Model, View, Controller) to build dynamic websites using PHP that can speed up developers to create web applications..

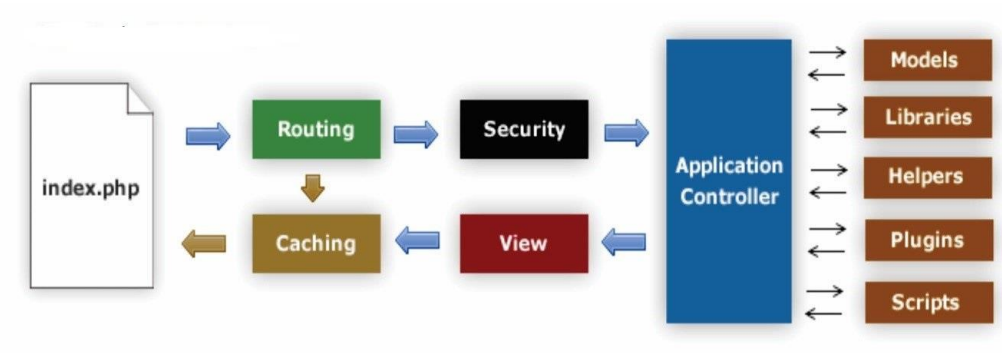

Image 1. Codeigniter Framework Workflow

a. **Index.php**: Index.php here functions as the first file in the program that will be read by the program.
b. **The Router**: The router checks the HTTP request to determine what the program must do.
c. **Cache File**: If there is already a "cache file" in the program, the file will be sent directly to the browser. This cache file can make a website open faster. The cache file can go through a process that actually has to be done by a codeigniter program.
d. **Security**: Before the controller file is loaded completely, HTTP requests and data submitted by the user will be filtered first through the security facilities owned by codeigniter.
e. **Controller**: The controller will open the file model, core libraries, helper and all resources needed in the program.

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f. **View**: The last thing to do is read all the programs in the view file and send them to the browser so they can be seen. If the view file is already cached, then a new view file that has not been cached will update the existing view file.

2. Leaflet Java Script

Java Script Leaflet or in short (LaefletJS) is a JavaScript library that is Open Source. The JSS leaflet was first released by Vladimir Agafonkin in 2011. This library is specifically used to build web-based mapping applications, supporting most mobile and desktop platforms.

Leaflets allow a person without a GIS (geographic information system) background to be able to easily display tile web maps on public servers. There are many plugins that can be used to add additional features to web maps. Javascrip Leflet can be accessed directly from the official website at https://leafletjs.com/ and also Javascrip files can be downloaded directly on the download menu.

Another advantage of using Leaflets is that there are several Plugins that can be used to "beautify" the map display. Map is not only as information or as an analysis of various phenomena on the surface of the earth (geography), but also an art. Below is an example of a leafleat map that we have created.

Image 2. Leaflet logo

3. Web API

API is an acronym for Application Programming Interface, a software that enables developers of websites, mobile and desktop to integrate and allow two different applications simultaneously to connect with each other and share data.

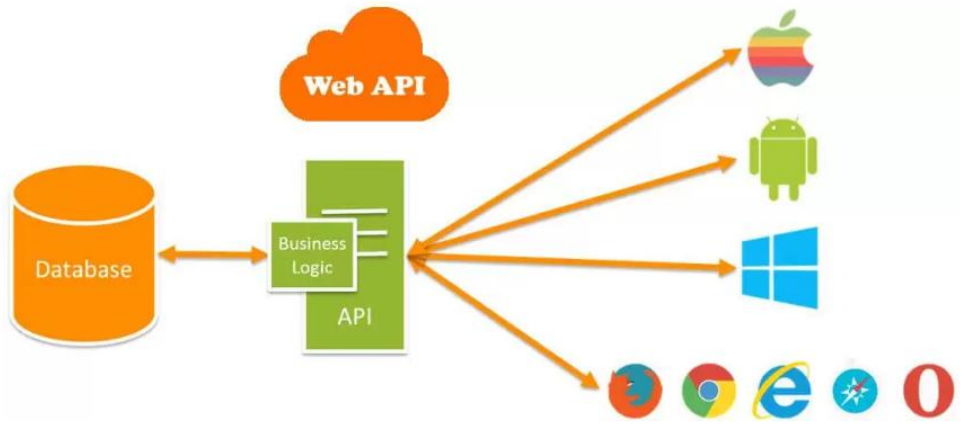

Image 3. Web API

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APIs that work at the operating system level help applications communicate with the base layer and with each other following a series of protocols and specifications. An example that can illustrate these specifications is POSIX (Portable Operating System Interface). By using the POSIX standard, applications that are compiled to work on certain operating systems can also work on other systems that have the same criteria. Software libraries also have an important role in creating compatibility between different systems.

The data used to display the number of infected data is taken from the API (Application Programming Interface) website https://kawalcorona.com/ The data displayed are positive numbers, recoveries and the number of deaths in 34 provinces in Indonesia.

RESULT AND DISCUSSION

The results of all stages of the study obtained the display of Covid-19 Deployment Geographic Mapping Information System:

1. Data API

This data shows the overall total of covid-19 distribution, that is total confirmation, total recovery, total death and total treatment. This data is originally in the form of JSON format, which will take the attributes in it and display it on the website created.


```
[
  - {
        name: "Indonesia",
        confirm: "52,812",
        recorvered: "21,909",
        deaths: "2,720",
        treated: "28,183"
    }
]
```


Image 4. Data API

2. Covid-19 Distribution Dashboard

. On the dashboard display there is a total covid-19 information whose data is taken from the corona escort fire then displayed on the website in the form of a widget.

Image 5. Dashboard Covid-19

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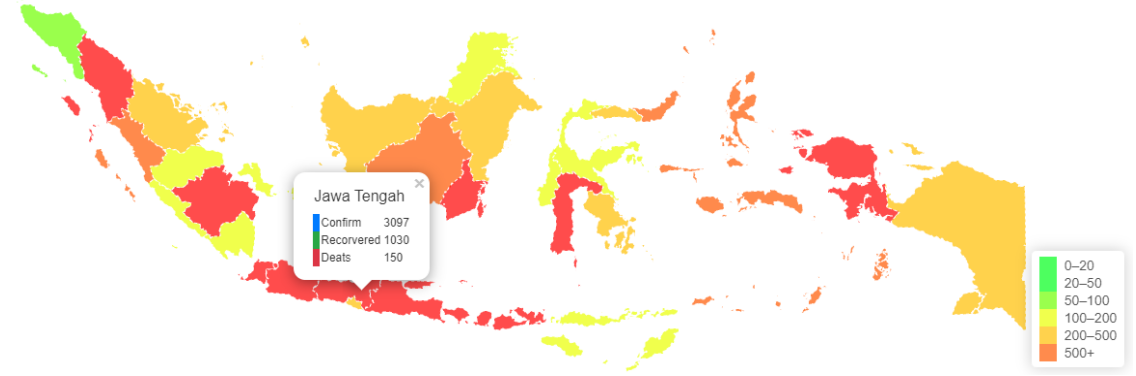
3. Choropleth Spread of Covid-19 Distribution

. Coropleth map as a method of cartographic representation that uses color differentiation or color gradation to fill polygons / areas separated by isolates that are generally in the form of administrative regions. The following is a choropleth map of the distribution of covid-19 based on data on the number of covid-19 distributions per province.



Gambar 6. Map of Choropleth of Covid-19

4. Covid-19 Distribution Chart

The graph serves to describe quantitative data (data in the form of numbers) to provide information about the development and comparison of data from time to time in the form of the development of the spread of covid-19 every day in Indonesia.

Image 7. Chart of Covid-19

CONCLUSION

Web-based Covid-19 Distribution Mapping GIS can be accessed quickly, easily and requires an internet network as well as providing information about mapping of Covid-19 deployments covering Indonesia. The map in the system is able to display information in each province in the form of confirm, recovered and death..

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Deployment of Covid-19 in this System uses the polygon feature to mark areas (provinces) that are infected with Covid-19. The system is able to provide a report in the form of a Covid-19 distribution case number graph and data displayed according to the date every day.

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