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# Application of Google Maps API on Smart City for Searching Distance Nearby Health Facilities in Bangkalan

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## ABSTRACT

Health facility is a facility which engaged in health in an effort to provide services from government and society to inform about health, prevention of disease, treatment, and bring back the sick to their main environment. The health information which is provided by Google Maps is not complete yet. So, the problem that arises is the media that provide health information is still small. And society in Bangkalan can't reach the health information in overall. That problem can solve with an application which is build by Framework Codeigniter and Google Maps API. This application can accommodate and provide health data facility completely. So the society in Bangkalan can search by their own self about location with the nearest distance and know all about health information. Such like health facility, the addresses, and doctor's schedules in hospital and community health centre. The application which has been build is effective to help society to know all location and information about health in Bangkalan. This proven by quality of this application to 10 respondent with result 77,3%

**Keywords:** Health Facility, Google Maps API, Nearest Distance.

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## 1. INTRODUCTION

People do various kinds of activities every day without knowing the time, so that it can affect their quality of life and make their health condition decline. When the soul, body, and social environment are in good condition that allows each individual to work in a manner active, social and economic, so humans are in a healthy condition. People in a state of illness will look for facilities that can restore their body condition to be healthy by visiting health facilities that have been provided. According to the Regulation of the Minister of Health of the Republic of Indonesia No. 71 of 2013 concerning Health Care in National Health Insurance Chapter I General Provisions Article 1 Paragraph 5, health facilities are facilities engaged in health in an effort to provide services in the form of a series of activities carried out by the government and the community in terms of disseminating information about health, prevention against health problems (disease), treatment, and returning patients to the community.

Based on Bangkalan in Numbers (2016), Bangkalan Regency is a Regency located in Madura Island which is located at 112° 40' 06" - 113° 08' 04" East Longitude and 6° 51' 39" - 7° 11' 39" South Latitude, and has several health facilities spread across 18 sub-districts including: Kamal, Labang, Kwanyar, Modung, Blega, Konang, Galis, Arosbaya, Tanah Merah, Geger, Tragah, Kokop, Socah, Tanjung Bumi, Bangkalan, Sepulu, Burneh, and Klampis Health facilities in Bangkalan Regency can be categorized into several types, including: hospitals, puskesmas, and pharmacies.

Health facilities scattered in Bangkalan Regency can be searched through Google Maps, but the information provided is only in the form of location, name and address of the health facility. Therefore, the problem that arises in finding the location and information on health facilities with Google Maps is that media which contain information about health facilities is incomplete, so that people in Bangkalan cannot find out information on overall health facilities

The search for information on health facilities must be supported by technological advances in the distribution of information that is fast, accurate, and accurate. Information is a statement in the form of information containing messages containing facts and explanations, delivered in electronic and non-electronic information and communication technology.

Electronic information requires the development and use of technology that will lead to complex interactions of integrated systems for a better quality of life in the future society. The concept is called Smart City (smart city). According to IBM (a world-class enterprise company that houses the establishment of Smart City), Smart City is divided into 6 parts, namely:

1. Smart Mobility is a Smart City that can be realized with the existence of a smart transportation and mobility process, so as to create good public services.
2. Smart People are Smart City that can be realized if Smart People can be fulfilled, because in humans there are criteria of creativity and social capital processes that can improve the quality of human resources, quality of life, and community income.

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3. Smart Economy, implementation and assessment in this section covers 2 things, namely the process of innovation and competitiveness. Both of these functions as the main capital for the future progress of the nation.
4. Smart Governance, this section specializes in governance requirements and criteria, aiming at the empowerment and participation of the community and government together. The hope to be achieved is that the government can run well and transparently by utilizing technological assistance, and the public can also know broadly all what policies have been carried out by the government in accordance with the aspirations of the people.
5. Smart Living, where this part of the smart city aims to process quality of life and culture to be better and smarter by utilizing information technology.
6. Smart Environment is a part that specializes in creating a smart environment that is a process of continuity and good processing of resources.

Smart City can be implemented in Bangkalan Regency by developing the Smart Living section. Smart Living can help people manage their quality of life better by utilizing technology in seeking information about health. Smart Living can be realized by having a web-based application using the Codeigniter Framework which has its own definition. Framework is a basic conceptual structure that functions to solve a complex problem, so that in building an application will be easier. Codeigniter is a web application framework that is open source and already provides libraries for building dynamic php applications. Codeigniter has a Model-View-Controller (MVC) concept with the following explanation:

1. Model The model is the part that connects with data and interactions in the database. The model represents the data structure of the application in the form of a database and is connected with SQL query commands, usually the model has classes and functions to retrieve, update, and delete data.
2. View View is connected to the end user view in the form of a web page
3. Controller Controller is the link between data and view. On the controller there are classes and functions that can process requests from the View into the data structure in the Model.

The application built can also display maps digitally on the web using the Google Maps API which contains classes and methods in javascript files. It is expected that with the application that has been built, it can help the community to find the location of the health facility with the closest distance and find information about the name of the health facility, address of the health facility, doctor's schedule at the hospital and puskesmas

## 2. RESEARCH METHODS

The research methods used to build applications by implementing the Google Maps API in searching the closest distance to health facilities in Bangkalan include:

### Analysis

Analyzing the problems that occur in the search for information, especially in the search for health information using Google Maps so that it requires other media that can accommodate information on overall health facilities. After analyzing the existing problems, the next step is to analyze what data is needed and the features used in the application to solve the problem, and analyze the hardware and software requirements in designing the application that has been made.

### Literature Study

Study research and collect data from written sources obtained from books, journals, and articles available on the internet.

### Data Collection

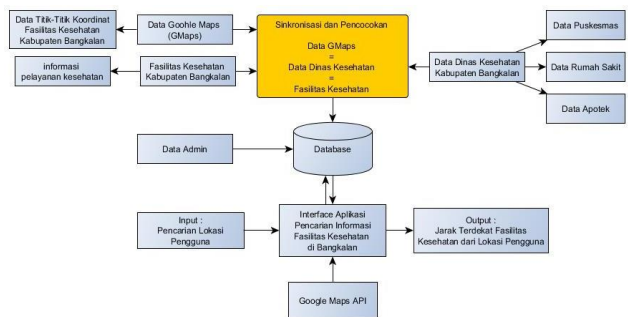
The author made observations at the health department in Bangkalan District to find data on health facilities. Data on health facilities that have been obtained, the authors seek information on health facility services related to how to go directly to the destination location and look for information through the website owned by the health facility. Then the authors observed health facilities in Bangkalan Regency through Google Maps.

### System Design

After carrying out the stages of analysis, literature study, and observation, the next step is to design the system. The system design built includes:

#### a. Application Design

The application design can be seen in Figure 1, by collecting data from the health department and looking for information on health services and the location of health facilities. Data that has been matched will be entered into the database, including admin data. Admin data is user data that can manage the application as a whole such as viewing, searching, adding, deleting, and changing data. The application is built using the Google Maps API, with input in the form of a user's location search and output in the form of the closest distance to the health facility from the user's position. User position search means finding the location of the admin and the



community when using this application. The public (user) can only see and search for health facility information and find out the nearest distance of the health facility from its location position.

Figure 1. Application Design

#### b. Data Modeling in the form of Physical Data Modeling (PDM)

PDM is used to make this application function as a description of the relationships between tables in the database. PDM can be seen in Figure 2.

Figure 2. Physical Data Modeling (PDM)

After analyzing, studying literature, collecting data, and designing the system, what needs to be done next is the implementation of the design in the form of applications and testing. Stages of testing are based on testing the functionality of the application which is used as a reference whether the system can run well or not and testing the application user on the user, where this test is carried out to determine the effectiveness of the system whether this application can help the public to find out information on health facilities in Bangkalan Regency. The assessment on application user testing was carried out by distributing questionnaires to 10 respondents from Trunojoyo Madura University (UTM). Trunojoyo Madura University Student Respondents (UTM) were chosen because the average UTM student did not come from Bangkalan, so information about facilities in Bangkalan Regency, especially facilities about health, was still unknown by Trunojoyo Madura University students.

### 3. Results And Discussion

#### Application Interface Results

Application design that has been made, is applied to the health facility information search application. The application interface results as follows:

##### 1. Information Interface of Health Facility Services

Figure 3 is a picture that displays an information page on one of the health facility services in Bangkalan Regency.



Figure 3. Health Facilities Service Information Interface

##### 2. Interface of Doctor's Practice Schedule

Figure 4 is a page that displays doctor's practice schedules at hospitals and health centers in Bangkalan Regency.

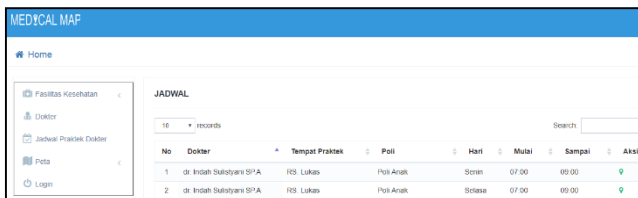


Figure 4. Interface of Doctor's Practice Schedule

Page Distance Nearest Health Facilities from the Position of the User's Location Figure 5 is a picture that displays the closest distance to the location of hospitals, puskesmas, and pharmacies in Bangkalan Regency from where the user is located.

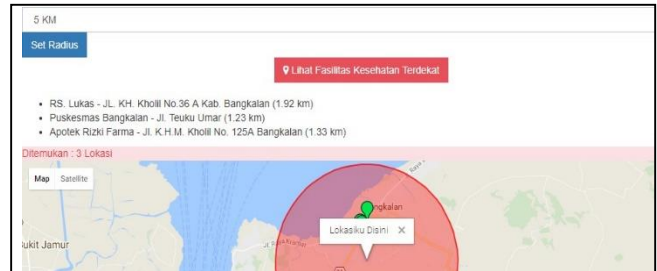


Figure 5. Closest Interface of Hospitals, Puskesmas, and Pharmacies from User's Location Position

#### Application User Testing Results on Users

The assessment phase given in the questionnaire will consist of several processes for each question, namely:

1. Determine the answer score, explained in Table 1

Table 1. Answer Scores

Skala Jawaban	Nilai
Sangat Tidak Setuju	1
Kurang Setuju	2
Cukup Setuju	3
Setuju	4
Sangat Setuju	5

2. Calculating the ideal score

$$\text{Ideal Score} = \text{Scale Value} \times \text{Respondents}$$

3. Calculating the rating scale, to find out the results of the questionnaire data in general and the overall

$$\text{scale of all answers} = \frac{\text{the number of answers} \times \text{the value of the scale}}{\text{scale}}$$

4. Calculate the percentage of approval

$$p = \frac{f}{n} \times 100\%$$

Note:

p = percentage

f = frequency of each answer questionnaire

n = ideal number of scores

5. Grouping the results of calculations that have been obtained into 5 categories, including the following:

- a. An average value of more than 86%, the results are very effective
- b. An average value of 76% to 85%, the results are effective
- c. An average value of 61% to 75%, the results are quite effective
- d. The average value of 51% to 60%, the results are less effective
- e. The average value is less than 50%, so the results are not effective

In table 2 there is a percentage of all questions from distributing questionnaires to Trunojoyo Madura University students.

Table 2. Presentation Results for Questions attached to the Questionnaire

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No	Requirement	Result
1	Apakah interface (tampilan) aplikasi pencarian lokasi fasilitas kesehatan sudah menarik ?	78 %
2	Apakah aplikasi pencarian lokasi fasilitas kesehatan mudah diakses ?	66 %
3	Apakah aplikasi pencarian lokasi fasilitas kesehatan mudah digunakan ?	74 %
4	Apakah informasi pada aplikasi pencarian lokasi fasilitas kesehatan mudah dicari ?	84 %
5	Apakah dengan penggunaan aplikasi ini anda merasa terbantu dalam mencari informasi tentang fasilitas kesehatan	82 %
6	Apakah merasa puas dengan fitur-fitur yang disajikan dalam aplikasi pencarian lokasi fasilitas kesehatan ?	80 %
Hasil Rata-Rata		77,3%

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From the average results for each question obtained is this application included in the effective category in helping the community to find out the location and information of health facilities in Bangkalan Regency.

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#### 4. CONCLUSION

Conclusion on the application of the Google Maps API application in Smart City in finding the closest route to a health facility in Bangkalan that this application can be built using the Codeigniter Framework and the Google Maps API, so that it can be said to be effective in assisting the public in knowing the location and information of health facilities in Bangkalan. This is evidenced by the results of the assessment of the quality of the application to 10 respondents who showed results of 77.3% and included in the effective category.

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