**RESEARCH REPORT
INTERNATIONAL RESEARCH COLLABORATION
AND SCIENTIFIC PUBLICATION**

WEB-BASED MAPPING DESIGN OF MUHAMMADIYAH AND 'AISYIYAH HIGH EDUCATION (PTMA) IN INDONESIA

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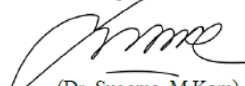   - Additional Output Fund : None

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IDENTITY AND GENERAL INFORMATION

1. RESEARCH IDENTITY

A. Title:

> Web Based Mapping Design Of Muhammadiyah And Aisiyah High Education (PTMA) In Indonesia

B. Focus Research

> *Web Based Geographic Information System Development*

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3. RESUME

Muhammadiyah Higher Education and 'Aisyiyah (PTMA) are educational institutions that are spread across Indonesia with different types including universities, institutes, colleges, polytechnics and academies. The vast area of Indonesia becomes an obstacle in the dissemination of information and promotion of each PTMA. The uneven distribution of PTMA makes the implementation of GIS quite efficient in mapping all PTMAs so that they can know the geographic distribution of PTMA in Indonesia, so that prospective students are both in Indonesia and from other countries and the public can know for sure the number of PTMAs spread throughout Indonesia geographically. The design is carried out with a sequence of processes, namely creating a PTMA Web GIS, making a CRUD (Create, read, update and delete) process on WebGis, and building a PTMA latitude and longitude database. The results of this mapping make prospective students and the public know that PTMA has an existence in the world of education. The existence of this web can be used as a conduit for information to prospective students, parents and the community in searching for geographically-based information about PTMA. Prospective students, campus academics, and the public can see the potential of each PTMA. PTMA WebGis is able to provide information related to the search for PTMA in the form of campus facilities, accreditation, the number of lecturers and other information related to the campus, as well as providing information on finding the fastest route or way to the location of each destination PTMA. Based on the test results from the percentage level of 90.07% of 50 respondents, the success of this system is feasible and meets the categories of needs used by users.

PROGRESS REPORT

RESEARCH COLABORATION OF UHAMKA-UTP

CONTENS

Chapter I
Introduction

Pergurauan Tinggi Muhammadiyah dan Aisiyah (PTMA) are educational institutions that are spread across the Indonesian territory with different types including universities, colleges, institutes, polytechnics, and academies. The vast territory of Indonesia becomes an obstacle in the dissemination of information and promotion of each PTMA. The uneven distribution of PTMA makes the implementation of GIS quite efficient in mapping all PTMAs, in order to know the geographic distribution of PTMA in Indonesia. Prospective students from both Indonesia and from other countries who wish to continue their higher education and the public can find out how many PTMAs are geographically spread across Indonesia. The results of this mapping make prospective students and the community know that PTMA has an existence in the world of education.

Web-based geographic information system (Elly, 2016) or also known as the word WebGis is a solution and alternative to this problem, where the existence of this web can be used as a linking line of information to prospective students, student guardians and the community in finding information about geographically based PTMA. There is a growing need for more efficient and effective GIS implementation in the spread of PTMA in Indonesia. So that prospective students, campus academics, and the public can see the potential of each PTMA after the implementation of the GIS.

The PTMA WebGis was carried out after taking the initial research data using a questionnaire (Appendix A) to find out how much they knew PTMA in Indonesia with parent and student respondents or prospective students obtained by 50 respondents with the calculation results of 17% Yes (knowing) and 83% Not (not knowing) it can be concluded that there are still many who do not know Muhammadiyah Higher Education and "Aisyiyah in Indonesia, because the vast area of Indonesia makes many parents or prospective students still do not know the spread of each PTMA in Indonesia along with detailed information. PTMA information using WebGis is a new way that is able to provide information and data about the intended PTMA in the form of campus facilities, accreditation, the number of lecturers and other information related to campus and WebGis provides information on the route or the fastest way to the location of each destination PTMA.

Problem Statement

Based on the background, there is a problem formulation, namely

1. How to do the mapping of Muhammadiyah and 'Aisyiyah Universities (PTMA) along with detailed information through mapping WebGis technology?

2. How to determine and inform the fastest distance that must be passed to get to the PTMA that the user wants?

Chapter II
Literature Review

State of The Art is the highest achievement of a research development process. This study will discuss theories or concepts related to the research topic being discussed.
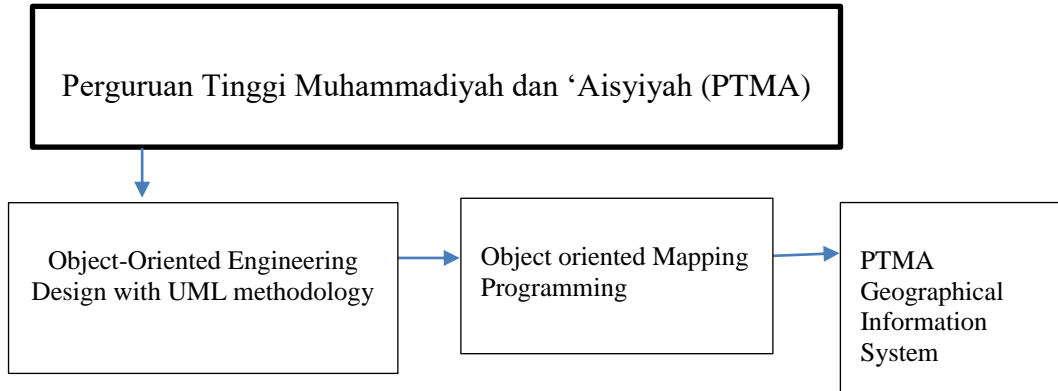
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│                                                             │
│   Perguruan Tinggi Muhammadiyah dan 'Aisyiyah (PTMA)        │
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└─────────────────────────────────────────────────────────────┘
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| Object-Oriented Engineering Design with UML methodology | → | Object oriented Mapping Programming | → | PTMA Geographical Information System |

Figure 2.1 Theoretical framework

2.1. Perguruan Tinggi Muhammadiyah dan 'Aisyiyah (PTMA)

Muhammadiyah Higher Education and 'Aisyiyah (PTMA) are educational institutions spread across Indonesia with different types including universities, colleges, institutes, polytechnics, and academies. Based on the guidebook for the recapitulation of PTMA data from the PP Muhammadiyah Diktilitbang Council and the PP Aisyiyah Dikti Council 2019 is shown in Table 2.1.

Tabel 2.1. Bentuk PTMA

Bentuk	Bentuk PTMA		
	PTM	PTMA	Jumlah
Akademi	10	2	12
Politeknik	4	1	5
Sekolah Tinggi	97	4	101
Institut	5	0	5
Universitas	47	1	48
Jumlah Total	163	8	171

2.2. UML (Unified Modeling Language)

Unified Modeling Language (UML) is a 'language' for modeling systems or software used to document and specify object-oriented (Urva et al., 2015).

2.2.1. Use Case Diagram

Use Case Diagrams are one type of diagram in UML that describes interactions or behaviors between systems and actors, use case diagrams can also be used to find out what functions are contained in the system (Urva et al., 2015). Use case diagrams facilitate communication between analysts and users as well as between analysts and clients can be seen in Figure 2.2.
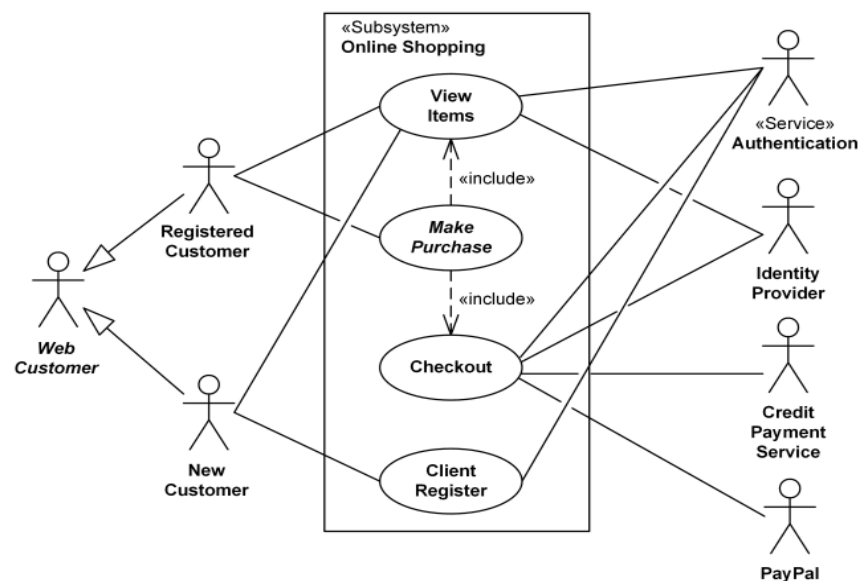
Gambar 2.2. Bentuk Umum Use Case Diagram
Sumber (www.uml-diagrams.org)

2.2.2. Class Diagram

Class diagram is a type of diagram in UML that is used to display classes and their relationships with other classes in a system, class diagrams display operations and properties in operations (Arifin & Hs, 2017).

2.2.3. Activity Diagram

Activity Diagram shows the steps in the work flow and is the control from one activity to another and describes the actions and results (Arifin & Hs, 2017). The symbols contained in the activity diagram can be seen in Figure 2.3.
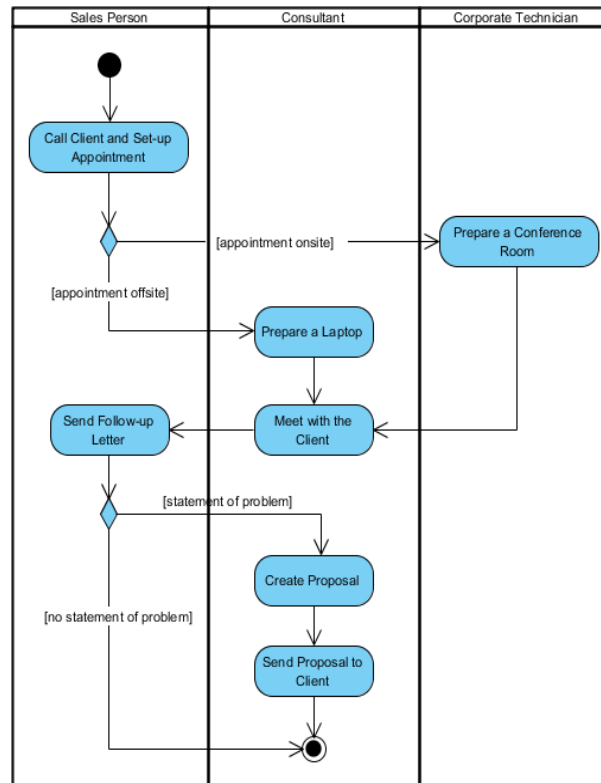
Gambar 0.3 Activity Diagram

2.3. Google Maps API

Development and facilities from google maps that have complete support, such as business information services, roads, locations, services, and public services (Information & Sig, 2017). By using it, you can use google maps on the website, even though it was previously a javascript API. The Maps API was later expanded to include an API in the Adobe Flash application. The success created by the google maps API gave birth to several competitors including Yahoo! Maps API, Bing Maps Platform, MapQuest Development Platform and OpenLayers (Bangun et al., 2019).

2.4. Geographical Information System

Special information systems that can process spatial (spatial reference) and aspatial (non-spatial) data (Zusrony et al., 2018). another meaning is a computer system capable of storing, building, processing, analyzing, collecting, disseminating and displaying geographically referenced information (District & Based, 2016), for example data identified by location (Bangun et al., 2019).

2.5. Data Spasial

GIS mostly handles spatial data whose data is geographically oriented, has a certain coordinate system and has two parts that make it different from other data, namely location information (spatial) and descriptive information (attribute) (Indrasmoro, 2013).

Here are some research on mapping. In 2019, Zulfauzi1), Apriander2) conducted a research entitled "Design of a Web-Based Geographical Information System for the Location of BRI Bank ATMs in Lubuklinggau City" (Zulfauzi, 2019). This study conducted an alternative to present information media on the location of BRI Bank ATMs in the city of Lubuklinggau for users. Research in 2016 Adytama Annugerah1), Indah Fitri Astuti2), Awang Harsa Kridalaksana3) entitled "Web-Based Geographical Information Systems Mapping Location of Typical Souvenir Stores in Samarinda" (Annugerah et al., 2016). This research makes it easy for web users to get information about the location of the store, shop information, goods sold and directions for souvenirs typical of Samarinda. In 2015, Priska Gurantil1), Affandy2) conducted a research entitled "Google Maps API Application in the Development of a WEB-Based Tourism Geographical Information System (GIS) (Case study: Sidoarjo Regency)" (Kusuma & Budisusanto, 2015). This research combines Web-based GIS technology (WebSIG) with Google Maps API to present information and provide information and provide features so that the people of Sidoarjo regency can participate in tourism development activities in Sidoarjo Regency. In 2014 Fauzan Masykur conducted a research entitled "Implementation of Geographical Information Systems Using Google Maps Api in Mapping Student Origin" (Masykur, 2014). This research with GIS can determine the geographic origins of students who take lectures at the Faculty of Engineering. Produce an

overview of where students come from so that the campus knows how well they are known in the community.

In the previous research, the Geographical Information System (GIS) provided information on the location or location of each place, when determining the route, you must first determine the origin and destination differently so that no mistakes occur. The difference with previous research is that there is a direction on the marker label to determine the distance calculation directly, and the moving marker label shows each location marker, utilizing the Google Maps API to determine the fastest distance and provide a more dynamic interface.

Chapter III
Research Methodology

The development of this Web GIS system in its design uses the prototype method, this method is used because it is in accordance with the stages to be carried out in this design starting from concept description, system requirements analysis, model development, coding, and this method can build good communication lines between users and users. developer. The stages in designing according to the method used can be seen in the flow chart below:

3.1. Flow Diagram

The flow of this research describes the stages of the PTMA mapping process based on Geographical Information Systems in Figure 3.1.
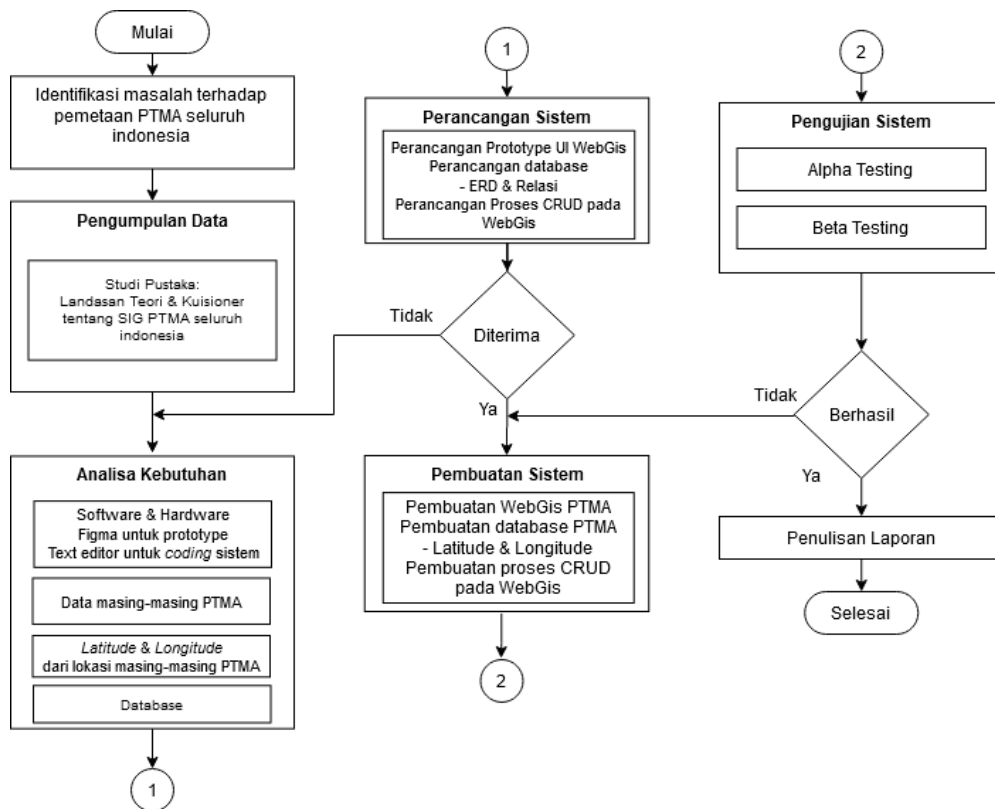
Figure 3.1 Geographical Information System Research Flow for Mapping Muhammadiyah and Aisyiyah Universities

3.2. Explanation of the Design Flow

3.2.1. Identification of problems

At this stage the author identifies a problem in PTMA mapping, the problem encountered is that the information about PTMA is not evenly distributed in Indonesia, so the implementation of WebGis is an effective step to map the number of PTMA geographically.

3.2.2 Data Collection

This data collection aims to strengthen and facilitate researchers in system design, namely:

1. Literature study

   At this stage, the writer looks for research that is relevant to this research.

2. Questionnaires

   At this stage the authors distributed a questionnaire to WebGis.

3.2.3 Needs Analysis

In designing a system to be built, software and hardware are needed to support the creation of PTMA mapping GIS. The tools are: Hardware Requirements, Software Requirements, Latitude & Longitude Data Requirements. This stage aims to collect each location from each PTMA so that geographic mapping can be carried out. Data Attached in ANNEX B.

3.2.4   Design

Several design stages were carried out, namely:

1. Functional System Design: The system design that is carried out is the design of the Main system or as a whole which is a blue print of the Geographical Information System for Mapping Muhammadiyah and Aisyiyah Universities

2. Prototype UI: At this stage, the design for the User Interface of the PTM mapping system will be carried out.

3. Database Design:At this stage, the design of the database design will be carried out, aiming to facilitate the data collection process. This design involves two activities, namely ERD and Relations.

4. CRUD Design:At this stage, the CRUD design will be carried out, aiming to find out what requirements can be entered, deleted and updated in the database.

3.2.5   System Development

Performed several stages of making the system, namely:

1. Website Creation

   At this stage, a GIS-based website was created for PTM throughout Indonesia, in accordance with the UI WebGis prototype and other design processes that had been approved at the system design stage.

2. Database creation

   At this stage, the creation of a database that applies to storing requirements for PTM mapping includes Latitude and Longitude as data to determine location coordinates and data or information that is owned by each PTM.

3. Making CRUD

   At this stage, it is made so that it can perform data processing, all data will be input using CRUD processing starting from the latitude and longitude as well as information from each PTM.

3.2.6 Sistem Testing

   After making the PTM GIS website has been completed, the next step to take is to conduct system testing, where there are three types of testing, namely:

1. Alpha Testing: This test is done by the researchers themselves to reduce various errors or errors in the system being created.

2. Beta Testing: This test is carried out by application users, namely students and the community as test targets for the feasibility of the system.

3.2.7   System Implementation

   Implementation is the final stage where a system that has been tested can be used and function properly for its users when applied.

Chapter IV
Staff And Student Mobility Progress

In this section, it was planned for February 2020, but due to the Covid-19 pandemic that hit Indonesia and Malaysia, this activity was delayed, then planned for September 2020 with the hope that the Covid-19 pandemic has ended, it turns out that until the beginning of 2021 the pandemic has not ended, even more violent . With great regret, finally the student mobility program and exchange staff have not been implemented properly.

Chapter V
Result , Discusion and conclution

This chapter will explain the stages in making a geographic information system for mapping PTMA throughout Indonesia, which aims to simplify the information retrieval process, so that the process that is usually carried out is less effective becomes more effective. The results of this analysis and design are also expected to help prospective students or parents from Indonesia and abroad to get more information.

5.1. System planning

System design is done to help facilitate the development process in product design. At the design stage, the design process consists of the design experience (UX) and interface (UI). Experience design creation is processed using the Unified Modeling Language (UML) as a step in modeling a system.

5.1.1. Use Case Diagram Design

Shows the relationship between the guest and the system that represents a user when interacting with the system. The following is an overview of the Use Case diagram shown in Figure 5.1.
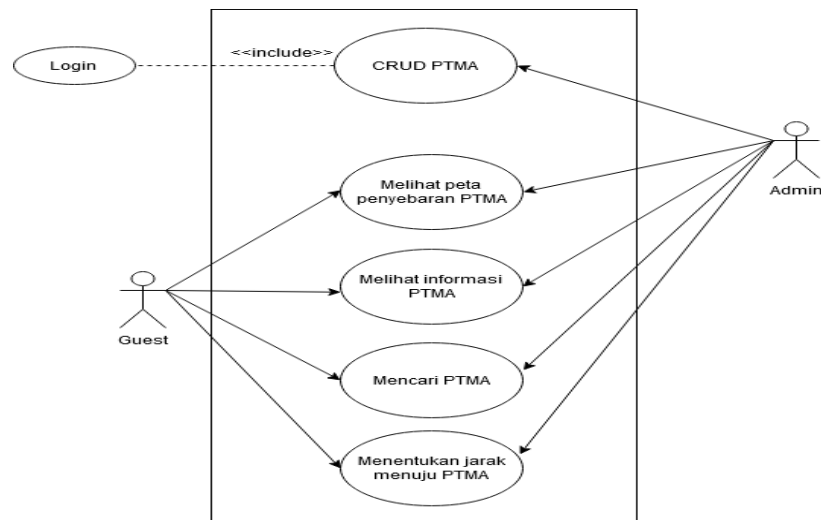
Figure 5.1. Use Case Diagrams of Geographical Information Systems to Map Muhammadiyah and Aisyiyah Universities (PTMA)

5.1.2. Actor

In the Geographical Information System for Mapping Muhammadiyah and Aisyiyah Higher Education (PTMA) involves 2 actors, namely Guest and Admin. Actor and actor descriptions are shown in Table 5.1.

Table 5.1 Actor's Explanation

No	Actor	Description
1.	Guest	A person who only uses or visits the system
2.	Admin	Someone who processes data from the PTMA WebGis

5.1.3. Explanation of the Use Case

Use cases in Geographical Information Systems for Mapping Muhammadiyah and Aisyiyah Universities (PTMA) do several things, including CRUD PTMA, PTMA Distribution Map, Viewing PTMA information, Searching for PTMA, Determining Distance to PTMA.

1. CRUD PTMA

   Tabel 5.2 Shows Admin Actions and System reactions for the PTMA CRUD Use Case.

Tabel 5.2. CRUD PTMA

	Admin Action	System Reaction
1.	Admin Login	Displays a dashboard page for data processing CRUD (*create, read, update, delete*)
2.	Admin chooses the campus menu	Showing the Campus CRUD as data processing
3.	Admin chooses admin	Showing Admin CRUD to process admin data
4.	Admin Logout	Displays the main page of the PTMA WebGis

2. PTMA Distribution Map

   The guest description when looking at the distribution points (markers) of PTMA in Indonesia. The specifications can be seen in Table 5.3.

Tabel 5.3. Displays a PTMA Deployment Map

No.	Guest Action	System Reaction
1.	Guest selects the Map menu	Displays a page containing a map filled with dots from each PTMA campus location starting from universities, colleges, institutes, polytechnics, and academies which are marked with a blue dot symbol as the location of each campus.

3. View PTMA information

Description from guest to display information from PTMA. When selecting a category from PTMA. The specifications can be seen in Table 5.4.

Table 5.4. Melihat informasi PTMA

No.	Guest Action	System Reaction
1.	Guest scrolls the page down until the PTMA category appears.	Displays a page containing PTMA categories ranging from universities, institutes, colleges, polytechnics, and academies.
2	The guest selects a sub menu from the categories selected by universities, institutes, colleges, polytechnics and academies	The system displays the campus names from each selected category.
3	Guest chooses more info on the name of the selected campus	Displays information from the campus starting from the history of the campus, vision, mission, faculties, and study programs as well as other information about the campus.

4. Looking for PTMA

Explain the description of the guest process to find PTMA information that they want to search. The specifications can be seen in Table 5.5.

Table 5.5. Looking for PTMA

No.	Guest Action	System Reaction
1.	Guest type the full name of the campus	Displays a page containing the campus you are looking for.

being searched in the search feature.

No.	Guest Action	System Reaction
2.	Guest chooses more info	Displays information from the campus starting from the history of the campus, vision, mission, faculties, and study programs as well as other information about the campus.

5.   Determine the distance to PTMA

An overview of the guest process to calculate the distance to one of the PTMA. The specifications can be seen in Table 5.6.

Tabel 5.6 Menentukan jarak menuju PTMA

No.	Guest Action	System Reaction
1.	The guest clicks on one of the blue dots on the map (marker).	Load maps page with the location of the guest blank then estimate the fastest route after the guest has filled in the location.
2.	The guest clicks the "direction" button at the bottom of the campus more info page	Load maps page with the location of the guest blank then estimate the fastest route after the guest has filled in the location.

5.1.4 **Activity Diagram Design**

The design of the Activity Diagram is based on the Use Case Diagram of the Geographical Information System for Mapping Muhammadiyah and Aisyiyah Universities (PTMA).

1. Activity diagram of the PTMA CRUD

Figure 5.2 is the activity of the admin when processing data on the PTMA WebGis, to enter the admin must enter a username and password, then the system will display data processing pages from the admin and campus. Admin can process admin and campus data by choosing one of them.
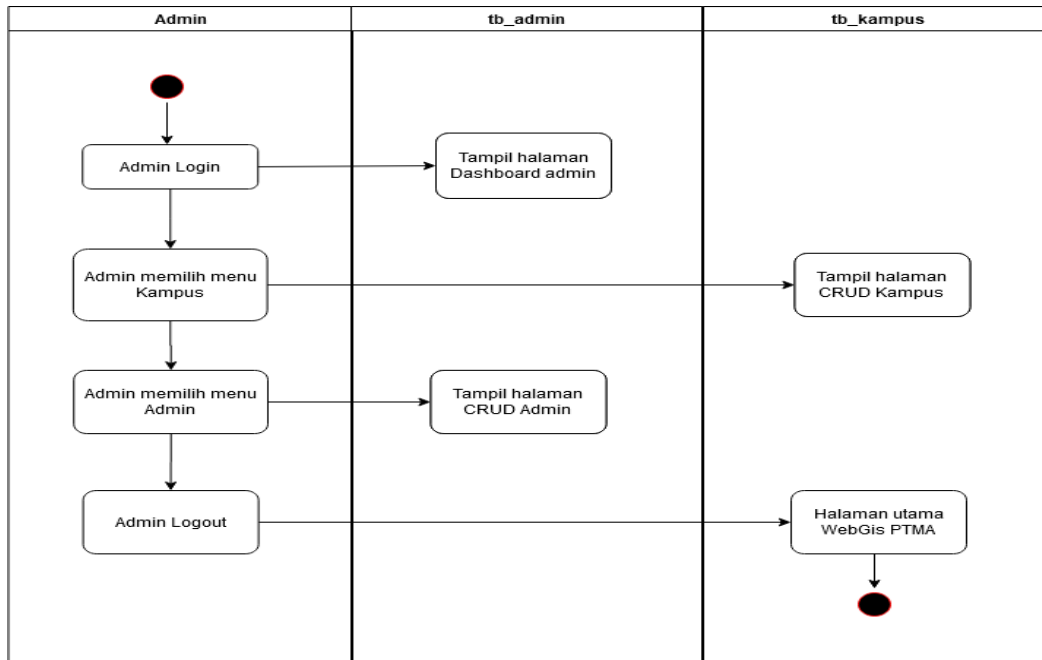
Figure 5.2 PTMA CRUD Activity Diagram

2. Activity diagrams display a map of the PTMA deployment.

Figure 5.3 is the activity of the guest to see the distribution of PTMA on the map, by pressing the map menu, the system will direct the map page containing the points (markers) of PTMA crossings in Indonesia.
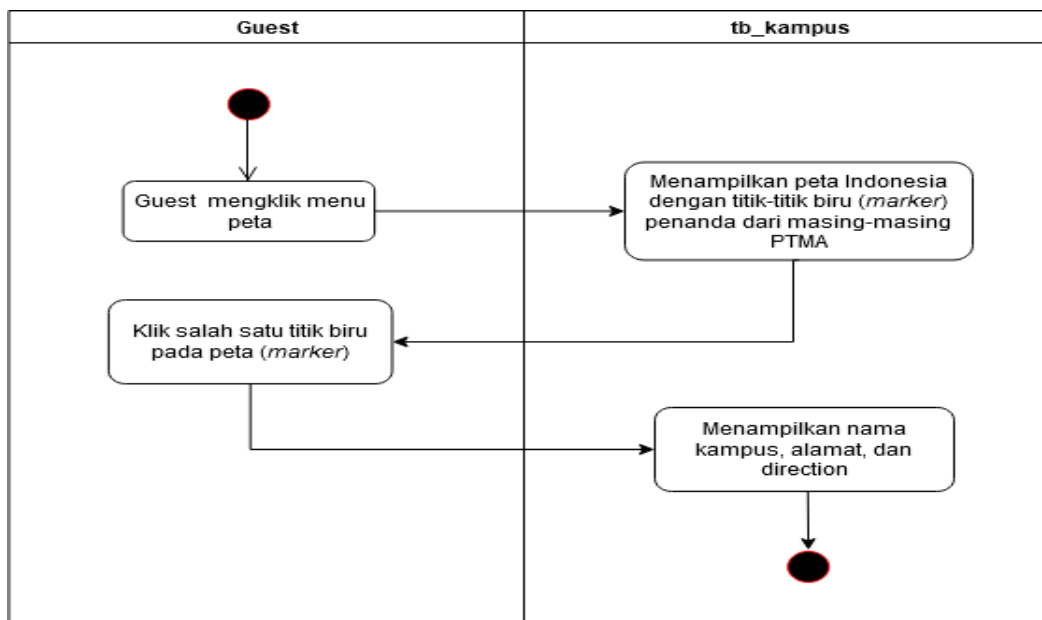

Figure 5.3 Activity diagram of the PTMA Distribution Map

3. Activity diagram Shows PTMA information

Figure 5.4 is the activity of the guest to get or display the information that is owned by each PTMA, the system displays the PTMA categories, namely universities, colleges, institutes, polytechnics, and academies, after the guest chooses one of these categories, the system displays a page containing each of them. each campus name according to its category.
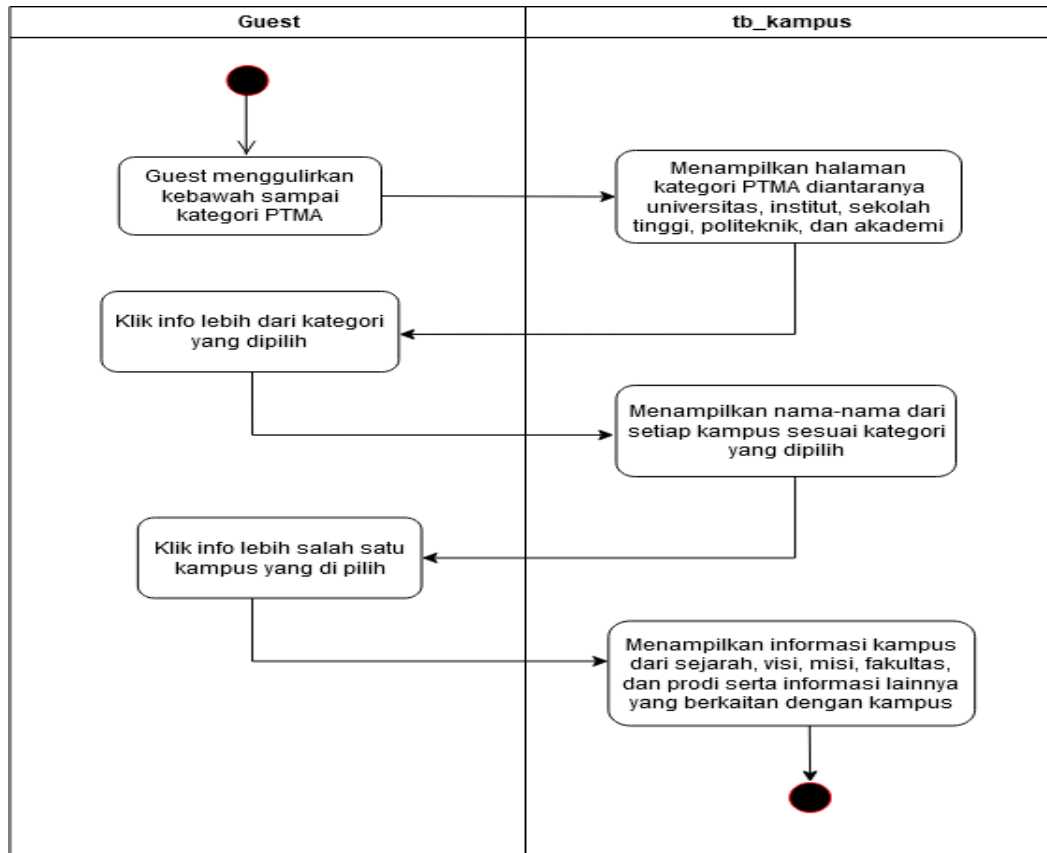
Gambar 5.4 PTMA Information Activity Diagram

4. Activity Diagram Finding PTMA

Figure 5.5 shows guest activity when searching for a PTMA by typing the campus name. Then the system will display the page according to what you are looking for.
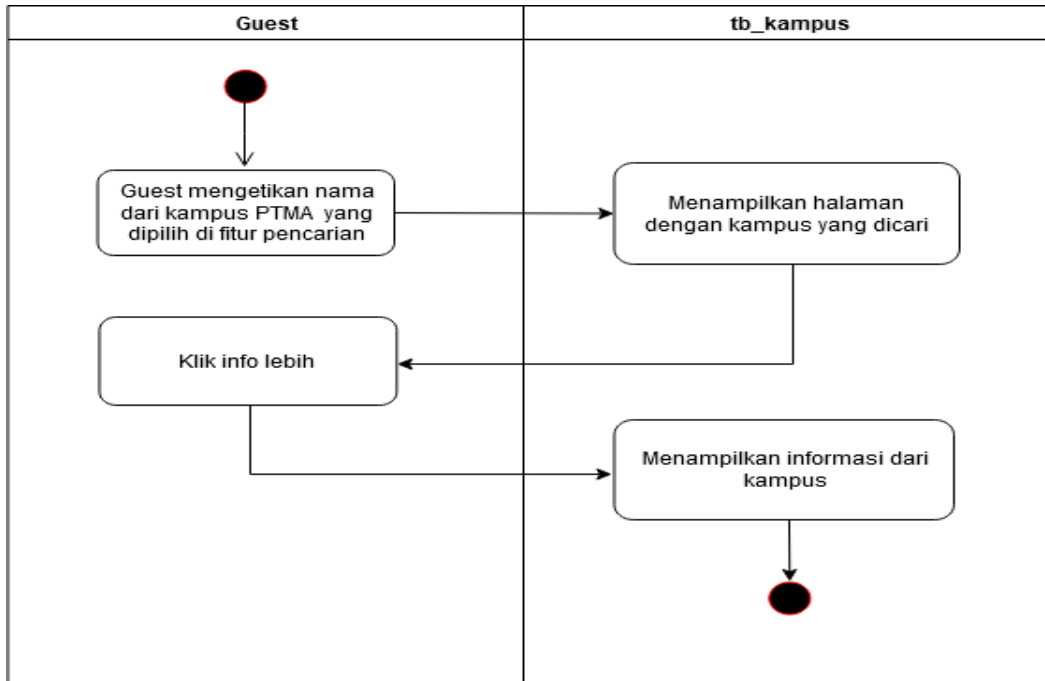
Figure 5.5 Activity Diagram Finding PTMA

5. Activity diagram Displays the distance to PTMA

Figure 5.6 shows the guest activity when determining the distance to one of the PTMAs. Then lead to the google maps page.
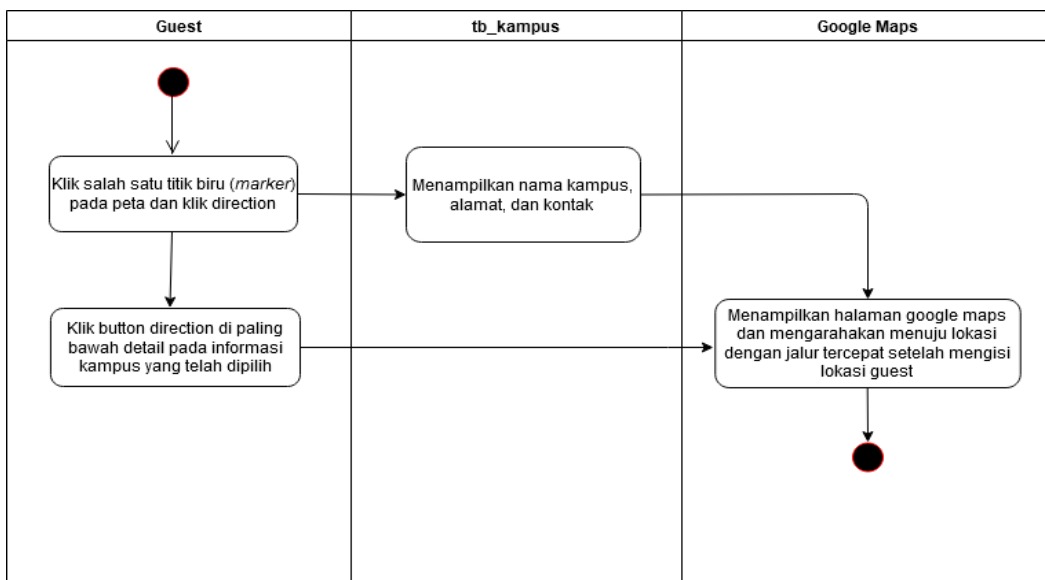
Gambar 5.6 Activity Diagram Displays the distance to PTMA

5.2. Database Design with Class Diagrams

Class diagram depicting the relationships between tables in the College Gis Web database. Figure 5.7. Shows the Database Design that correlates each class based on the PTMA Webgis Use Case Diagram.
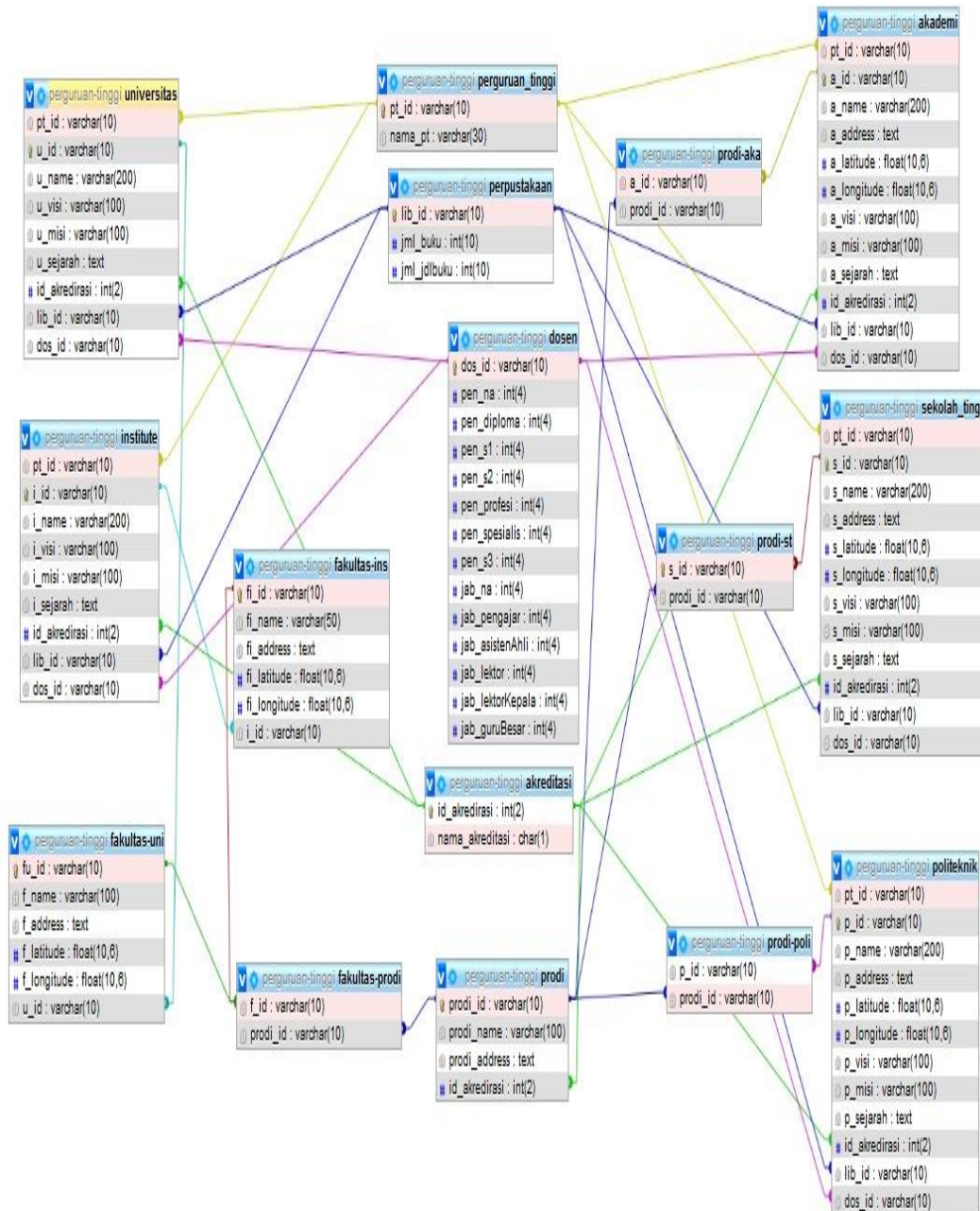
Gambar 5.7 Class Diagram Webgis PTMA Seluruh Indonesia

5.3. *Component* Diagram Design

Figure 5.8 shows the Component Diagram design that relates the component requirements of the PTMA Webgis software.
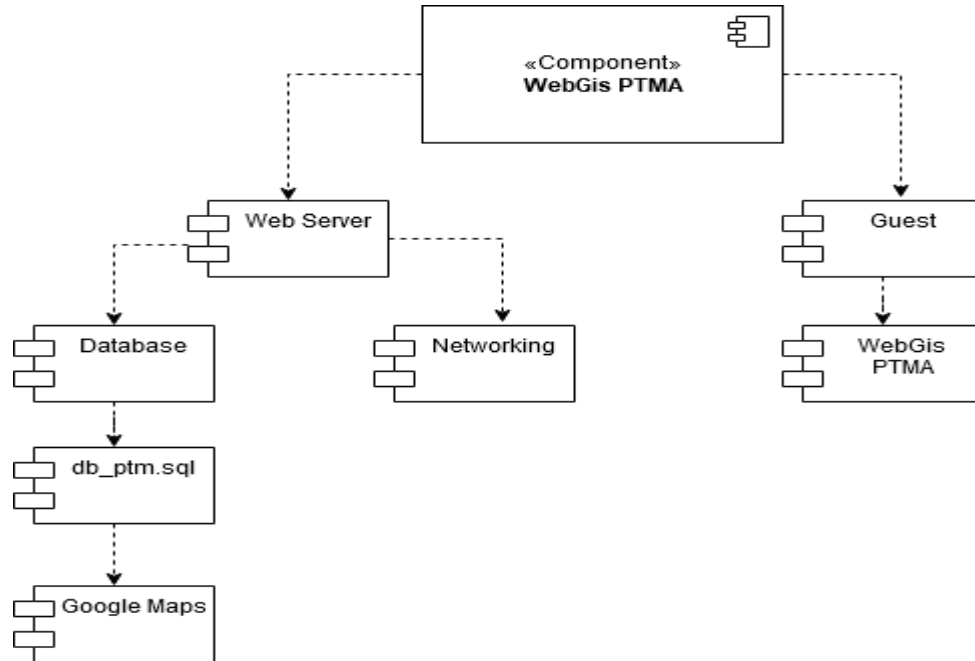
Figure 5.8 Component Diagram of PTMA Webgis

5.4. Deployment Diagram Design

Figure 5.9 shows the Deployment Diagram design that describes the Webgis PTMA hardware requirements.
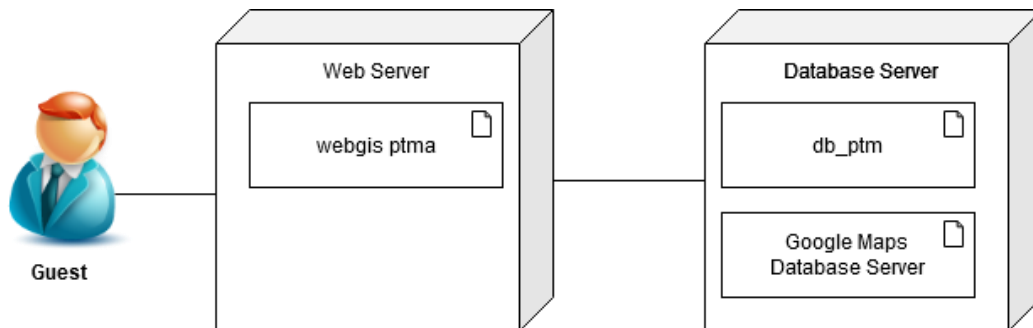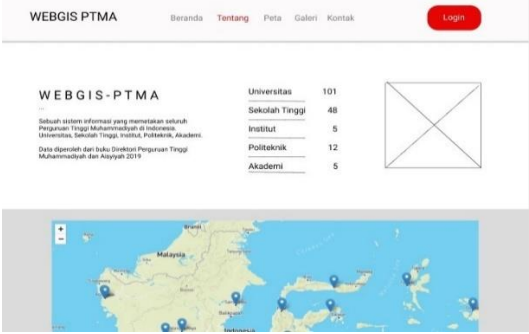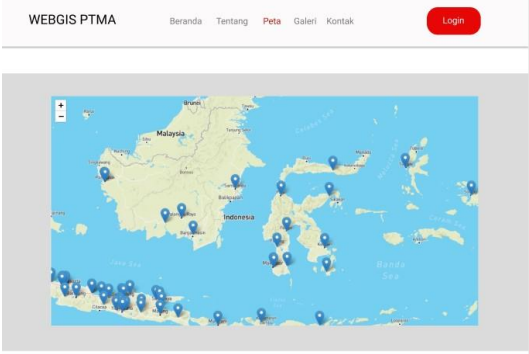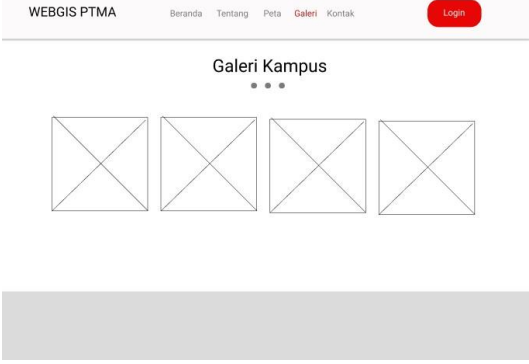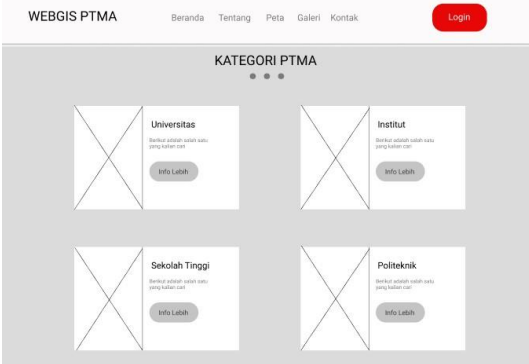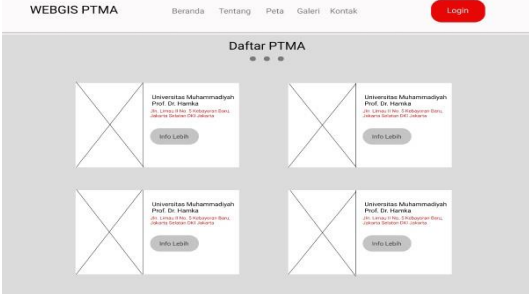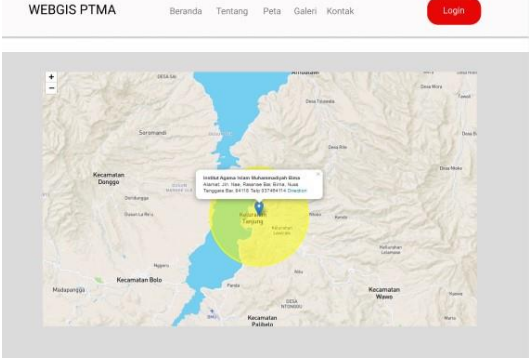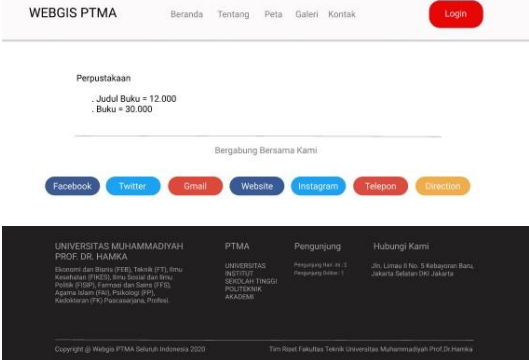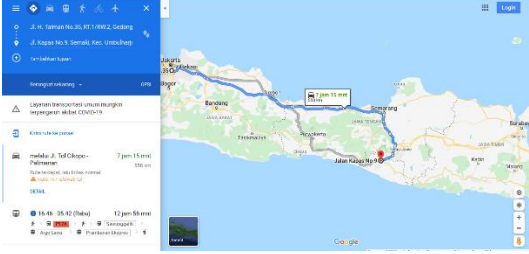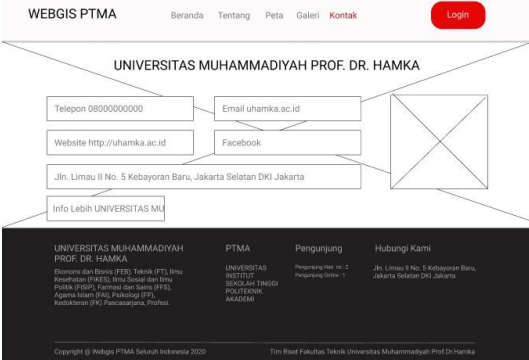

Figure 5.9 Deployment Diagram of PTMA Webgis

5.5. MockUp Interface System Design
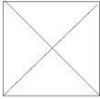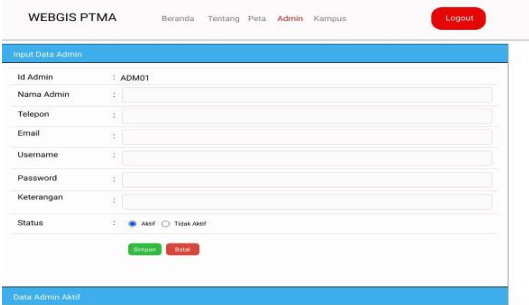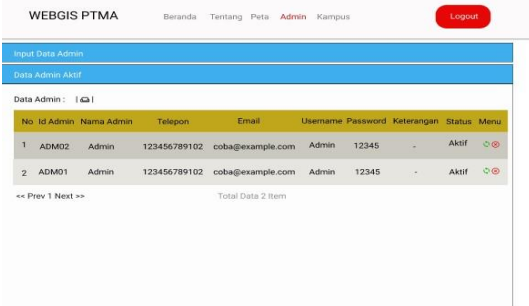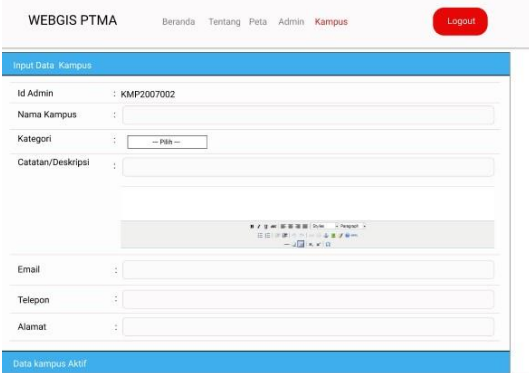
The author designed a mockup of the user interface which aims to describe the appearance of the system and the features that are made based on needs. The results of this design are expected to facilitate the implementation of the system created. The following is the interface design of the PTMA WebGis which is shown in Table 5.7.
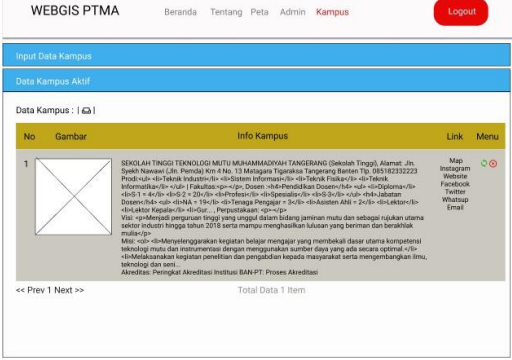
Table 5.7. Interface Design

No.	Design	Design Description
1.	 Main page	This page is the main page of the PTMA WebGis, on this page a search feature is available to find one of the PTMA campuses
2.	 About page	This page is a page of a brief description of the PTMA webGis and information on the number of each campus.
3.		This page is a page that shows the points (markers) of each campus in Indonesia

	Map page	
4.	 PTMA Gallery Page	This page is a page that displays photos of each PTMA.
5.	 PTMA category	This page is a page that contains the categories of dividers for each PTMA according to its type, namely Universities, Institutes, Colleges, Polytechnics, and Academies.
	 Register PTMA	This page is the content page of the selected category, displaying the names of the campuses according to the category.
		This page is a page that contains details of the campus that represents the campus.

	PTMA details	
	\n\nDirection PTMA	This page is a way of directing the map markers to determine the fastest distance to campus.
	\n\nDirection PTMA	This page is a way of directing the PTMA details to determine the fastest distance to the campus.
	\n\nGoogle Maps	This page is a google maps page that determines the destination route after filling in the location of the guest.
		This page is a contact page and map location of each PTMA.

	Kontak PTMA	
	Login Admin	This page is a login page for admins who can manage PTMA data
	CRUD Admin	This page is a page of CRUD Admin, and this page is for inputting admin data.
	CRUD Admin	This page is a CRUD Admin page, this page contains admin data and admin processing to be updated and deleted.
		This page is the Campus CRUD page, this page is for inputting the latest data from the Campus.

CRUD Kampus	
  CRUD Kampus	This page is the Campus CRUD page, this page contains data from each campus and there are data processing options for updating and deleting.

5.6. Result of Design and Implementation of System Interface

Displays the results of the implementation of the program on the PTMA WebGis in the form of views that are built according to the design plan. This section will display the entire interface of the system that has been created.

5.6.1. Main Menu Interface Implementation

The following is the main view of the PTMA WebGis which is applied to map PTMA in Indonesia. This main menu consists of Home, About, Map, Gallery, Contacts and Login. On this page there is also a PTMA search feature and can be seen in Figure 5.10.

Figure 5.10 Main Menu interface

In the main view, when the Guest selects the about menu, map, gallery, and contacts will scroll down to display the page of each selected menu. The PTMA WebGis interface can be seen in Figure 5.11, 5.12, 5.13, 5.14.
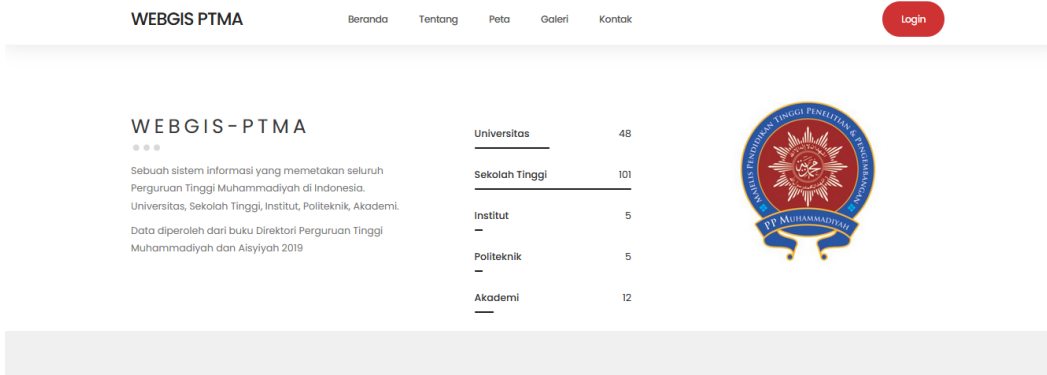
Figure 5.11 Display interface About
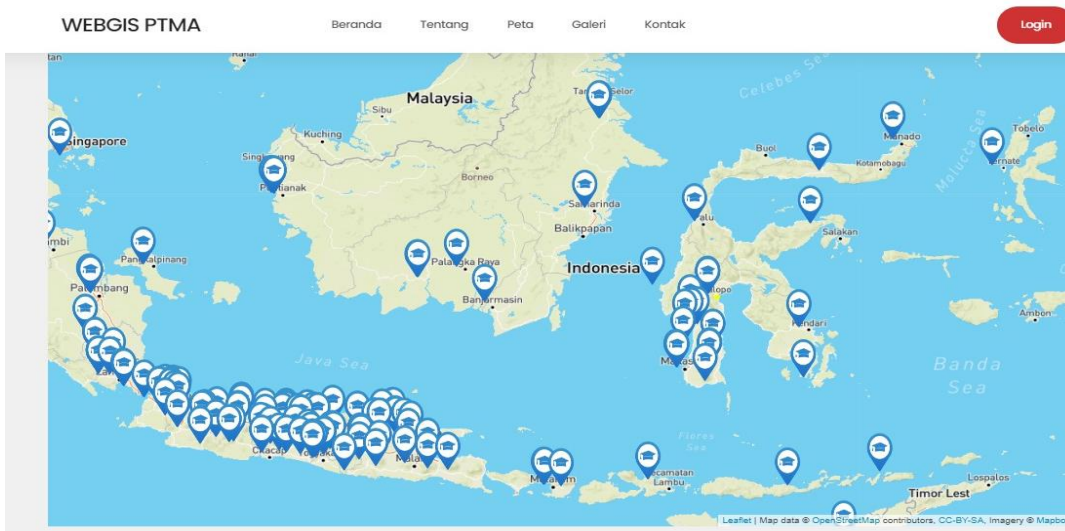
Figure 5.12 Display Map interface
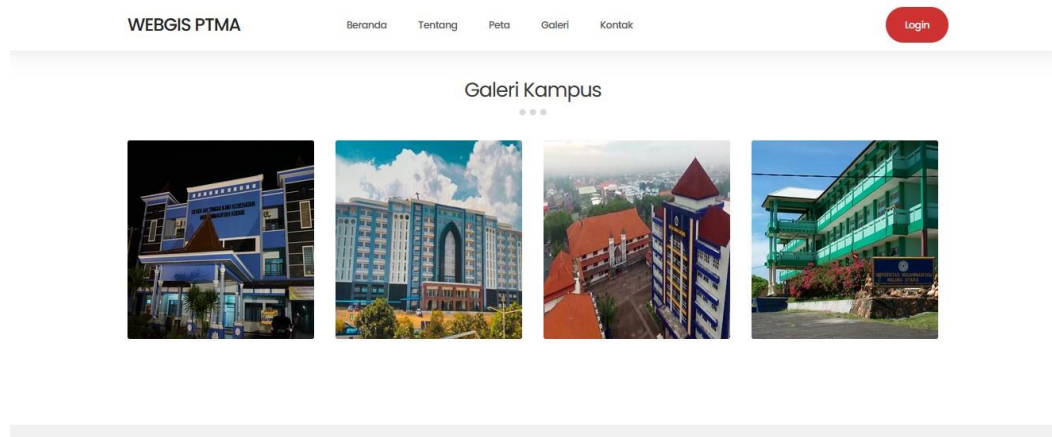
Figure 5.13 Campus Gallery interface display

Figure 5.14 Display interface Contacts

On the main menu display, guest scrolls down to the PTMA Category page after the Gallery page, which will display the interface of the PTMA Category which includes Universities, Institutes, Colleges, Polytechnics, and Academies and if one is selected by pressing more info it will display the names of the each campus according to its category. and pressing more info on the selected campus will display information from the campus. The PTMA category display can be seen in Figures 5.15, 5.16, and 5.17.
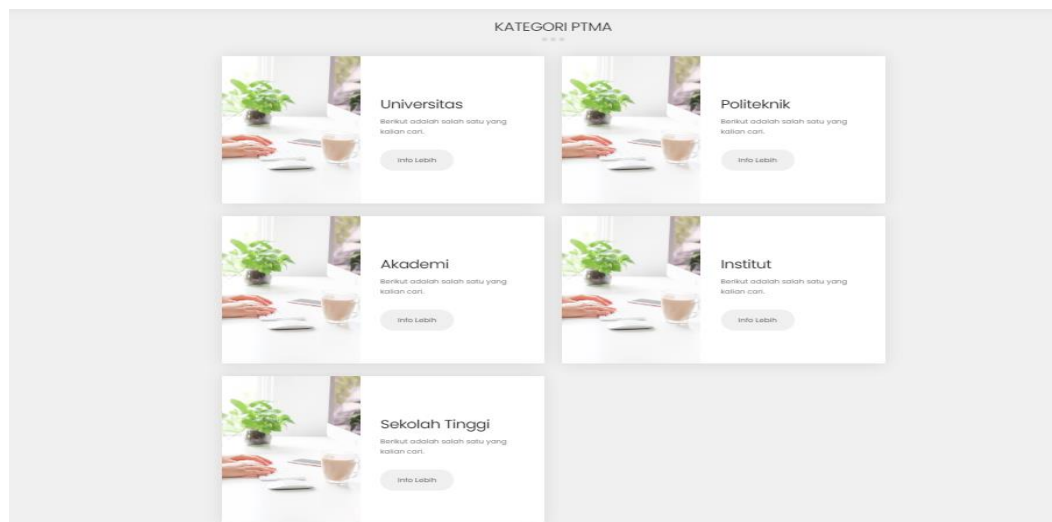
Figure 5.15 PTMA Category interface
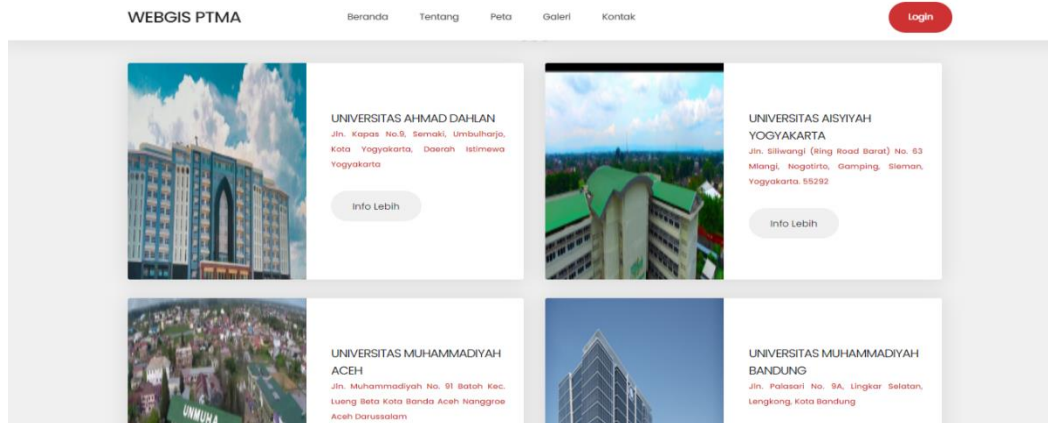
Figure 5.16 PTMA List interface
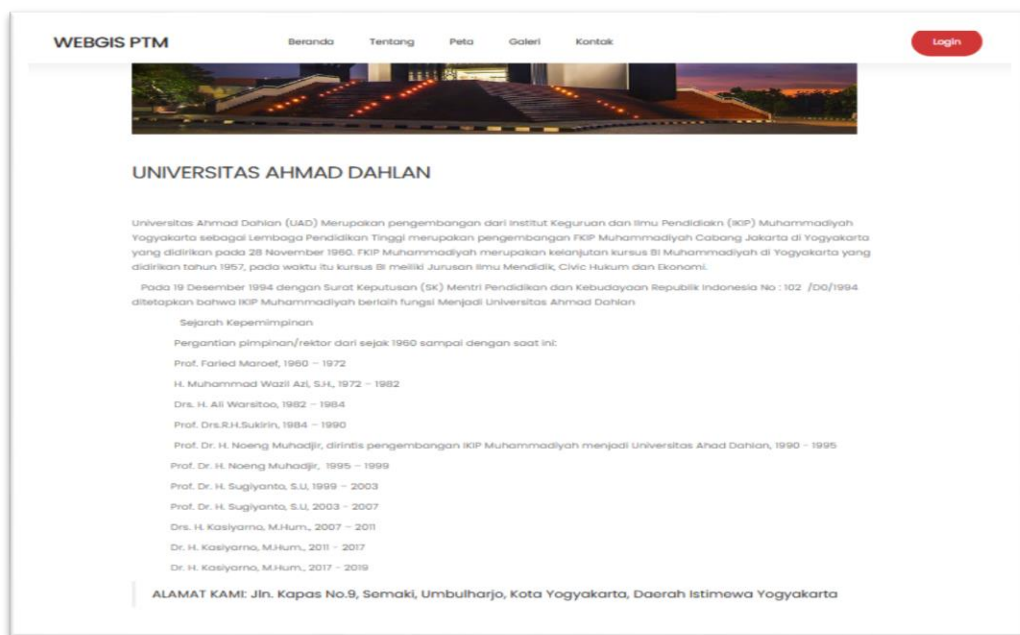
Figure 5.17 PTMA Detail display interface

5.6.2. Direction Interface Implementation

This is a display when the guest chooses the direction button or chooses a direction at the blue point (marker) on the map, it will direct you to the google maps page to see and find the fastest distance to campus. The direction button interface is shown in Figure 5.18, the direction for the map marker is shown in Figure 5.19, and for google maps it is shown in Figure 5.20.
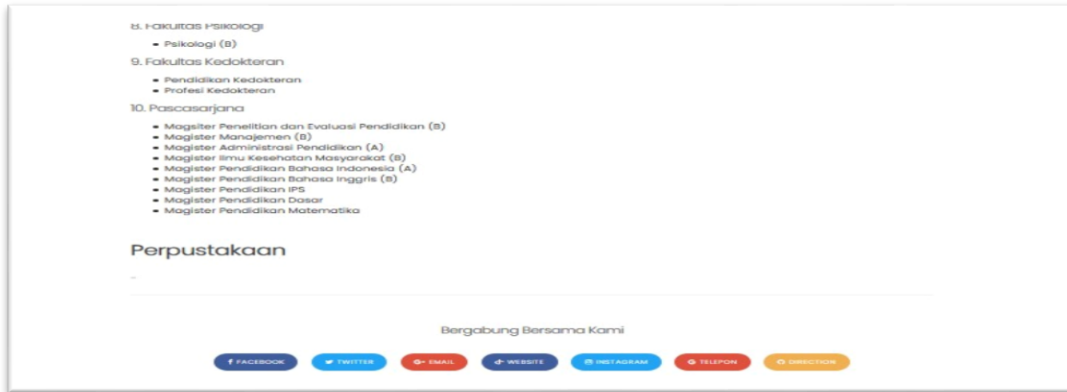
Figure 5.18 Direction of the PTMA interface display
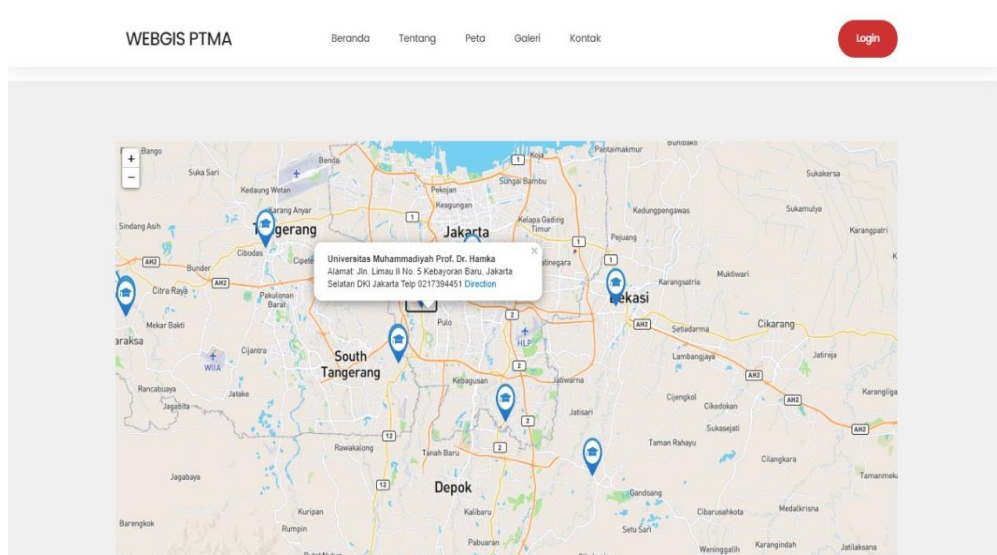
Figure 5.19. PTMA Direction Marker interface display
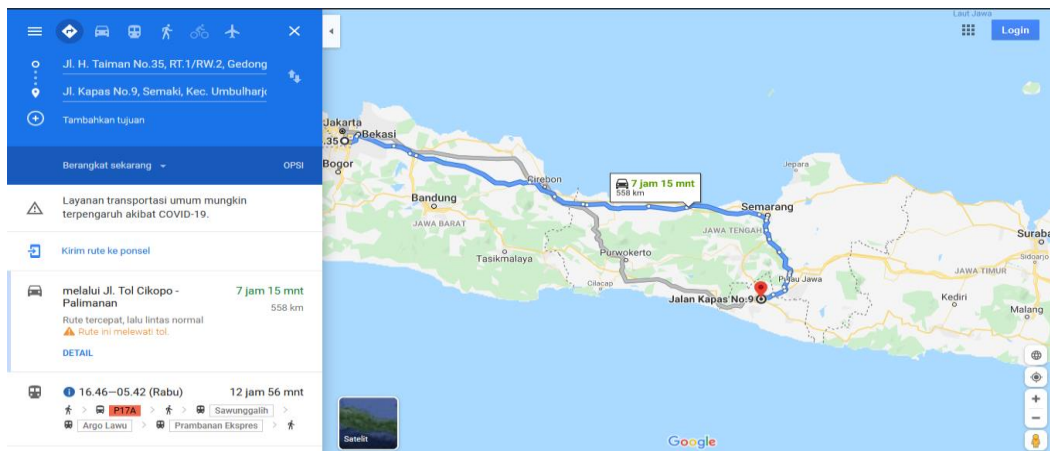
Figure 5.20 Display of the Google Maps interface

5.6.3. Admin Interface Implementation

This is a display when Admin selects the login button, the system will redirect to a special admin page which is useful for managing admin and campus data. The admin interface is shown in Figure 5.21, 5.22, 5.23.
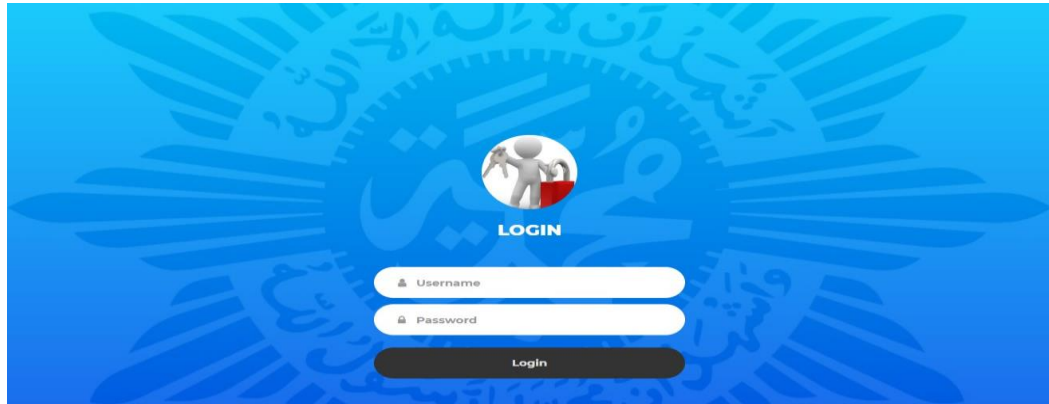
Figure 5.21 Display Admin Login Interface
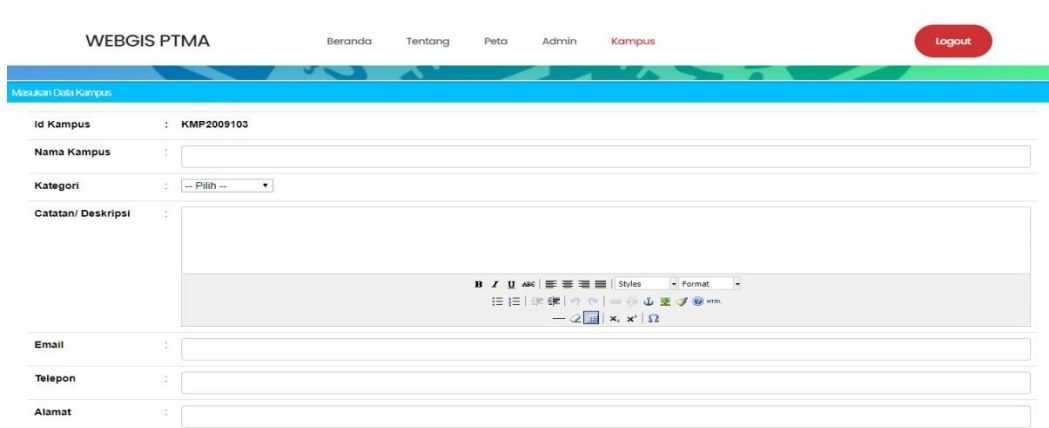
Figure 4.22 CRUD Campus Interface
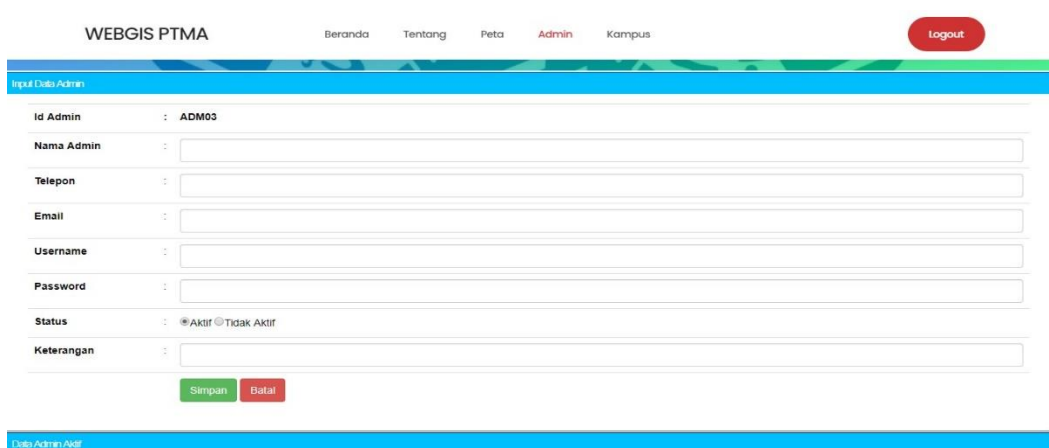
Figure 4.23 CRUD Admin Interface

5.7. Testing

Application testing is carried out in two directions, namely testing carried out by the developer before carrying out the manufacturing process or distributing to the user, and testing for the application will be carried out by the user as a system feasibility, along with an explanation of the discussion of application testing.

5.7.1. Alpha and Beta Application Testing

Testing the Aplha and Beta applications, namely tests carried out by developers and users, this test is carried out using the black box method to check whether every component that has been made in the system has worked and this system process can be seen in Table 4.8.

Table 4.8. Testing System

Tested Menu	Testing	The Result	Information
Main Menu	Click About	Displays a description of the PTMA WebGis challenge	Success
	Click Map	Displays a map containing PTMA deployment markers	Success
	Click Campus Galery	Featuring galleries from campus	Success
	Click Contacts	Displays the contacts from the campus	Success
Login Menu	Login Botton	The button button is used to log into the system, namely admin	Success
	Admin Menu	After the menu is selected, the system will move to admin data processing (CRUD)	Success
	Campus Menu	After the menu is selected, the system will move to campus data processing (CRUD)	Success
	Logout Button	After the logout button is selected, the system will move to the main page	Success
About	University	Once selected, directs to the campus category page	Success
	Institute	Once selected, directs to the campus category page	Success
	Sekolah Tinggi	Once selected, directs to the campus category page	Success

		Once selected, directs to the campus category page	Success
	Polytechnic	Once selected, directs to the campus category page	Success
	Academic	Once selected, directs to the campus category page	Success
Map	*Popup Marker*	After clicking the marker, a description popup will appear	Success
	Direction Marker	After the direction is selected by the user, the system will switch to google maps	Success
Campus Gallery	Picture	After clicking, the image will display a popup	Success
PTMA Category	More Info University	Once selected, display the names of the campuses according to the category	Success
	More Info Institute	Once selected, display the names of the campuses according to the category	Success
	More Info Sekolah Tinggi	Once selected, display the names of the campuses according to the category	Success
	More Info Polytechnic	Once selected, display the names of the campuses according to the category	Success
	Academy More Info	Once selected, display the names of the campuses according to the category	Success
	More Info On Campus The Selected	Once selected, displays detailed information about the potential of the campus	Success
More Info	*Facebook Button*	After the menu is selected by the user, the system will move to the campus facebook	Success
	Twitter Button	After the button is selected by the user, the system will move to the campus twitter	Success
	Website Button	After the button is selected by the user, the system will move to the campus website	Success
	Instagram Button	After the button is selected by the user, the system will move to the Instagram page of the campus	Success
	Telepon Button	After the button is selected by the user, the system will move to the whatsapp API page	Success

	Direction Button	After the button is selected by the user, the system will move to the google maps page to determine the distance	Success
Contact	Contact Menu	After the menu is selected by the user, the system will scroll showing two different contacts from the campus.	Success
	More Info Campus Button	After the button is selected by the user, the system will move to display more information on the potential campus.	Success
	Facebook Button	After the menu is selected by the user, the system will move to campus facebook	Success
	Website Button	After the menu is selected by the user, the system will move to the campus website	Success
	Instagram Button	After the menu is selected by the user, the system will move to campus Instagram	Success
	Whatsapp Button	After the button is selected by the user, the system will move to the whatsapp API page	Success
	Direction Button	After the button is selected by the user, the system will move to the google maps page to determine the distance	Success
	Twitter Button	After the menu is selected by the user, the system will move to campus twitter	Success

5.7.2. System Testing By User

At this stage, the test will be trialled on PTMA WebGis visitors. Researchers distributed testing questionnaires to 50 respondents who visited PTMA WebGis with 4 categories, namely parents, students, students and others. Testing is aimed at system features, whether the system can run or not. This test applies the black box method that focuses on the functionality of a system. The following are the results of the questionnaire calculations on the Likert scale Table 5.9 and 5.10.

Table 5.9 Questionnaire Questions

No.	Pertanyaan	STS	TS	S	SS
1.	Is this PTMA WebGis very easy to use?		1	15	34
2.	Can this PTMA WebGis help you find the campus that you are looking for?		1	13	36
3.	Can the information displayed on this PTMA WebGis help you?			19	31
4.	Does more information about the campus help you find out the potential of each PTMA?			19	31
5.	Can this PTMA WebGis be called a good interface design?			23	27
6	Can the blue dot icon (marker) on the map help you find out which campus point it is?			22	28
7.	Can determining the route (direction) help you find the fast mileage to the chosen campus?			24	26

Questions consist of: 7 pieces, Number of respondents: 50 people, Ideal Score (Number of respondents x

Highest Score) (50 x 4) = 200

Percentage calculation: (Amount (A) / Ideal Score) x 100

Figures 0% - 19.99% = Strongly Disagree (STS)

Figures 20% - 39.99% = Not Suitable (TS)

Figures 40% - 79.99% = Agree (S)

Figures 80% - 100% = Strongly Agree (SS)

The results of the final questionnaire calculation can be seen in table 5.10.

Table 5.10 Final Results of the Questionnaire
PTMA WEBGIS FINAL QUESTIONNAIRE CALCULATIONS

No	Score				N-Max	Total score				Total	Percentage (%)
	1	2	3	4		1	2	3	4		
1	0	1	15	34	200	0	2	45	136	183	91,5
2	0	1	13	36		0	2	39	144	185	92,5
3	0	0	19	31		0	0	57	124	181	90,5
4	0	0	19	31		0	0	57	124	181	90,5
5	0	0	23	27		0	0	69	108	177	88,5
6	0	0	22	28		0	0	66	112	178	89
7	0	0	24	26		0	0	72	104	176	88
Total	0	2	135	213		0	4	405	852	1.261	630,5
Average											**90,07**

CONCLUTION

Based on the results of research, design and discussion, the authors can conclude as follows:

1. This system can provide information on the mapping of Muhammadiyah and 'Aisyiyah (PTMA) campuses in Indonesia and their distribution and provides information describing the strengths of each of the PTMAs in Indonesia.

2. Researchers use google maps api as a support for mapping PTMA in Indonesia to make it more efficient and easier.

3. Researchers have created a PTMA mapping information system in Indonesia based on a geo-geographic information system as supporting information for users based on the results of testing systems that have been tested in alpha and beta testing, where the test applies calculations from the Likert scale which results in an ideal score with 90.07 satisfaction. against the user.

Chapter VI
Research Output

1. Web Base Aplication For PTMA Geografic Information System, dengan URL https://webgisptm.akademi-indonesia.com/

2. Certificate **HAKI** For WEB GIS Program plication

4. Paper Submit in International Conference On Natural Social cience Education (ICNSSE)

5. Full Paper

6. Presenter Setificate in ICNSSE Conference

Copyright Certificate

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KEMENTERIAN HUKUM DAN HAK ASASI MANUSIA

SURAT PENCATATAN

CIPTAAN

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Nomor dan tanggal permohonan	:	EC00202035962, 27 September 2020
Pencipta		
Nama	:	**Dr. Sugema, ST., M.Kom., Atiqah Meutia Hilda, S.Kom., M.Kom. dkk**
Alamat	:	Jl. Sawo Atas No. 7 Rt. 02/ Rw. 07, Gandaria Utara, Kebayoran Baru, Jakarta Selatan, Dki Jakarta, 12140
Kewarganegaraan	:	Indonesia
Pemegang Hak Cipta		
Nama	:	**Dr. Sugema, ST., M.Kom., Atiqah Meutia Hilda, S.Kom., M.Kom. dkk**
Alamat	:	Jl. Sawo Atas No. 7 Rt. 02/ Rw. 07, Gandaria Utara, Kebayoran Baru, Jakarta Selatan, Dki Jakarta, 12140
Kewarganegaraan	:	Indonesia
Jenis Ciptaan	:	**Program Komputer**
Judul Ciptaan	:	**WEB Based Geographic Information System For Mapping The Distributed Of Muhammadiyah And Aisyiah Foundations**
Tanggal dan tempat diumumkan untuk pertama kali di wilayah Indonesia atau di luar wilayah Indonesia	:	25 Agustus 2020, di Fakultas Teknik UHAMKA Jakarta
Jangka waktu pelindungan	:	Berlaku selama 50 (lima puluh) tahun sejak Ciptaan tersebut pertama kali dilakukan Pengumuman.
Nomor pencatatan	:	000205485

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Surat Pencatatan Hak Cipta atau produk Hak terkait ini sesuai dengan Pasal 72 Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta.

a.n. MENTERI HUKUM DAN HAK ASASI MANUSIA
DIREKTUR JENDERAL KEKAYAAN INTELEKTUAL

Dr. Freddy Harris, S.H., LL.M., ACCS.
NIP. 196611181994031001

LOA Artikel pada International Conference On Natural And Social Science Education

LETTER OF ACCEPTANCE

Dear,

Dr. Sugema, M.Kom

Assalamu'alaikum wr wb.

Greetings from ICNSSE 2020: International Conference On Natural And Social Science Education

We are pleased to inform you that your abstract entitled **Mapping Design of Web-Based Muhammadiyah Higher Education and 'Aisyiyah (PTMA) the whole Region Indonesia** has been **accepted** for:

ORAL PRESENTATION

on ICNSSE 2020 (Jakarta, 20 Oktober 2020).

Please kindly completed your payment Rp.300.000,00 transfer to:
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Web-Based Mapping Design of Muhammadiyah and 'Aisyiyah High Education (PTMA) In Indonesia

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Abstract. Muhammadiyah and 'Aisyiyah Universities (PTMA) are educational institutions spread across Indonesia including universities, colleges, institutes, polytechnics and academies. The breadth of Indonesia becomes an obstacle in the dissemination of information and promotion from each Muhamamdiyah and 'Aisyiyah Universities. Therefore, it is needed WebGis PTMA that maps muhammadiyah and aisyiyah universities throughout Indonesia where the system is created using php and mysql and google maps api. The purpose of this research is to facilitate and provide information about Muhammadiyah 'Aisyiyah Universities in Indonesia. The method used by the prototype, which is this method to make it easier to design the mapping system of Muhamamdiyah and 'Aisyiyah Universities by utilizing geographic information systems. Based on the test results from the percentage rate of 90.07% of the 50 respondents, the success of this system is already feasible and meets the category of needs that are.

Keyword: PTMA, Indonesia, Mapping, Web

1. PREFACE

Muhammadiyah Higher Education and 'Aisyiyah (PTMA) are educational institutions that are spread across Indonesia with different types including universities, colleges, institutes and polytechnics. The extent of Indonesia becomes an obstacle in the dissemination of information and promotion of each PTMA. The uneven distribution of PTMA makes the implementation of GIS quite efficient in mapping all PTMAs, in order to know the geographic distribution of PTMA in Indonesia. Prospective students from both Indonesia and from other countries who wish to continue their higher education and the public can find out how many PTMAs are geographically spread across Indonesia. The results of this mapping make prospective students and the community know that PTMA has an existence in the world of education.

Web-based geographic information system (Elly, 2016) or also known as the word WebGis is a solution and alternative to this problem, where the existence of this web can be used as a linking line of information to prospective students, student guardians and the community in finding information about geographically based PTMA. There is a growing need for more efficient and effective GIS implementation in the spread of PTMA in Indonesia. So that prospective students, campus academics, and the public can see the potential of each PTMA after the implementation of the GIS.

PTMA WebGis was carried out, after taking the initial research data using a questionnaire (Appendix 7) to find out how much they knew PTMA in Indonesia with parent and student respondents or prospective students, 50 respondents got the calculation result of 17% Yes (knowing) and 83% Not (not knowing) it can be concluded that there are still many who do not know Muhammadiyah Higher Education and "Aisyiyah in Indonesia,

because the vast area of Indonesia makes many parents or prospective students still do not know the spread of each PTMA in Indonesia along with detailed information.

PTMA information using WebGis is a new way that is able to provide information and data about the intended PTMA in the form of campus facilities, accreditation, the number of lecturers and other information related to campus and WebGis provides information on the route or the fastest way to the location of each destination PTMA. Based on this, the researcher carried out a mapping of Perguruan Muhammadiyah and 'Aisyiyah (PTMA) along with detailed information through WebGis technology mapping and determined and informed the fastest distance that must be traveled to get to the PTMA that the user wanted. To solve this problem, the researcher limits the scope of the problem so that it is more focused and reaches the desired target, namely (a). create a mapping with the Google Maps API, (b). Geographically mapping PTMA, prospective students and the community as the target WebGis users, and (c). Data from the Directory of Muhammadiyah Universities and 'Aisyiyah Majlis Dikti Year 2019.

The PTMA mapping system throughout Indonesia will provide convenience, processing, and information for prospective students and the public, both from Indonesia itself and from other countries. This will become a map of the strength of PTMA in Indonesia. This PTMA system also produces GIS (Geographical Information System) technology with the Google Maps API to be used as a mapping system that provides the fastest and mileage information to the intended PTMA user. So that people in getting information needs about the existence and profile of PTMA in Indonesia. Prospective Students can also represent the distance between PTMAs and know the large number of PTMAs in Indonesia geographically.

2. *STATE OF THE ART*

State of The Art is the highest achievement of a research development process. This study will discuss theories or concepts related to the research topic being discussed.
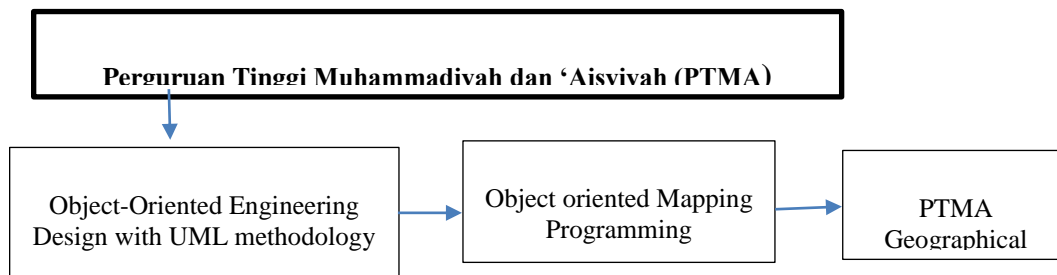
2.1. Kerangka Teori

2.1. Perguruan Tinggi Muhammadiyah dan Aisyiyah (PTMA)

Higher Education Muhammadiyah and 'Aisyiyah (PTMA) are educational institutions spread across Indonesia with different types including universities, colleges, institutes and polytechnics. Based on the guidebook for the recapitulation of PTMA data from the PP Muhammadiyah Diktilitbang Council and the PP Aisyiyah Dikti Council in 2019 is shown in Table 2.1.

Tabel 2.1. Bentuk PTMA

Bentuk	Bentuk PTMA		
	PTM	PTMA	Jumlah
Akademi	10	2	12
Politeknik	4	1	5
Sekolah Tinggi	97	4	101
Institut	5	0	5
Universitas	47	1	48
Jumlah Total	163	8	171

The PP Muhammadiyah Diktilitbang Council and the PP Aisyiyah Dikti Council in 2019 also recapitulated the Study Program Levels in Figure 2.2, Accreditation Value in Figure 2.3. , The number of PTMA Lecturers according to education level is in Figure 2.4., The number of PTMA Lecturers according to the Functional Position in Figure 2.5.
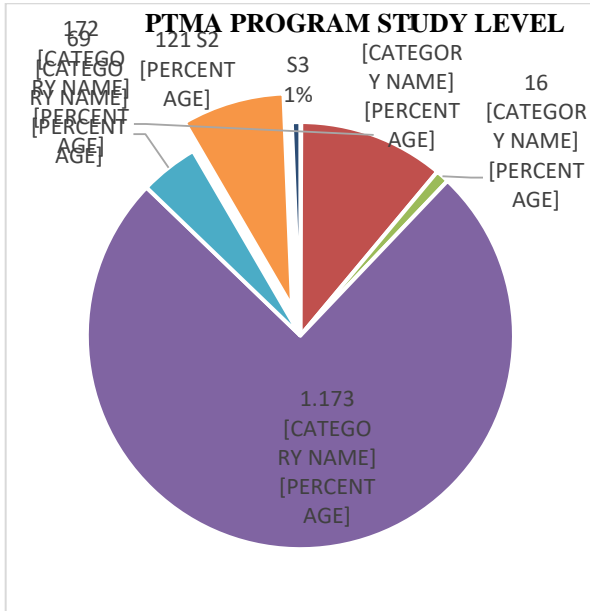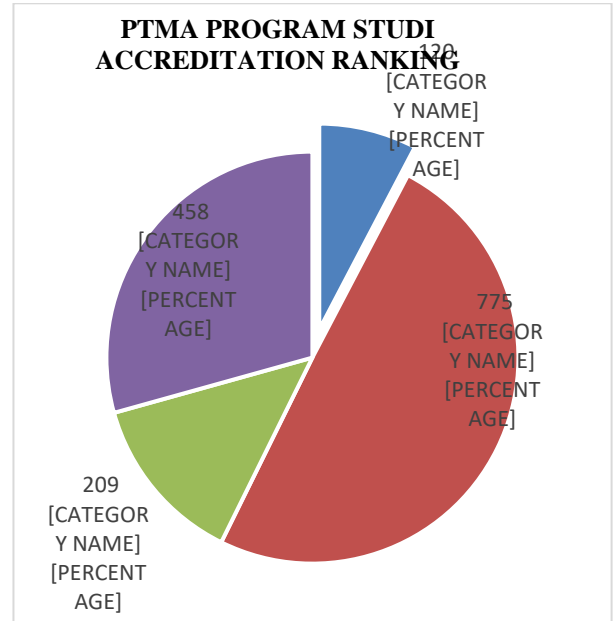
Figure 2.2. Study Program Level
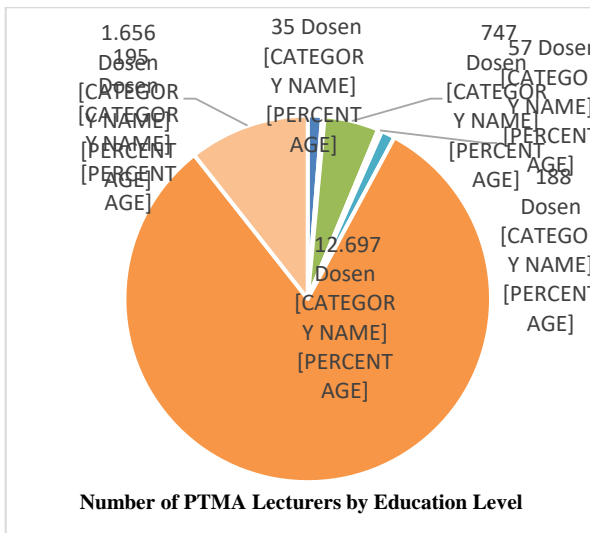
Figure 2.3. Accreditation Score

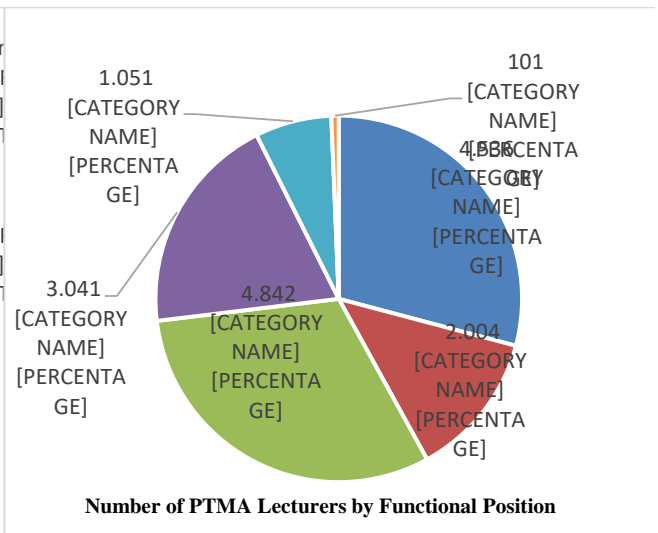Figure 2.4. PTMA Lecturers by Education Level

Figure 2.5. PTMA Lecturers According to Functional Positions

Functional design uses an object-oriented methodology, namely the Unified Modeling Language (UML) methodology, which is a modeling 'language' for systems or software used to document and specify object-oriented (Urva et al., 2015). The designs that are carried out are: (a). Use Case Diagrams: Use Case Diagrams are a type of diagram in UML that describes the interaction or behavior between systems and actors, use case diagrams can also be used to find out what functions are contained in the system (Urva et al., 2015) . Use case diagrams facilitate communication between analysts and users as well as between analysts and clients can be seen in Figure 2.6.
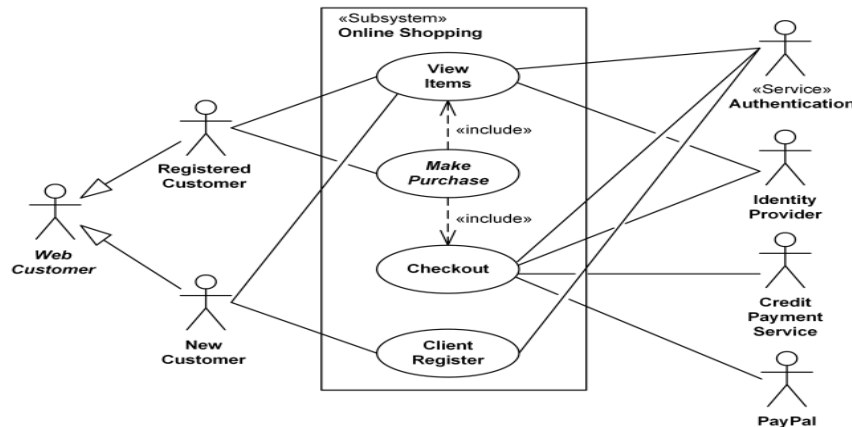
Figure 2.6. General Forms of Use Case Diagrams

Source (www.uml-diagrams.org)

(b). Class Diagram: Class diagram type diagram in UML that is used to display classes and their relationships with other classes in a system, class diagrams display operations and properties in operations (Arifin & Hs, 2017). (c). Activity Diagram: Activity Diagram shows the steps in the work flow and is the control from one activity to another and describes the actions and results (Arifin & Hs, 2017).

Development and facilities from google maps that have complete support, such as business information services, roads, locations, services, and public services (Information & Sig, 2017). By using it, you can use google maps on the website, even though it was previously a javascript API. The Maps API was later expanded to include an API in the Adobe Flash application. The success created by the google maps API gave birth to several competitors including Yahoo! Maps API, Bing Maps Platform, MapQuest Development Platform and OpenLayers (Bangun et al., 2019).

Special information systems that can process spatial (spatial reference) and aspatial (non-spatial) data (Zusrony et al., 2018). Another meaning is a computer system capable of storing, building, processing, analyzing, collecting, distributing and displaying geographically referenced information (District & Based, 2016), for example data identified by location (Bangun et al., 2019).

GIS mostly handles spatial data whose data is geographically oriented, has a certain coordinate system and has two parts that make it different from other data, namely location information (spatial) and descriptive information (attribute) (Indrasmoro, 2013).

Here are some research on mapping. In 2019, Zulfauzi1), Apriander2) conducted a research entitled "Design of a Web-Based Geographical Information System for the Location of BRI Bank ATMs in Lubuklinggau City" (Zulfauzi, 2019). This study conducted an alternative to present information media on the location of BRI Bank ATMs in the city of Lubuklinggau for users. Research in 2016 Adytama Annugerah1), Indah Fitri Astuti2), Awang Harsa Kridalaksana3) entitled "Web-Based Geographical Information Systems Mapping Location of Typical Souvenir Stores in Samarinda" (Annugerah et al., 2016). This research makes it

easy for web users to get information about the location of the store, shop information, goods sold and directions for souvenirs typical of Samarinda. In 2015, Priska Gurantil1), Affandy2) conducted a research entitled "The Google Maps API Application in the Development of a WEB-Based Tourism Geographical Information System (GIS) (Case study: Sidoarjo Regency)" (Kusuma & Budisusanto, 2015). This research combines Web-based GIS technology (WebSIG) with Google Maps API to present information and provide information and provide features so that the people of Sidoarjo regency can participate in tourism development activities in Sidoarjo Regency. In 2014 Fauzan Masykur conducted a research entitled "Implementation of Geographical Information Systems Using Google Maps Api in Mapping Student Origin" (Masykur, 2014). This research with GIS can determine the geographic origins of students who take lectures at the Faculty of Engineering. Produce an overview of where students come from so that the campus knows how well they are known in the community.

In the previous research, the Geographical Information System (GIS) provided information on the location or location of each place, when determining the route, you must first determine the origin and destination differently so that errors do not occur. The difference with previous research is that there is a direction on the marker label to directly determine the distance calculation, and the moving marker label shows each location marker, utilizing the Google Maps API to determine the fastest distance and provide a more dynamic interface.

3. RESEARCH METHODOLOGY

The flow of this research describes the stages of the PTMA mapping process based on Geographic Information Systems. Making the system used is the prototype method, because this method describes the process of the design made by the author by describing the concepts, requirements and models of the system, besides this method is a good path in building communication between users and developers. gradually described. The flowchart for the research methodology is shown in Figure 3.1.
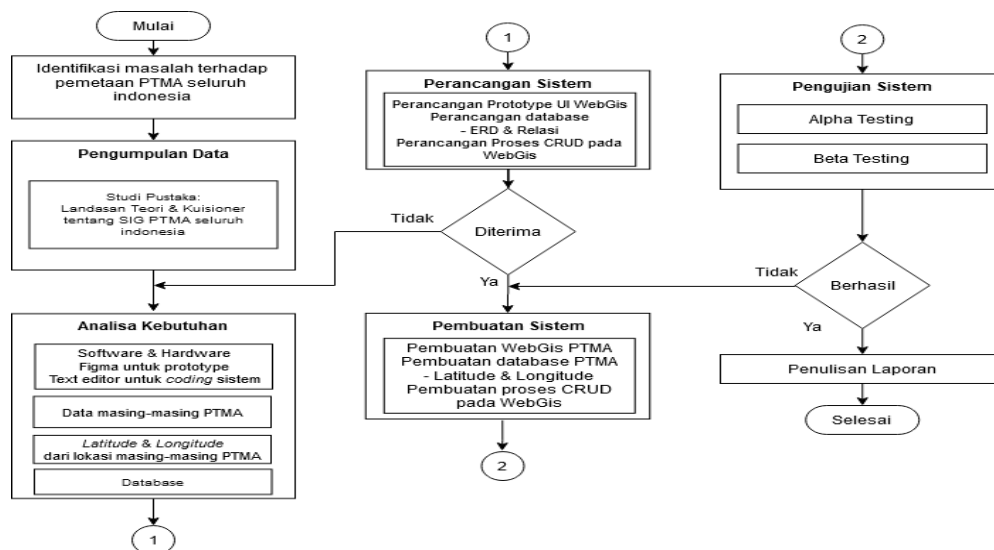
Gambar 3.1. Geographical Information Systems Research Flow for Mapping
Perguruan Tinggi Muhammadiyah dan Aisyiyah (PTMA)

The research begins with the following steps: (A). identification of problems. At this stage the researcher identifies a problem in PTMA mapping, the problem encountered is that the information about PTMA is not evenly distributed in Indonesia, so the implementation of WebGis is an effective step to map the number of PTMA geographically. (B). Data collection: This data collection aims to strengthen and facilitate researchers in system design, namely: literature study to find research relevant to this study, questionnaire, this stage the researcher distributes questionnaires to WebGis. (C). Requirements Analysis: In designing a system to be built, software and hardware are needed to support the creation of PTMA mapping GIS. The tools are:

(1). Hardware: the hardware used in designing GIS applications, are:

  a. Processor : Intel® Core™ i3-4005U CPU @1.70GHz (4 CPUs)- 1.7GHZ
  b. HDD   : 500 GB
  c. RAM   : 4 GB
  d. VGA   : Intel(R) HD Graphics Family

(2). Software: software used for application development as follows:

  a. Sistem Operasi   : Windows 10
  b. Desain *Mockup*   : Figma
  c. Bahasa Pemrograman   : HTML,PHP,JavaScript.
  d. *Text Editor*   : *Visual Studio Code*

(4). Latitude & Longitude: This stage aims to collect each location of each PTMA so that it can be done geographically. Data Attached in ANNEX B. (5). PTMA data: This stage aims to collect all PTMA data, including universities, colleges, institutes, and polytechnics. (6). Database: This stage provides a database that aims to accommodate the requirements for mapping, one of which is latitude and longitude.

(D). Design: System design is done to help facilitate the development process in product design. At the design stage, the design process consists of the design experience (UX) and interface (UI). Experience design creation is processed using the Unified Modeling Language (UML) as a step in modeling a system. This research carried out several design stages, namely: (1). Functional System Design: The system design that is carried out is the main system design or as a whole which is a blue print of the Geographical Information System for Mapping Muhammadiyah and Aisyiyah Universities. Functional design shows the relationship between the guest and the system that represents a user when interacting with the system. The use case diagram is illustrated. The following is an overview of the Use Case diagram shown in Figure 3.2.
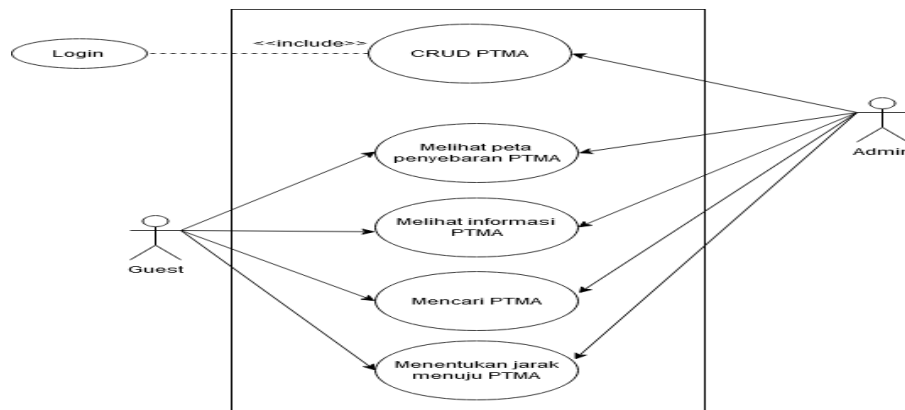
Figure 3.2 Use Case Diagram of Geographical Information System for Mapping

Perguruan Tinggi Muhammadiyah dan Aisyiyah (PTMA)

(2). Database Design with Class Diagrams showing the Database Design that relates each class based on the PTMA Webgis Use Case Diagram. Figure 3.3 is a Class Diagram for PTMA Webgis throughout Indonesia. At this stage, the design of the database design will be carried out, aiming to facilitate the data collection process. This design involves two ways, namely ERD and Relations.
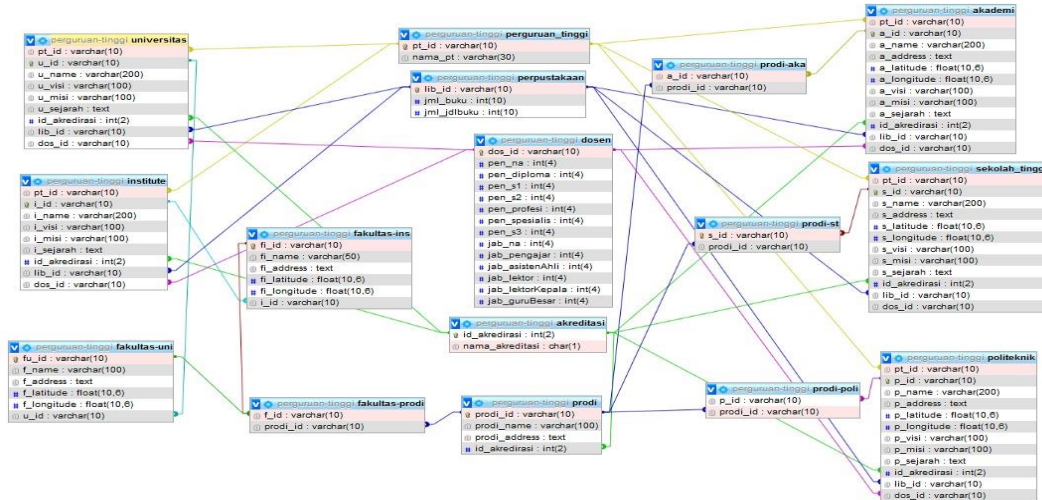
Gambar 3.3. Perancangan Database Class Diagram Webgis PTMA Seluruh Indonesia

(3). CRUD Design: At this stage the CRUD design will be carried out, aiming to find out what requirements can be entered, deleted, and updated in the database.

(4). Designing the Component Diagram in Figure 3.4 shows the Component Diagram design that relates the component requirements for the Webgis PTMA software.
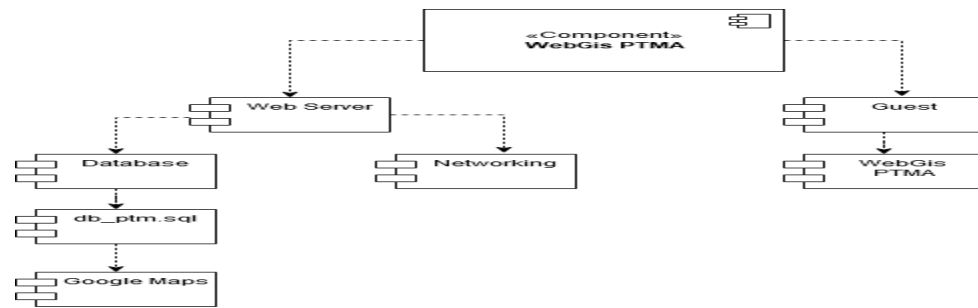
Figure 3.4 Component Diagram of PTMA Webgis

(5) The design of the Deployment Diagram in Figure 3.5 shows the Deployment Diagram that relates the hardware requirements for Webgis PTMA.
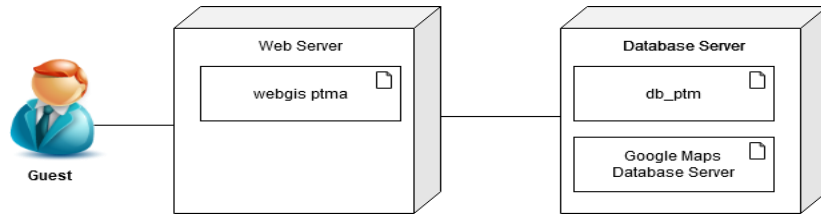
Figure 3.5 Deployment Diagram of PTMA Webgis

(5). Prototype UI: At this stage the design for the User Interface of the PTM mapping system will be carried out. Prototype UI design by describing the MockUp Interface System. Mockup design of the user interface which aims to describe the appearance of the system and the features that are made based on needs. The results of this design are expected to facilitate the implementation of the system created. The following is the interface design of the PTMA WebGis which is shown in Table 3.1

Table 3.1. Interface Design

No.	Design	Information Design
1.	Halaman Utama	This page is the main page of the PTMA WebGis, on this page a search feature is available to find one of the campuses of PTMA

(D). System Development, Performed several stages of making the system, namely: (a). Website Development: At this stage, a GIS-based website is made for PTM throughout Indonesia, in accordance with the UI WebGis prototype and other design processes that have been approved at the system design stage. (b) Database creation: At this stage, a database is created that applies to storing requirements for PTM mapping, including Latitude and Longitude as data to determine location coordinates and data or information held by each PTM. (c) Making a CRUD: At this stage it is made in order to perform data processing, all data will be input using CRUD processing starting from the latitude and longitude as well as information from each PTM.

(E). After the creation of the PTM GIS website has been completed, the next step is to conduct system testing, where there are three types of testing, namely: (a). Alpha Testing: This test is carried out by the researchers themselves to reduce various errors or errors in the system being created. (b) Beta Testing: This test

is carried out by application users, namely students and the community as test targets for the feasibility of the system.

(F). System Implementation: Implementation is the final stage where a system that has been tested can be used and function properly for its users when applied.

(G) Testing: Application testing is carried out in two directions, namely (a). Testing the Aplha and Beta applications, testing is carried out by the developer before carrying out the manufacturing process or distributing it to users. (b). Testing the System by the User, this test is carried out using the black box method to check whether every component that has been made in the system has worked and the system process. At this stage, the test will be trialled on PTMA WebGis visitors. Researchers distributed testing questionnaires to 50 respondents who visited PTMA WebGis with 4 categories, namely parents, students, students and others. Testing is aimed at system features, whether the system can run or not. This test applies the black box method that focuses on the functionality of a system. The following are the results of the questionnaire calculations on the Likert scale table 4.9 and 4.10.

4. RESULTS AND DISCUSSION

This chapter will explain the stages in making a geographic information system for mapping PTMA throughout Indonesia, which aims to simplify the information retrieval process, so that the process that is usually carried out is less effective becomes more effective. The results of this analysis and design are also expected to help prospective students or parents from Indonesia and abroad to get more information. (a). System Interface, Displaying the results of the implementation of the program on the PTMA WebGis in the form of a display built in accordance with the design plan. This section will display the entire interface of the system that has been created. The system interface is done in 2 ways, namely: (1). Main Menu Interface. The main view of the PTMA WebGis applied to map PTMA in Indonesia. This main menu consists of Home, About, Map, Gallery, Contacts and Login. On this page there is also a PTMA search feature and can be seen in Figure 4.1.

Figure 4.1 Main Menu Interface

When Guest selects about menu, map, gallery, and contact will scroll down showing the page from each selected menu. The PTMA WebGis interface can be seen in Figures 4.2, 4.3, 4.4, and 4.5.
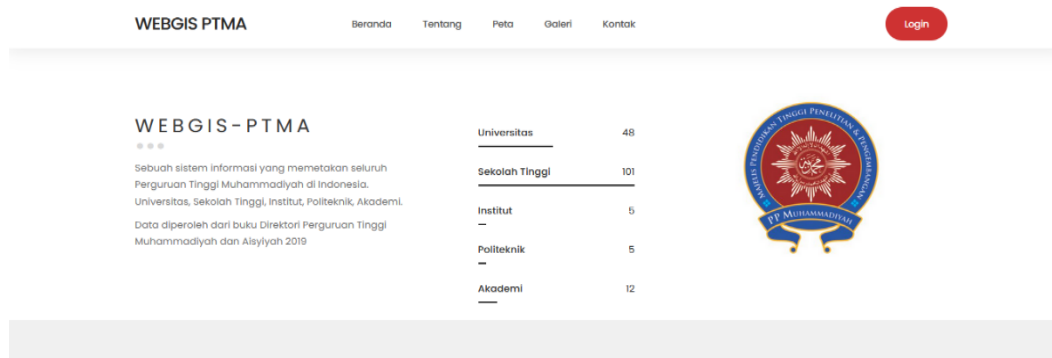
Figure 4.2. Interface About
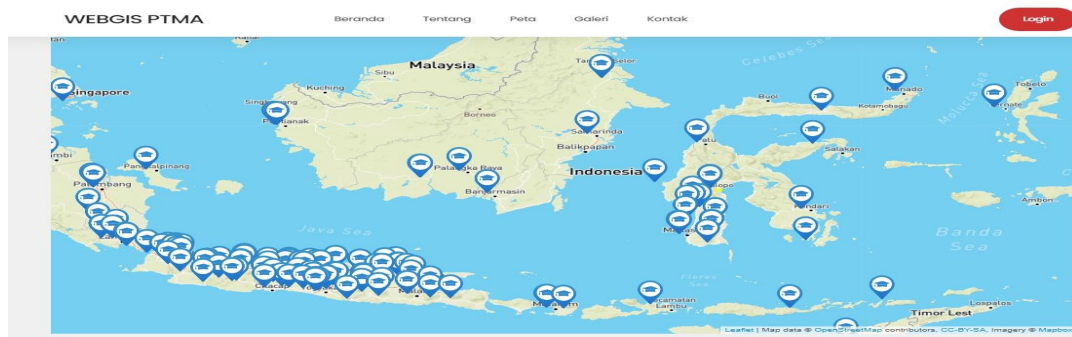
Figure 4.3. Map Interface

Figure 4.4. Campus Gallery Interface
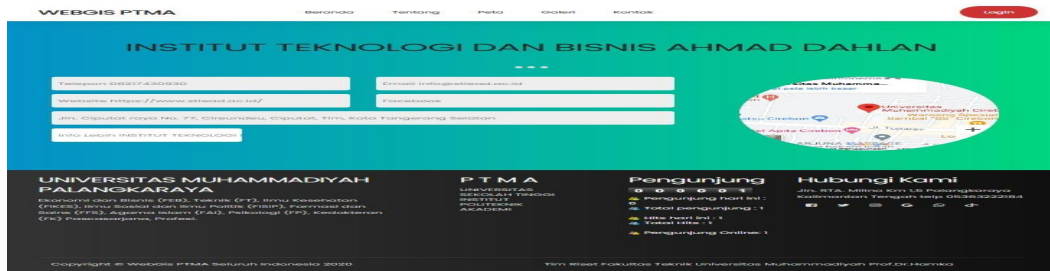
Figure 4.5. Contact Interface

Guest scrolls down to the PTMA Category page after the Gallery page, which will display the interface of the PTMA Category which includes Universities, Institutes, Colleges, Polytechnics, and Academies and if one is selected by pressing more info it will display the names of each campus according to its category. and pressing more info on the selected campus will display information from the campus. The PTMA category display can be seen in Figures 4.6, 4.7, and 4.8.
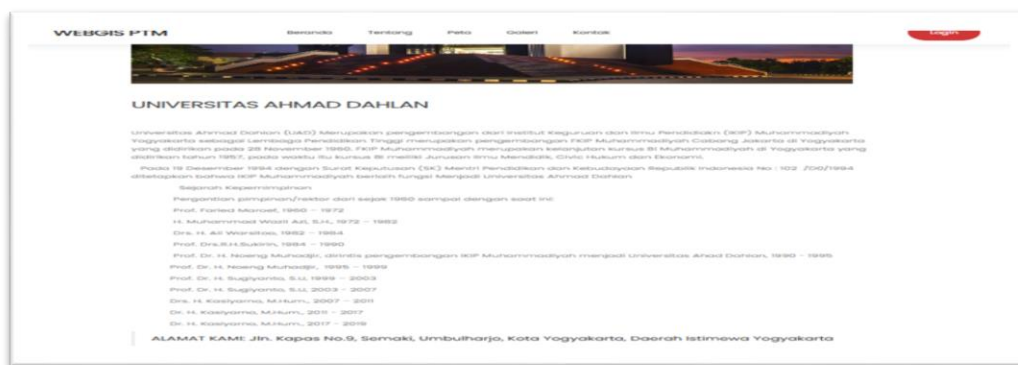
Figure 4.6 PTMA Detailed Interface.

(2). Direction interface, when the Guest selects the direction button or selects direction at the blue point (marker) on the map, it will redirect to the google maps page to see and find the fastest distance to campus. The direction button interface is shown in Figure 4.7, the direction on the map marker is shown in Figure 4.8, and for Google maps is shown in Figure 4.9.
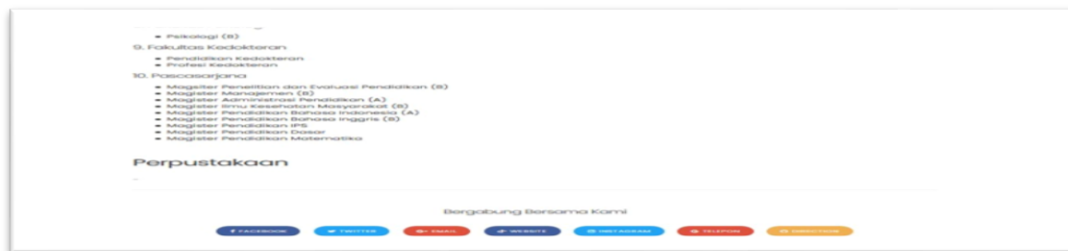
Figure 4.7 PTMA Direction Interface
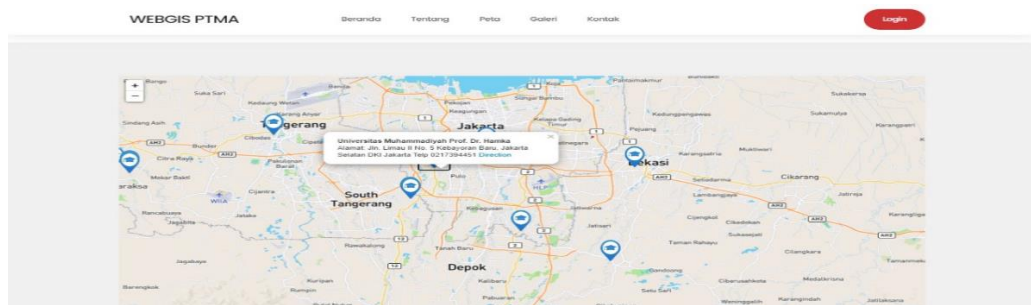
Figure 4.8. PTMA Direction Marker interface display
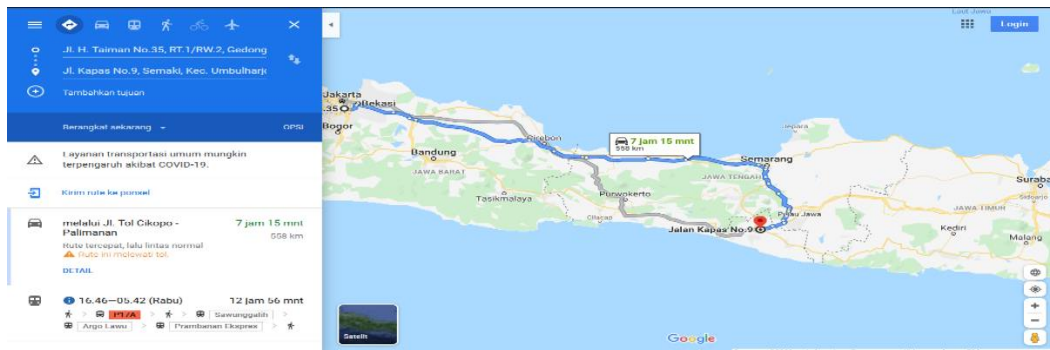
Figure 4.9 The Google Maps interface

(3) Admin interface, when the admin chooses the login button, the system will redirect to a special admin page which is useful for managing admin and campus data. The admin interface is shown in Figures 4.10, 4.11, 4.12.

Figure 4.10 The Admin Login Interface
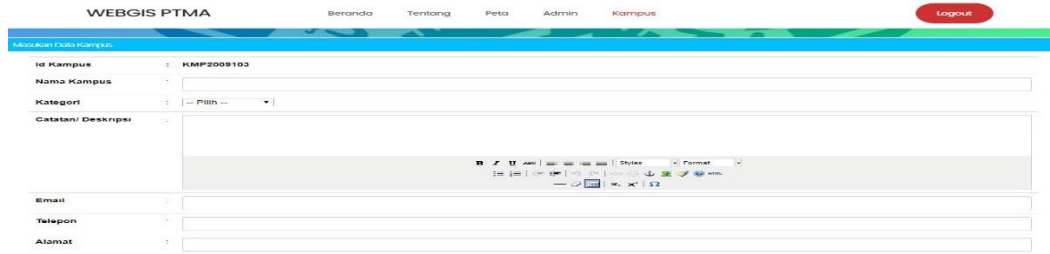
Figure 4.11. Campus CRUD Interface
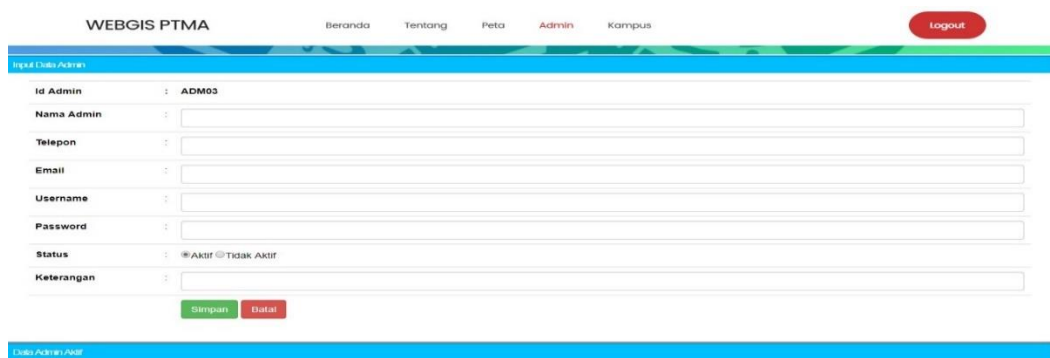
Figure 4.12 CRUD Admin Interface

Tests conducted with Alpha and Beta on the tested menu consisting of the Main Menu, Login Menu, About, Map, Campus Gallery, PTMA Category, More Info and Contacts and all the features in it are successfully displayed. Testing the System by Users from 7 questions and 50 prospective students get an average score of 90.7, so the success of this system is feasible and meets the categories of needs used by users. Table 4.1. Indicates the eligibility level of the PTMA System.

Table 4.1 Final Results of the Questionnaire

PTMA WEBGIS FINAL QUESTIONNAIRE CALCULATIONS

No	Score				N-Max	Total score				Total	Percentage (%)
	1	2	3	4		1	2	3	4		
1	0	1	15	34	200	0	2	45	136	183	91,5
2	0	1	13	36		0	2	39	144	185	92,5
3	0	0	19	31		0	0	57	124	181	90,5

4	0	0	19	31	0	0	57	124	181	90,5
5	0	0	23	27	0	0	69	108	177	88,5
6	0	0	22	28	0	0	66	112	178	89
7	0	0	24	26	0	0	72	104	176	88
Total	0	2	135	213	0	4	405	852	1.261	630,5
Average										**90,07**

Summary

Based on the results of research, design and discussion, the authors conclude as follows: (1). This system can provide information on the mapping of Muhammadiyah and 'Aisyiyah (PTMA) campuses in Indonesia and its dissemination and provides information that describes the strengths of each of the PTMAs in Indonesia. (2). Researchers use the Google Maps API as a support for mapping PTMA in Indonesia to make it more efficient and easier. (3) Researchers have created a PTMA mapping information system in Indonesia based on a geographical information system as supporting information for users based on the results of system testing that has been tested in alpha and beta testing, where the test applies calculations from the Likert scale which results in an ideal score with 90.07 satisfaction against the user.

Acknowledgments

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Chapter VII
Next Step Plan

The next step in the continuation of this research is to continue the development of the PTMA Web GIS system in the form of a Mobile-based application. It was developed with the aim of making it easier for users to use the PTMA WEB GIS system, namely with the concept of being able to access via the user's Mobile Phone.

In terms of data up to date, the PTMA Database will be updated, because every year PTMA conditions are always changing, both in terms of quantitative as well as in terms of PTMA quality. Such as changes in the achievement of Accreditation for Institutions and Study Programs, the occurrence of mergers between Tertiary Education Institutions (Mergers), the addition of PTMA Building Locations and Assets, Changing the form from Higher Education to University, and other data changes.

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APPENDIX 1
Justifikasi Of Research
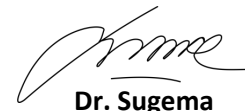
Research Team : Sugema, Atiqah Meutia Hilda, Arry Avorizano, Eka Nana Susanti

NO	DESCRIPTION	COST	
A	**Honorarium fees**		
	Chairman's Communication Fee (Data Package 100,000 x 12 = 1,200,000)	1,200,000	
	Research Member Communication Costs (3 X 100,000 X 12 = 3,600,000)	3,600,000	
B	**Travel and Accommodation Costs**		
1	Travel Expenses Taking Care of Permits and Data Collection	1,526,800	
	Java Region to the Muhammadiyah PPP Muhammadiyah Education Council		
	Jakarta - Jogjakarta (PP)		
2	Lodging Costs Taking care of permits and data collection	700,000	
3	Operational Vehicle Board Costs	500,000	
4	Travel costs for data collection and coordinates		
	Eastern Indonesia Region, Location Sorong, West Papua		
	Jakarta - Sorong	3,800,200	
	Sorong - Jakarta	3,700,200	
5	Eastern Region Data Collection Lodging Costs	1,800,000	
	(3 X 600 000 = 1,800,000)		
6	3-day vehicle rental fee X 500,000 = 1,500,000	1,500,000	
C	**PTMA GIS Web Information System Development Costs:**		
7	Unifind Modeling Language (UML) Design Cost	2,500,000	
8	Class Diagram Design and Database Design Costs	2,500,000	
9	Graphic User Interface (GUI) Design Costs	3,000,000	
10	Programming Fee / Application Coding	4,200,000	
11	Blackbox Testing Fee (System Validity Test)	1,300,000	
12	System Effectiveness Test Cost	1,200,000	
13	Cost of Detailed Data Input for All PTM (4 X 700,000) = 2,800,000)	2,800,000	
14	Cost of Data Collection and Input of MAPS Coordinate Points		
	(2 X 700,000 = 1,400,000)	1,400,000	

NO	DESCRIPTION	COST	
D.	**Consumable Costs**		
15	Purchase of External Storage 1 Tera Byte	1,100,000	
16	EPSON 1170 Printer Ink, Black and Color	250,000	
17	A4 HVS paper (2 reams X 45,000 = 90,000)	90,000	
18	Internet Benefit Rental Fee JLM 10 MBPS (12 months X 234,000)	2,808,000	
E.	**Management costs for issuance of research EXTENSIONS**		
19	IPR fees	600,000	
20	IPR Management Fee	300,000	
21	Article Submit Fee on ICNSSE	306,500	
22	Costs of Article Creation and Translation	750,000	
23	1 TB External Hard Drive Purchase Cost	1,100,000	
24	Final Report Translate Fee	1,200,000	
F	**Management Fee / Meeting and FGD:**		
25	Preparatory Meeting Fee (6 x 150,000 = 900,000)	900,000	
26	FGD I Cost of Task Distribution (6 x 150,000 = 900,000)	900,000	
27	FGD II Cost of Data Collection Plan (6 X 150,000 = 900,000)	900,000	
28	FGD III Cost of Synchronizing Java Region Data (3 X 200,000 = 600,000)	600,000	
29	FGD IV Cost of Synchronizing Eastern Region Data (3 x 200,000 = 600,000)	600,000	
30	FGD V Data Synchronization Wil. Kalimantan (4X1,50,000 = 600,000)	600,000	
31	FGD VI Cost of Coordinate Data Synchronization with DBase (3X150 = 450,000)	450,000	
32	FGD Cost for System Design Development (3 X 200,000 = 600,000)	600,000	
33	Cost of FGD Synchronization Design and Coding (3 x 200,000 = 600,000)	600,000	
34	WEB GIS Application Evaluation Meeting Fee (2 x 200,000 = 400,000)	400,000	
35	Report Preparation Preparation Meeting (4 X 150,000 = 600,000)	600,000	
	Total Biaya Pengeluaran	**52,881,700**	

Jakarta, Des' 2020
Ketua Team

Dr. Sugema

Letter of Agreement for Research Collaboration

MASTER RESEARCH AGREEMENT

BETWEEN

UNIVERSITI TEKNOLOGI PETRONAS

AND

UNIVERSITAS MUHAMMADIYAH PROF DR HAMKA

Sustainable Energy and Smart Community

T H I S   M A S T E R   R E S E A R C H   A G R E E M E N T is made on the   day of   2018 (hereinafter referred to as "**this Agreement**");

BETWEEN	**INSTITUTE OF TECHNOLOGY PETRONAS SDN. BHD.** [Company No. 352875-U], a company incorporated in Malaysia and having its registered address at Tower 1, PETRONAS Twin Towers, Kuala Lumpur City Centre, 50088 Kuala Lumpur, Malaysia (hereinafter referred to as "**ITPSB**") which has been established to manage **UNIVERSITI TEKNOLOGI PETRONAS** (hereinafter referred to as "**UTP**"), a private higher learning institution established under the Private Higher Educational Institutions Act 1996 of the first part;
AND	**UNIVERSITAS MUHAMMADIYAH PROF DR HAMKA** (Decree of Directorate General of Higher Education, Ministry of Education and Culture No. 138 / DIKTI / Kep / 1997), a university located at Jalan Limau II, Kebayoran Baru, Jakarta Selatan, Daerah Khusus Ibukota Jakarta, 12130, Indonesia (hereinafter referred to as "**UHAMKA**") of the second part.

UTP and UHAMKA shall hereinafter be referred to collectively as the "Parties" and individually as the "Party".

WHEREAS

A.   ITPSB has earlier entered into a Memorandum of Understanding (hereinafter referred to as the "MoU") dated 26 March 2018 with The Council of Higher Education Research and Development of Muhammadiyah (hereinafter referred to as the "Council"), which operates under the Central Board of Muhammadiyah.

B.   UHAMKA is one of the Higher Education Institutions under Muhammadiyah and is under the purview of the Council.

C.   ITPSB and the Council are of the view that there are synergistic benefits to be derived from the Parties' collaboration. Therefore, pursuant to and as part of the implementation of the MoU, ITPSB and UHAMKA have agreed to collaborate to further develop the knowledge and expertise of both parties in relation to a general research theme in particular "**Sustainable Energy and Smart Community**" (hereinafter referred to as "Research") comprising of fourteen (14) projects (hereinafter referred to as "Project(s)") as further detailed out in this Agreement.

D.   The Parties hereby agree to enter into this Agreement for the purposes of establishing a framework of the collaboration for defining the principles, philosophy and obligations of each Party, particularly in respect of the Project(s) which includes establishing a framework for each Project.

NOW IT IS HEREBY AGREED AS FOLLOWS:

CLAUSE 1 – DEFINITIONS AND INTERPRETATIONS

1.1   In this Agreement, unless the context otherwise requires: -

"**Agreement**" means this Master Research Agreement, including the recitals, schedules and addendums which forms an integral part of this agreement and which may be

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amended, varied, supplemented or otherwise modified at any time or from time to time by mutual agreement in writing between the Parties.

"**Background Information**" means all technical data, information (including confidential information), drawings, designs, operating experience and procedures, techniques, know-how and other knowledge in any form, including Intellectual Property relating to technology owned or possessed by each Party at the date of commencement of this Agreement.

"**Intellectual Property**" means

(a)   Inventions; manner, method or process of manufacture; method or principle of construction; or design; plan, drawing or design; or scientific, technical or engineering information or document;

(b)   Improvement, modification or development of any of the foregoing;

(c)   Patent, application for a patent, right to apply for a patent or similar rights for or in respect of any intellectual Property referred to in paragraph (a) or (b);

(d)   Trade secret, know-how, confidential information or right of secrecy or confidentiality in respect of any information or document or other intellectual Property referred to in paragraph (a) or (b);

(e)   Copyright or other rights in the nature of copyright subsisting in any works or other subject matter referred to in paragraph (a) or (b);

(f)   Registered and unregistered trademark, registered design, application for registration of a design, right to apply for registration of a design or similar rights for or in respect of any work referred to in paragraph (a) or (b);

(g)   Any Intellectual Property in addition to the above which falls within the definition of intellectual property rights contained in Article 2 of the World Intellectual Property Organisation Convention of July 1967; and

(h)   Any other rights arising from intellectual activities in the scientific, literary or artistic fields,

Whether vested before or after the date of this Agreement and whether existing in Malaysia or otherwise and for the duration of the rights.

Project(s) means the fourteen (14) research and development projects undertaken by the Parties jointly by virtue of this Agreement.

Research refers to the general research theme entitled "Development of Low Carbon Technologies for Sustainable Built Environment" undertaken by the Parties jointly.

1.2   Any word (including a word defined or given a special meaning) denoting the singular shall include the plural and vice versa.

1.3   Any word denoting one gender only shall include each other gender.

1.4   A reference to a person shall include a corporation as well as a natural person.

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1.5   A reference to a Schedule is a reference to a Schedule to this Agreement.

CLAUSE 2 – COLLABORATION

2.1   In this collaboration between UTP and UHAMKA, both Parties shall carry out research collaboration activities in relation to the general theme of "**Sustainable Energy and Smart Community**" (hereinafter referred to as the "Research").

2.2   The Parties undertake to provide the following research funding (hereinafter referred to as the "Funding") for the purposes of implementing the Research:

(a)   UTP shall provide seven (7) research grants of Malaysian Ringgit Twenty-Two Thousand Only (MYR22,000) per research grant to UHAMKA to perform the Project(s) (Total Amount of MYR154,000)

(b)   UHAMKA shall provide seven (7) research grants of Indonesian Rupiah Seventy Eight Million Only (IDR78,000,000) per research grant to UTP to perform the Project(s) (Total Amount of IDR546,000,000)

2.2   The Parties further agree to establish and record in this Agreement the following fourteen (9) research and development Project(s) which will be led by UTP and UHAMKA respectively, and the amount of research funding allocated for each Project:

Research Area	Project ID	Lead Institution	Grant Amount
Gas Sensor	UTP1	UTP	IDR78,000,000
	UHAMKA1	UHAMKA	MYR22,000
Advanced Material	UTP2	UTP	IDR78,000,000
	UHAMKA2	UHAMKA	MYR22,000
Chemistry/ Molecular Modelling	UTP3	UTP	IDR78,000,000
	UHAMKA3	UHAMKA	MYR22,000
Software/Data Analytics	UTP4	UTP	IDR78,000,000
	UHAMKA4	UHAMKA	MYR22,000
Brain Response	UTP5	UTP	IDR78,000,000
	UHAMKA5	UHAMKA	MYR22,000
Learning Assessment	UTP6	UTP	IDR78,000,000
	UHAMKA6	UHAMKA	MYR22,000
Mapping & Image Processing	UTP7	UTP	IDR78,000,000
	UHAMKA7	UHAMKA	MYR22,000

2.3   The Parties agree that the details of each of the above Projects shall be affected in the form of an Addendum(s) in accordance to the format set out in Schedule A.

CLAUSE 3 – GENERAL RESPONSIBILITIES OF THE PARTIES

In consideration of and subject to the terms of this Agreement and all applicable laws, the Parties shall carry out their respective responsibilities in accordance with the provisions of this Agreement.

3.1   The Parties shall conduct and perform the Project(s) under this Agreement with due care, diligence and efficiency and in conformity with sound scientific, management and financial practice in respect of personnel and property of the Parties and in respect of the environment in which the activity is performed.

3.2   The Parties shall at all times undertake the Project(s) in such a manner as to always safeguard and protect the Parties' mutual interests and the Parties shall further take all necessary and precautionary steps to prevent abuse or uneconomical use of facilities and equipment, made available by the Parties.

3.3   Each Party shall exercise their duties in good faith, transparency and accountability with regards to the conduct of the Project(s) and further undertakes to ensure that the channels of communication between each Party shall remain open to ensure the success of the Project(s).

3.4   The Parties recognise that it is impracticable to make provisions in this Agreement for every contingency that may arise in the course of performance and implementation of the Project(s) and accordingly agree that it is their mutual intention that this Agreement shall operate between them with fairness and equity and if in the course of performance and implementation thereof unfairness to a Party is disclosed or foreseen then the Parties shall use their best endeavour to mutually agree upon such action as may be necessary to fairly and equitably remove the cause or causes of the same.

CLAUSE 4 – INTELLECTUAL PROPERTY

4.1   For the purpose of the Project(s):

    (a)   Background Intellectual Property Rights
        Background Intellectual Property Rights shall include any Intellectual Property Rights that are made available as between the Parties, and which may include Background Information, which are to be used for the Project(s), subject to discussion and mutual agreement between the Parties. Background Intellectual Property Rights shall remain the separate property of the Party making such Background Intellectual Property Rights available.

    (b)   Foreground Intellectual Property Rights
        Foreground Intellectual Property Rights shall include any Intellectual Property Rights that arise, or are obtained or developed, created, written, prepared and discovered jointly by the Parties, arising or otherwise brought into existence pursuant to this Agreement.

4.2   The ownership of all Foreground Intellectual Property Rights arising out of the Project(s) shall be expressly subject to a Joint Development Agreement to be mutually agreed by the Parties.

4.3   The provision of this Clause 4 shall survive the expiry or termination of this Agreement.

CLAUSE 5 – CONFIDENTIALITY

5.1   The Parties agree that the Project(s) may involve the disclosure of certain confidential information of the respective Parties. For the purpose of the Project(s), the term "Confidential Information" refers to any and all information including but not limited to data and information pertaining to curricula, courses, syllabi, teaching materials, research activities and technical information made available by a Party ("Disclosing Party") to the other Party ("Receiving Party") during the course of the Project (s).

5.2   All Confidential Information shall be marked or identified as "CONFIDENTIAL" in writing and in a conspicuous manner at the time it is disclosed to the Receiving Party.

5.3 All Confidential Information disclosed to or provided by or on behalf of the Disclosing Party pursuant to this Agreement may not be disclosed, published, used or in any way exploited or permitted to be disclosed, published, used or exploited by the Receiving Party to any third party or re-produced for any purpose other than for the Project(s) without first obtaining the prior written approval of the Disclosing Party.

5.4 The obligations under this Clause 5 shall extend to and bind all of the Receiving Party's officers, directors, employees, advisors, contractors, sub-contractors, consultants, agents or representatives to whom the Confidential Information and/or document or documents in which it is contained is made available except where the Confidential Information is in or has come into the public domain otherwise than by the default or negligence of either Party or is required to be disclosed by any governmental or other authority or regulatory body to such extent only as is necessary for that purposes or as is required by law.

5.5 The confidentiality obligations under this Clause 5 shall survive the expiry of this Agreement for a period of two (2) years.

CLAUSE 6 – RELATIONSHIP OF THE PARTIES

Nothing in this Agreement shall be construed as establishing or creating a partnership or a relationship of master and servant between any of the Parties hereto or as constituting any party as an agent or representative of the other Party for any purpose or in any manner whatsoever.

CLAUSE 7 – TERMINATION

7.1 If any party commits any of the conditions stated below, then, affected party shall be entitled to terminate this Agreement by serving a notice to that effect:

7.1.1 any party becomes insolvent or is unable to pay its debts when due or admits in writing its inability to pay its debts; or

7.1.2 any party enters any arrangement or composition with its creditors generally, or a receiver or manager is appointed; or

7.1.3 any party goes into liquidation or passed a resolution to go into liquidation, otherwise than for the purpose of reconstruction; or

7.1.4 any party fails to comply with any of the obligations under this Agreement.

7.2 The notice to terminate in the case of sub-clauses 7.1.1 to 7.1.3 shall not be less than twenty-one (21) days, save for in the case of sub-clause 7.1.4, whereby the notice to terminate shall take effect only after the affected party first giving twenty-one (21) days' notice in writing to the defaulting party to remedy a default, and where such default is not remedied in that period, upon giving not less than further twenty-one (21) days' notice of termination.

7.3 Upon termination of this Agreement, shall be without prejudice to the rights of the party terminating to seek and obtain damages for any breach of this Agreement by the other party.

CLAUSE 8 - FORCE MAJEURE

Both Parties shall not be held liable for delays or failures to perform that result from events or circumstances beyond the reasonable control of either Party and in particular, any failure by either to carry out its obligations as set out in Clause 3 above.

CLAUSE 9 – PUBLIC STATEMENT

Both Parties agree that no public statement shall be made on the Research and Project(s), or in relation to any products, processes or inventions developed as a result of the Research and Project(s) unless approved first by both Parties.

CLAUSE 10 – ASSIGNMENT

This Agreement shall not be assigned in whole or in part by either Party without the prior written consent of the other.

CLAUSE 11 – WAIVER

11.1   The waiver by a Party in respect of any breach of a term of this Agreement by the other party shall not be deemed to be a waiver in respect of any other term or of any subsequent breach of that term.

11.2   The failure of a Party to enforce at any time any term of this Agreement shall in no way be interpreted as a waiver of such term.

CLAUSE 12 – NOTICES

12.1   Any notice required to be given pursuant to this Agreement shall be in writing and may be delivered or posted by ordinary mail, postage prepaid, to the Party to which such notice is required to be given under this Agreement at the address set out in **Schedule B**.

12.2   The addresses referred to in sub-clause 12.1 may, from time to time, be changed by written notice.

12.3   Any notice given under this clause by post shall be deemed to have duly served at the expiration of three (3) clear days (i.e. excluding weekends or public holidays) after the time of such posting and production of any official post office receipt showing the time and date of posting shall be conclusive evidence of the time and date of posting.

CLAUSE 13 – ENTIRE AGREEMENT

The terms of the Agreement between the Parties are those set out in this Agreement and the Schedules and no written or oral agreement or understanding made or entered into prior to the date of this Agreement shall in any way be read or incorporated into this Agreement.

CLAUSE 14 – SUCCESSORS-IN-TITLE

This Agreement shall be binding on the respective heirs, personal representatives, receivers, successors-in-title and assigns of the Parties hereto.

CLAUSE 15 – AMENDMENT/MODIFICATION

Any provision of this Agreement may be amended or modified by mutual consent between the Parties and such amendment/modification shall be in writing and signed by the duly authorised representative of the Parties.

{End of Clauses}

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be signed in their respective names as of the day and year first above written.

Signed by and on behalf of:
INSTITUTE OF TECHNOLOGY PETRONAS SDN. BHD.

....
Professor Dr. Mohamed Ibrahim Abdul Mutalib
Vice Chancellor and CEO

In the presence of:

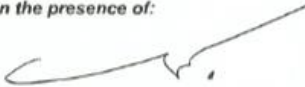..
Professor Ir. Dr. Mohd. Shahir Liew
Deputy Vice Chancellor Research and Innovation

Signed by and on behalf of:
UNIVERSITAS MUHAMMADIYAH PROF DR HAMKA

....
Prof. Dr. H. Suyatno, M.Pd
Rektor

In the presence of:

....
Prof. Dr. H. Gunawan Suryoputro, M.Hum
Wakil Rektor I

UNIVERSITAS MUHAMMADIYAH PROF. DR. HAMKA
LEMBAGA PENELITIAN DAN PENGEMBANGAN
Jl. Raya Bogor Km. 23 No. 99, Pasar Rebo, Jakarta Timur 13830
No. HP. +628129675763/+6281219190592

SURAT PERJANJIAN KONTRAK KERJA
KEGIATAN PENELITIAN KERJASAMA INTERNASIONAL
ANTARA
UNIVERSITAS MUHAMMADIYAH PROF. DR. HAMKA (UHAMKA) INDONESIA
DENGAN
UNIVERSITI TEKNOLOGI PETRONAS (UTP) MALAYSIA

Nomor : 303/F.03.07/2019
Tanggal : 26 Maret 2019

Bismillahirrahmanirrahim,
Assalamualaikum Warrahmatullahi Wabarakatuh

Pada hari ini selasa, dua puluh enam maret tahun dua ribu sembilan belas yang bertanda tangan di bawah ini **Prof. Dr. Hj. Suswandari, M.Pd** Ketua Lembaga Penelitian dan Pengembangan Universitas Muhammadiyah Prof. Dr. HAMKA, selanjutnya disebut sebagai **PIHAK PERTAMA** dengan **Dr. Sugema, ST., M.Kom.** Dosen Tetap Universitas Muhammadiyah Prof. Dr. HAMKA Program Studi Teknik Elektro sebagai Ketua Tim Peneliti, selanjutnya disebut sebagai **PIHAK KEDUA.**

PIHAK PERTAMA dan **PIHAK KEDUA** telah sepakat, menyetujui dan berkomitmen tinggi untuk mengadakan kontrak kerja kegiatan penelitian kerjasama internasional sebagai tindak lanjut dari *Memorandum of Understanding between* UNIVERSITI TEKNOLOGI PETRONAS AND UNIVERSITAS MUHAMMADIYAH PROF. DR. HAMKA pada bulan November 2018 dan ditandatangani di Jakarta pada bulan November 2018.

Pasal 1
PIHAK KEDUA siap dan berkomitmen tinggi untuk melaksanakan kegiatan penelitian dengan judul: *The Implementation of K-Mean Clustering Method for the Mapping Level of Muhammadiyah Higher Educations.*

Pasal 2
Kegiatan tersebut dalam Pasal 1 akan dilaksanakan **PIHAK KEDUA** selama dua belas bulan mulai tanggal 1 April 2019 dan selesai pada 30 Maret 2020.

Pasal 3
PIHAK PERTAMA atas nama Universitas Muhammadiyah Prof. Dr. HAMKA menyediakan dana sebesar IDR 75,790,000 (terbilang: *tujuh puluh lima juta tujuh ratus sembilan puluh ribu rupiah*) setara dengan MYR 22,000 (terbilang: *dua puluh dua ribu ringgit malaysia*) untuk melaksanakan kegiatan tersebut sebagaimana Pasal 1 dengan sumber biaya dari RAPB Universitas Muhammadiyah Prof. Dr. HAMKA melalui Lembaga Penelitian dan Pengembangan Tahun Anggaran 2018-2019 dan sumber lain yang telah disebutkan dalam MoU dalam penelitian kerjasama internasional ini.

Pasal 4

Pembiayaan kegiatan penelitian meliputi kegiatan sebagai berikut:

1. Kegiatan penelitian secara menyeluruh sesuai dengan judul yang telah disepakati.
2. Pengambilan data.
3. *Staff mobility* selama 2 minggu.
4. *Student mobility* selama 2 bulan terkait dengan proses penelitian yang dilaksanakan.
5. Publikasi hasil penelitian pada jurnal internasional bereputasi.
6. Penguatan data untuk akreditasi.

Pasal 5

Dana penelitian di-*breakdown* sebagai berikut:

1. Kegiatan penelitian secara menyeluruh sesuai dengan judul yang telah disepakati sebesar IDR 37,895,000 (terbilang: *tiga puluh tujuh juta delapan ratus sembilan puluh lima ribu rupiah*) setara dengan MYR 11,000 (terbilang: *sebelas ribu ringgit malaysia*).
2. Pengambilan data sebesar IDR 3,445,000 (terbilang *tiga juta empat ratus empat puluh lima ribu rupiah*) setara dengan MYR 1,000 (terbilang: *seribu ringgit malaysia*).
3. *Staff mobility* selama 2 minggu sebesar IDR 17,225,000 (terbilang: *tujuh belas juta dua ratus dua puluh lima ribu rupiah*) setara dengan MYR 5,000 (terbilang: *lima ribu ringgit malaysia*).
4. *Student mobility* selama 2 bulan terkait dengan proses penelitian yang dilaksanakan sebesar IDR 10,335,000 (terbilang: *sepuluh juta tiga ratus tiga puluh lima ribu rupiah*) setara dengan MYR 3,000 (terbilang: *tiga ribu ringgit malaysia*).
5. Publikasi hasil penelitian pada jurnal internasional bereputasi sebesar IDR 6,890,000 (terbilang: *enam juta delapan ratus sembilan puluh- ribu rupiah*) setara dengan MYR 2,000 (terbilang: *dua ribu ringgit malaysia*).

Pasal 6

Pembayaran dana tersebut dilakukan dalam dua termin, dengan nilai kerjasama sebagai berikut:

1. Tahap pertama sebesar 70%.
2. Tahap kedua sebesar 30%.

Pasal 7

PIHAK KEDUA wajib melaksanakan kegiatan penelitian kerjasama internasional ini dalam waktu yang sudah ditentukan dalam Pasal 2.

Pasal 8

PIHAK PERTAMA akan melakukan monitoring dan evaluasi pelaksanaan kegiatan penelitian kerjasama internasional ini dalam bulan ke tujuh dengan capaian minimal 70%.

Pasal 9

PIHAK PERTAMA akan melakukan sanksi denda kepada **PIHAK KEDUA** dalam setiap hari keterlambatan penyerahan laporan hasil penelitian sebesar 0,5 persen dan maksimal 20 persen dari total dana sebagaimana tersebut dalam Pasal 3.
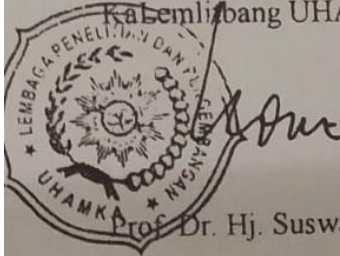
Pasal 10

Dana penelitian dikenakan Pajak Pertambahan Nilai pada poin honor peneliti sebesar 5%. Besaran honor peneliti dapat dilihat pada usulan yang diajukan dalam proposal.

Wassalamualaikum Warrahmatullahi Wabarakatuh

Jakarta, 26 Maret 2019

PIHAK PERTAMA
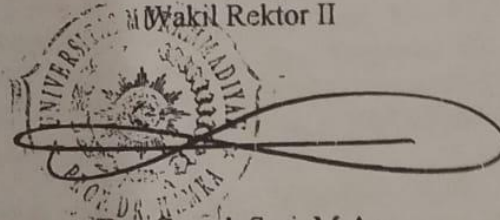Ka.Lemlitbang UHAMKA

Prof. Dr. Hj. Suswandari, M.Pd.

PIHAK KEDUA
Peneliti

Dr. Sugema, ST., M.Kom.

Menyetujui
Wakil Rektor II

Drs. Zamah Sari, M.Ag.

Kepada

Yth. Ketua Lembaga Penelitian

Universitas Muhammadiyah Prof.DR.HAMKA

Assalamualaikum Warahmatullahi Wabarakatuh,

Teriring Doa Semoga Bapak/Ibu selalu sukses dalam menjalankan tugas sehari hari. Aamiin

Selanjutnya kami Menyampaikan Laporan Akhir Penelitian Hibah / Kolaborasi UHAMKA dengan UTP. Kami Team Riset Kolaborasi dari Fakultas Teknik yang terdiri dari

  Ketua : Dr. Sugema, M.Kom.
  Anggota : Atiqah Meutian Hilda, M.Kom
       Arrry Avorizano, M.Kom
       Eka Nana Susanti, M.Pd

Melaporkan bahwa terjadi keterlambatan dalam pelaksanaan dan pelaporan Riset ini dikarenakan kami menemui kendala-kendala sebagai berikut :

1. Diawal MOU kami mengalami kendala, Ketua Tim Riset dari UTP memasuki Usia Pensiun sehingga beliau mengundurkan diri dan digantikan oleh Dr.Shuib, pergantian tsb mengakibatkan ada jeda dalam implementasi risetnya.
2. Dalam hal Program Student Mobility dan Staf Exchange yang semula direncanakan bulan Februari 2020, ternyata diluar dugaan datangnya Pandemi Covid-19, sehingga semua rencana Student Mobility dan Staf Exchange menjadi tertunda, selanjutnya direncanakan kembali bulan oktober 2020, namun Pandemi belum berakhir juga, dan akhirnya Gagal untuk melakukan Student Mobility dan Staf Exchange.
3. Dalam hal Kolaborasi, semula Tim FT UHAMKA yg Memanage Database dan penentuan Koordinat Latitude dan Longutude, sedangkan UTP Mendesain WB GIS nya, tetapi setelah sistem jadi, kami tidak bisa mendapatkan Source Code nya sehingga sulit untuk dikembangkan oleh tim FT UHAMKA, dan Link hosting dari UTP sudah expire. Sehingga kami memutuskan Untuk Mendesain Ulang dan membuat ulang WEB GIS PTM ini.
4. Pubilikasi pada journal internasional sedang dalam proses, akan tetapi sudah dipresentasikan pada Seminar Internasional ICNSSE.

Demikian Kendala yang kami alami selama ini, semoga segera mendapat solusinya dan segera dapat terselesaikan.

Atas Perhatian dan kerjasamanya, kami ucapkan Terima kasih.

            Jakarta, 1 Februari 2021

            Ketua Team,

            Dr. Sugema, M.Kom