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Design of Geographic Information System Based on Android for Culinary Tourism in Pedan District, Indonesia

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Abstract
Pedan City is a sub-district city located in the Klaten Regency area and has always been a culinary tourism object for tourists or residents in the Pedan area and its surroundings. The main problem that arises is when there are more and more culinary attractions in the city of Pedan sub-district, but there is less detailed information about these culinary attractions. The main objevtive of this work is to provide location information tourism in the Pedan area easily and simply because it can be operated anywhere the user is using an android-based mobile device. The method used in this research is the Waterfall method. The results of the study are expected to increase culinary tourism in the city of Klaten district, especially Pedan sub-district, as well as interest for tourists or residents in the city of Pedan sub-district to be interested in visiting culinary tourism objects in the Pedan city area

Keywords: Geographic Information System, Android, Culinary Tourism

1. Introduction

The millennium 4.0 era, which is growing towards the current 5.0, makes people think rationally, how important is technology, which guides all human activities to be able to do everything effectively and efficiently. Everything related to technology must be related to information. In fact, almost all fields of human work require information technology and internet technology, as a result of advances in science and technology (Yadav et al., 2020; Kuncoro et al., 2020; Saleh and Dewi, 2020).

The current trend of technological development is mobile-based technology. Smartphone is a mobile technology that has an Android-based operating system, which is currently very familiar and popular in the community (Minghua et al., 2011; Ambarwulan and Muliyati, 2016; Sadiah, 2020). The development of mobile technology currently leads to online business applications that are currently mushrooming in cyberspace, to how to implement these applications with webs and android-based geographic information systems (Baliga et al., 2019; Fernando et al., 2019; Putra et al., 2020).

The development of information, communication and geographic technology has made geographic information systems develop quite rapidly in the business world, especially supported by internet connections that are getting easier at higher speeds so that the implementation of geographic information systems is easier to use, from Web-based applications to now mobile-based (Boyda et al., 2019; Wang and Xie, 2018; Graser et al., 2019). One of the fundamental uses of GIS is the ability to determine the position and location of an address. The synergy between the internet and GIS makes GIS as a tool designed to obtain, store, repair, manipulate, analyze, and display all forms of geographically referenced information that is easier to use with internet technology (Muray, 2021; Kirby et al., 2017). However, not all information provided to the public is always correct, accurate and easily understood by the public. Therefore, people must sort out the information they get themselves so that the information they receive can be useful and make their work easier, not the other way around.

Geographic Information System (GIS) is an information system based on spatial data and represent objects on earth (Antoniou et al., 2018; Fenais et al., 2019; Jia et al., 2017). In GIS itself, information technology is a device that helps in storing data, processing data, analyzing data, managing data and presenting information. GIS is a computerized system that helps in maintaining data about the environment in the geographical field. GIS always has a relationship

with the scientific discipline of Geography, it has a relationship with disciplines relating to those on the earth's surface, including regional planning and architecture. The use of computers is always associated with various things, one of which is in finding information about a location. However, some people are still struggling to find this information. If the process is carried out using a programming application, then the process will be more effective and efficient.

Currently GIS has been widely used in various fields ranging from natural resource management, telecommunications, spatial planning, transportation, property, health, natural disasters, education, and marketing that displays detailed geographic information systems through maps (Gassar and Cha, 2021; Salehi and Ahmadian, 2017). In determining the components of the location of a place, usually look at the strategic side, tourism, culinary and others. One of the presentations of location information in the form of data or information associated with the internet and GIS. Pedan sub-district has a wide variety of cuisines, both types of restaurants, caffee, souvenir centers and so on. So far, culinary lovers seek information by asking local people and looking for that information on websites, for example culinary tourism in Pedan sub-district with pictures and addresses. When talking about and showing a place, or a location where culinary tourism is located, what is often obtained is only limited to street names and directions or regional characteristics, while the clarity of the location is not mapped, so it does not support people to come to Pedan and have culinary tours. This manual method is less effective. And Geographic Information System information in the field of culinary tourism which is presented in the form of data or information associated with the geographical conditions of an area which is often known as GIS

2. Methodology

2.1 Determination of the sampling location

The location of the research implementation is in the city of Pedan sub-district, Klaten Regency, Central Java Province, Indonesia. For detail information can be seen in Figure 1.

Figure 1 Location map and culinary description of Pedan District, Klaten Regency

In this study, the sampling location has been determined, which is limited to the location of culinary tourism in the city of Pedan sub-district, Klaten district. The method used is the Waterfall Method

2.2 Waterfall Method Phases

The waterfall model is a classical model that is systematic, sequential in building software (Kramer, 2018; Buchori et al., 2017). The name of this model is actually “Linear Sequential Model”. This model is often referred to as the "classic life cycle" or the waterfall method. This model belongs to the generic model of software engineering and was

first introduced by Winston Royce around 1970 so it is often considered ancient, but is the most widely used model in Software Engineering (SE). This model takes a systematic and sequential approach. It is called a waterfall because the stages that are passed must wait for the completion of the previous stage and run sequentially. The phases in the waterfall model according to pressman's reference can be seen in Figure 2.

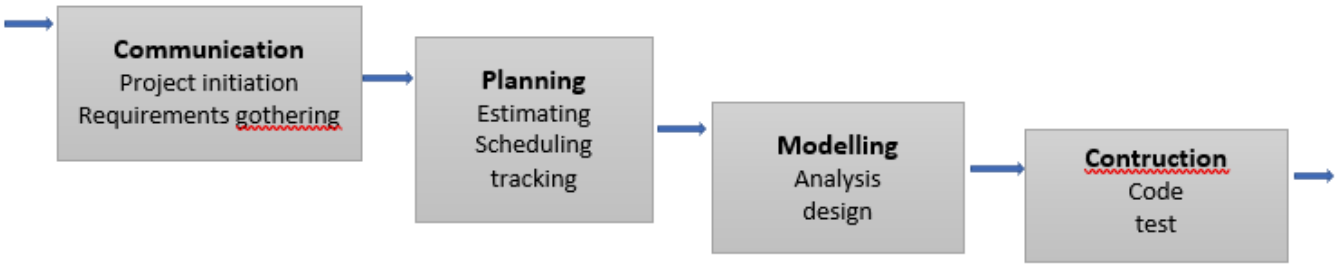

Figure 2. The phases of the waterfall method according to Pressman

Figure 2 can be described that the phases of the waterfall model are:

1. Communication (Project Initiation & Requirements Gathering).
   Before starting technical work, it is very necessary to communicate with customers in order to understand and achieve the goals to be achieved. The result of this communication is the initialization of the project, such as analyzing the problems encountered and collecting the necessary data, as well as helping to define the features and functions of the software. Additional data collection can also be taken from journals, articles, and the internet.
2. Planning (Estimating, Scheduling, Tracking)
   The next stage is the planning stage which explains the estimation of the technical tasks to be carried out, the risks that can occur, the resources needed to create the system, the work products to be produced, the scheduling of work to be carried out, and tracking of the system work process.
3. Modeling (Analysis & Design)
   This stage is the design and modeling stage of the system architecture which focuses on the design of data structures, software architectures, interface displays, and program algorithms. The goal is to better understand the big picture of what will be done.
4. Construction (Code & Test)
   This construction stage is the process of translating the design form into a machine-readable code or form/language. After coding is complete, testing is carried out on the system and also the code that has been created. The goal is to find errors that may occur to be corrected later.
5. Deployment (Delivery, Support, Feedback)
   The Deployment stage is the stage of software implementation to the customer, periodic software maintenance, software repair, software evaluation, and software development based on the feedback provided so that the system can continue to run and develop according to its function (Atmoko, D.A. 2018).

2.3. System Analysis and Design

2.3.1. Definition of system design

At the time of building an application in general will be preceded by system design first. System design is a process that broadly includes operating steps in the data processing process and procedures to support system operations. The system design can be interpreted as (Jogiyanto, 2020):

1. Stage after analysis of the system development cycle.
2. Definition of functional requirements.
3. Preparation for implementation design
4. Describe how a system is formed.
5. Which can be in the form of drawing plans and making sketches or arrangements of several separate elements into a unified whole and functioning.
6. includes the configuration of the hardware components of a software system.

2.3.2. Flow Chart

The flowchart for the web application can be seen in Figure 3. Based on Figure 3, it appears that the user can only do some things via mobile or desktop (PC). Controlling data such as viewing all data, searching for data, viewing data search results, to viewing selected data can be done via mobile or desktop (PC).

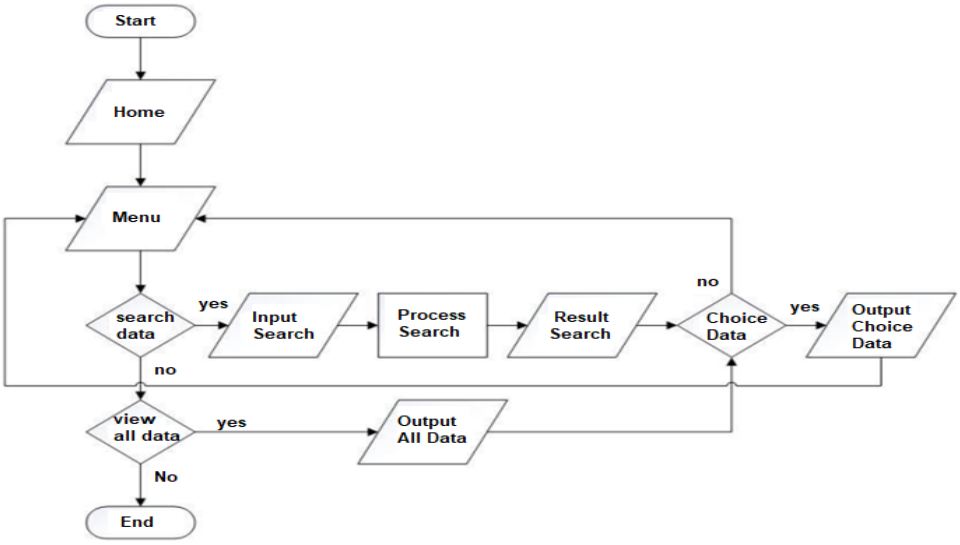

Figure 3. Flow chart user

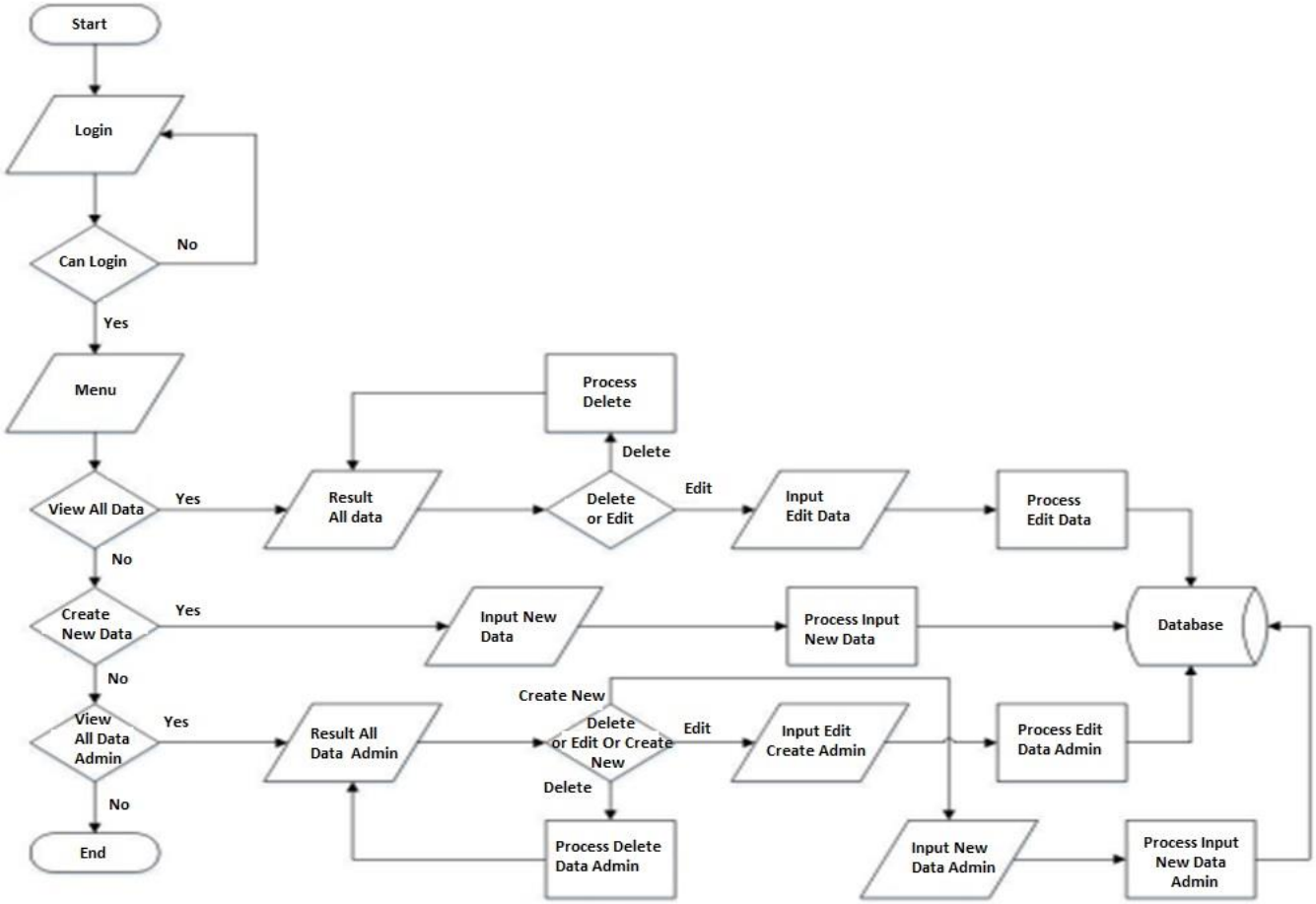

Figure 4. Flow chart for admin

Flowchart admin can only do some things via desktop (PC), Controlling data such as viewing all data, adding data, editing data, deleting data, viewing admin data, adding admin data, editing admin data, the selected can be done via desktop (PC) and for admins and users it can be accessed through the website provided by the author (See Figure 4).

2.3.3. System Context Diagram

Figure 5 is a context diagram of the design of a geographic information system for culinary tourism in the Android-based Pedan sub-district that was built. This context diagram only displays the entities contained in the application, namely admin, user, and system.

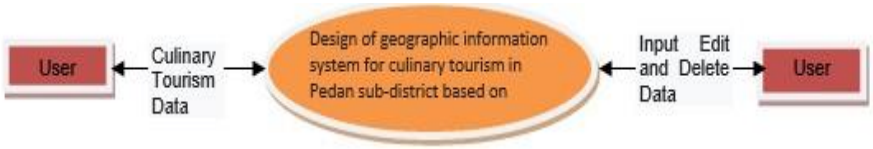

Figure 5. System context diagram

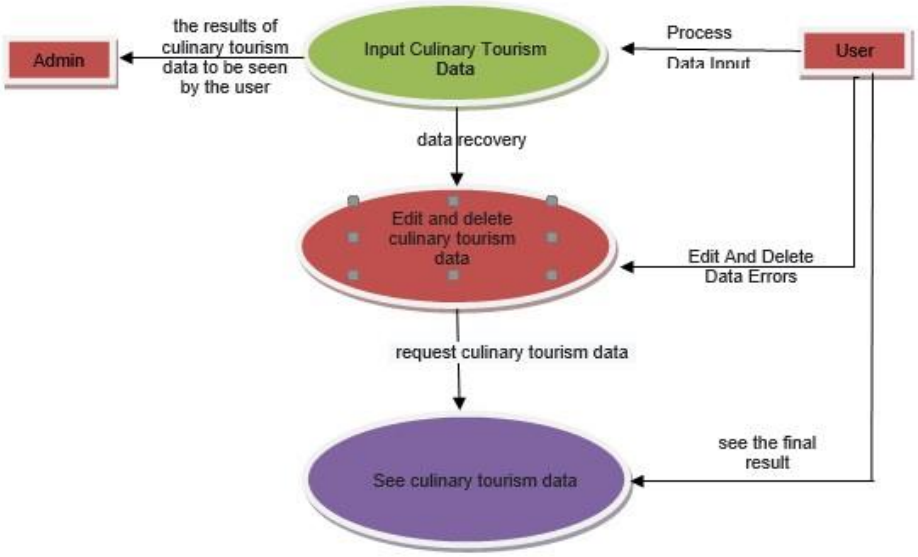

Figure 6. Zero level dfd system

The zero-level data flow diagram shown in Figure 6. It is clear, that there are three main processes in this website system. Namely input data, edit and delete data, and view tourist data. These three interrelated processes include the CRUD (Create, Read, Update, and Delete) methods in the database. For the data input process carried out by the admin itself, it comes from recommend data from the user and the data found by the admin which is a valid data source for this website. Thus, reducing errors and data input errors on this website.

2.3.4. Entity Relationship Diagram (ERD)

Entity Relationship Diagram or commonly called ERD is a model that describes the relationship between data in the database. Below is an ERD for the Design of a Geographic Information System for culinary tourism in pedan district based on android can be seen in Figure 7.

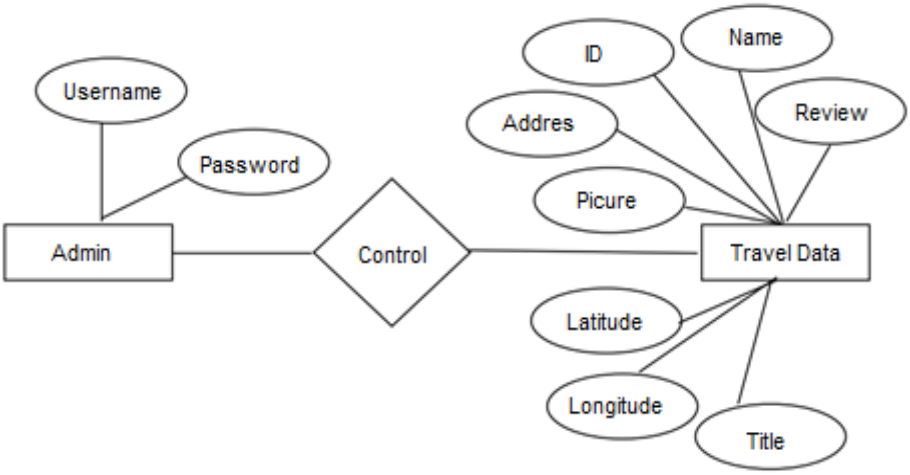

Figure 7. Erd design of culinary tourism gis in pedan district based on android.

3. Results and Discussion

The results achieved are in the form of implementing a Culinary Tourism GIS Design system in Pedan District based on Android. System implementation is the steps or procedures carried out to realize the system design that has been previously approved. System implementation aims to create new systems or replace existing systems. The purpose of implementing this system is tangible evidence of a careful planning. All aspects of system planning are realized so that the final system can be tested and operated directly by the user. The user has the right to ensure that the implementation of the system is in accordance with the system plan. System implementation takes into account many things, such as ensuring the system runs properly, installing the system correctly, and continuously controlling it. Basically, in implementing the system there are several important components so that the applications that are built can run. Here are some of the components needed :

3.1. Hardware

Hardware is the part of the computer that can be physically seen and can be seen touched. Hardware is all the components of the equipment that make up a computer computer systems and other equipment that enables computers to perform his job. In making the GIS Design for Culinary Tourism in Pedan District Based on Android, the author uses a computer as a replacement hardware. Where on the computer has been installed a text editor and web server software that allows this website to run on a computer.

3.2. Software

Software is a set of instructions that enable hardware to process data. This software is not in physical form, but in the form of programs created through electronic devices. In software known as the operating system and application programs. The author develops the software section in the form of an application. The software used in planning to implementing the system are:

1. IDE (Integrated Development Environment) using Sublime Text 3.
2. MySQL databases.
3. XAMPP Control Panel
4. Google Chrome Web Browser.
5. Minimum Windows 7 64bit.

3.3. Brainware

Users or Brainware are humans who are involved in running and managing the system on the computer. It is also interpreted as an intellectual device that runs and explores the capabilities of both hardware and software. Brainware is an important part of a computer system. Because a system will not run if there is no brainware role. In this system built, the admin is the one who takes on the role of brainware.

3.4. Outcomes Achieved

One of the outcomes achieved is a demo of the GIS Design of Culinary Tourism in Pedan District based on Android which visually explains how the application looks, starting from the Home display, login, admin, data input, tourist attractions, culinary, and editing data.

3.5. Initial View

The initial appearance of the Culinary Tourism GIS Design in Pedan District Based on Android in the form of a home page for the user, can be seen in Figure 9. With the home feature, the user will be assisted to be directed to various features on this website. At the initial display there are several options according to what you want to find.

Figure 8 describes the features of a culinary tourism GIS design in Pedan District based on Android, which provides several favorite culinary places in the Pedan sub-district city, Klaten district. On the homepage menu, it is explained about the history of the city of Pedan and others.

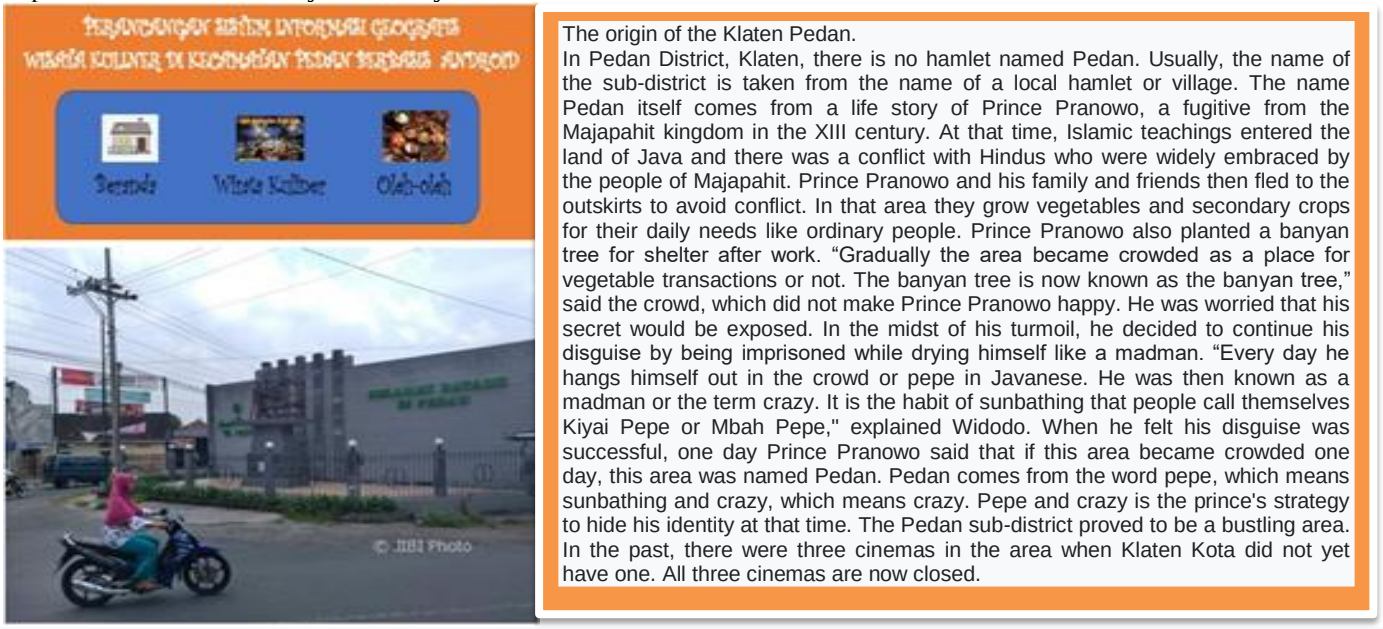

Figure 8. Initial view

3.6 Culinary Display

Figure 9 describes the features of the culinary tourism gis design in pedan district. android-based provides several favorite culinary places in the pedan sub-district city, klaten district.

Figure 9. Display of the Best-Selling Restaurant in the city of Pedan

3.7 Data Input Display

The display of input data for culinary tourism GIS design in Pedan District based on android in the form of a display when the admin enters the Data Input menu. There is several pi to fill in such as address, phone number, article, and the location of the place you want to input (See Figure 10).

Figure 10 display data input

4. Conclusion

After the planning process to system implementation, in closing the report the author draws several conclusions, including:

1. Development of Culinary Tourism GIS Design in Pedan District Based on Android supporte by a Google Maps API system to display the location of tourist attractions. So that the user can know the location or location of the tourist attractions.
2. The difficulty of building a system identifies that the existing system must always be under control. So the system always has new innovations.
3. The author limits the function of the Culinary Tourism GIS Design in Pedan District based on Android, considering its nature which is only to display data. Not as the main means for inputting, editing, and deleting data.
4. With the Android-Based Culinary Tourism GIS Design application in Pedan District, the admin can provide new insights about the location of tourist attractions in Pedan City

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