MAKING A VIRTUAL MAP IN THE ARCHIPELAGO FLOWER GARDEN TOURS

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ABSTRACT

Nusantara Flower Garden is the first display park in Indonesia which has hundreds of varieties of various types of flowers that are collected in the country and abroad. The purpose of creating a virtual map on this flower garden tour is to make the map more interactive and effective and the research methodology consists of 5 (five) stages, namely problem identification, data collection (literature study, interview, observation), system analysis, software development namely by using the method waterfall and application testing. Based on the information that there are tourists who find it difficult to search the location, therefore it is necessary to create a virtual map on the archipelago flower park tour to help tourists in overcoming location search. The application that is built displays the archipelago flower garden map, displaying tourist location information in the Nusantara flower garden, displaying the route from the location of the visitor to the destination. This application uses the dijkstra algorithm to determine the shortest distance or route / direction search. Based on blackbox testing it can be concluded that this application has met the criteria of good information media that helps visitors make it easier to find information on the location of the archipelago flower garden and search routes to the destination and can make time efficient.

Keywords: Virtual map, Djikstra Algorithm, Route search / direction, archipelago flower garden, tourist attraction.

1. INTRODUCTION

Nusantara flower garden is the first display park in Indonesia which has hundreds of varieties of various types of flowers that are collected in domestic and foreign countries, flower garden i has an area of about 35 hectares is in Sukaresmi district of Cianjur regency, West Java and is located at an altitude of 750 masl [3] The total area of the park is 35 hectares, 23 hectares are filled with flowers and various flowering trees, 7 hectares for children's playgrounds, 2 hectares for nurseries, 3 hectares for Saung Nini and Saung Aki villas, a restaurant and meeting rooms. The archipelago flower garden has 9 gardens, namely Japanese garden, rose garden, French garden, Mediterranean garden, labyrinth garden, palm garden, American garden, Bali garden and water park. In addition to the park there are other facilities no less interesting, namely there are several temples, lakes, giant clocks or garden clocks and have a variety of animal-shaped topiari consisting of several flowers.

Based on the results of interviews conducted on 20 tourists from the Nusantara Flower Garden, it was stated that to find all the locations in the Nusantara Flower Park using a manual map / brochure. In addition to the manual map / brochure, to find the location in the Nusantara flower garden, by looking at the road signs. From the existing information sources, 19 out of 20 tourists stated that it was difficult to find all the locations in the archipelago flower garden. Because the manual map / brochure only displays small images that are numbered to match the location name. In addition, many tourists ignore the manual map / brochure, because it is too complicated and prefers to see the road signs, but the road signs are only on the main road. This makes it difficult for tourists to explore all the locations in the Nusantara flower garden, especially locations that are far from the main road. And in addition to reading the manual map or road instructions, to get information about all the locations in the Nusantara Flower Garden, tourists ask the officer, the problem is that there are no officers in all locations in the Nusantara Flower Garden given the vastness of the park. There are 17 locations not guarded by officers, where the location is the location most frequently visited by tourists. In addition to manual maps and road signs there are also supporting facilities to surround the park location, namely the Wara-Wiri car which is an open vehicle with a capacity of 14 visitors to surround the park location. This car only passes certain routes, not all locations in the flower park are approached by the car, the car just stops and raises passengers at special stops and tourists are not informed about all the location in the archipelago flower garden because there is no officer in the car wara-wiri.

Based on the problems that have been described, it is necessary to use virtual maps in the Nusantara Flower Garden tour with the hope that this virtual map application will provide information on all the locations in the Nusantara Flower Garden that are

fast, precise, efficient and effective. Through this application is expected to provide solutions and conclusions can be drawn as the title that will be raised is: "MAKING A VIRTUAL MAP IN THE THE ARCHIPELAGO FLOWER GARDEN TOURS ".

1.1 Identification of problems

Based on the description on the background of the problem above, the existing problems can be identified as follows:

1. The manual map / brochure only displays a small image that is numbered to match the location name. This resulted in tourists finding it difficult to find the location inside the archipelago flower garden.
2. A road sign that only exists on the main road causes tourists to have difficulty exploring the location in the Nusantara flower garden, especially the location that is far from the main road.
3. Officers in the Nusantara Flower Garden are few and only in several areas. There are 17 locations that are not guarded by the officers in the Nusantara Flower Garden, this makes it difficult for tourists to get information about the location in the Nusantara Flower Garden.

1.2 Purpose and objectives

The purpose of the research carried out in the Nusantara Flower Garden is to build applications that make it easier for tourists to find out the location of tourist objects in the Nusantara Flower Garden.

The purpose of this construction is as follows:

Membuat virtual map agar peta lebih interaktif dan efektif.

1. Create a virtual map so that maps are more interactive and effective.
2. Make it easier for tourists to find the location inside the archipelago flower garden.
3. Tell tourists about the location information in the Nusantara flower garden.

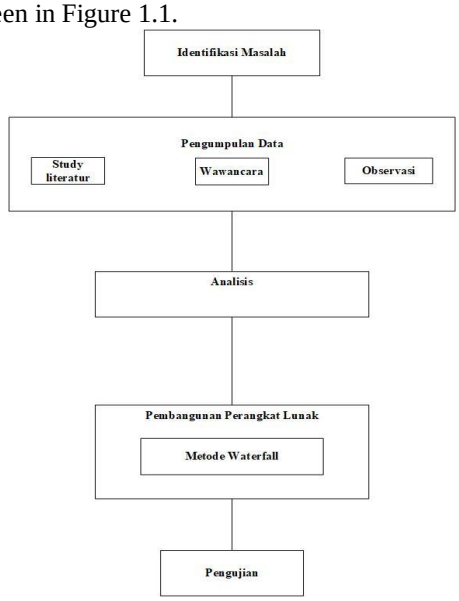
1.3 Scope of problem

The limitations that are applied in the construction of the archipelago flower garden tourism map application are as follows:

1. Virtual map application built on the web.
2. This application is dynamic.
3. The information submitted is only in the form of the name of a tourist attraction, information on tourist attractions.
4. The target user is the archipelago flower garden tourists.
5. Hardware must be connected to the internet.
6. Data modeling in this study uses Object Oriented Programming (OOP) modeling.1.4

1.4 Research methodology

Research methodology is a stage process used to solve a logical problem, which requires data to support the implementation of a study. The following are the steps that will be carried out in the study can be seen in Figure 1.1.



Gambar 1.1 The stages used by the research

1.3.1 Theoretical basis

The theoretical foundation aims to provide an overview of the theories involved in the application development. The theoretical foundation discussed is the understanding of Mobile Application, Android, Maps, GPS, Databases, Methods used and the programming languages used in application development.

1.3.5.1 Virtual

Virtual is "that is not real, virtual", Virtual comes from visual words, which means the process of changing a concept and the expression of an idea or feeling by using the form of images, writing, drafts and others so that it can be seen with the sense of sight (eyes) to be served.

1.3.5.2 Map (Map)

A map is a description of the entire or part of the earth's surface on a flat plane that is minimized using a certain scale. The study of maps is called cartography.

1.3.5.3 Google Maps API

The Google Maps API is a service that allows Google Maps to be integrated into applications that do require features from Google Maps. The Google Maps API is a Javascript library. By using the Google Maps API, it can facilitate developers in creating applications that require map technology in it and do not need to think about how to make it manually because using Google Maps API is all that is needed related to

digital map technology is complete enough and can be used for applications that need it [7].

2. RESEARCH CONTENT

2.1 System analysis

System analysis can be defined as the decomposition of a whole system into its component parts with a view to identifying and evaluating problems, opportunities, obstacles that occur and the expected needs so that improvements can be proposed. Analysis can also be interpreted as research on an existing system with the aim of designing a new or updated system. In the process of making an absolute system, research and analysis of the system to be built is carried out.

2.1.1 Problem analysis

Problem analysis is the stage of describing the problems that existed before this application was built and aims to help the development of this map application. The following is a description of the problems that include the following:

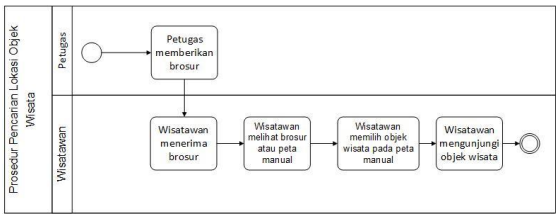
1. To search the location of tourist objects in the botanical garden, tourists use manual maps / brochures, the problem is that the manual map / brochure only displays a small image which is numbered to match the location name. This resulted in tourists
2. difficulty finding a location inside the archipelago flower garden.
3. In addition to a manual map to find tourist locations, see the road signs, the problem is that the road signs that only exist on the main road cause tourists to have difficulty exploring the location in the Nusantara flower park, especially the location that is far from the main road. For example, tourists are in the water park, tourists want to visit the Japanese garden, while tourists do not know the direction to the Japanese park location, to find out the direction / route to the destination, tourists must see the road signs but from the water park to the main road is very far away , it takes time so tourists choose not to see the road signs and visit other object locations.
4. If tourists find it very difficult with the information already available, then the tourists ask the officers around, the problem is that the officers in the Nusantara Flower Garden are few and only in some areas. There were 17 locations that were not guarded by officers at the Nusantara Flower Garden, this resulted in tourists not being able to ask the officers.

2.1.2 Current System Analysis

System Analysis that is running or process analysis is a stage that gives an overview of the current system. This analysis aims to provide a complete picture of the current system which will then be described in the form of Business Process Modeling Notation (Bpmn) in accordance with the problems that occur. Operations carried out include procedures for finding the location of tourist attractions in the Nusantara Flower Garden.

Search scenarios for the location of tourist objects are:

1. Travelers choose attractions on the brochure.
2. Travelers see brochures for location information
3. If tourists already know the location to go to the tourist attraction, tourists immediately visit the tourist attraction.



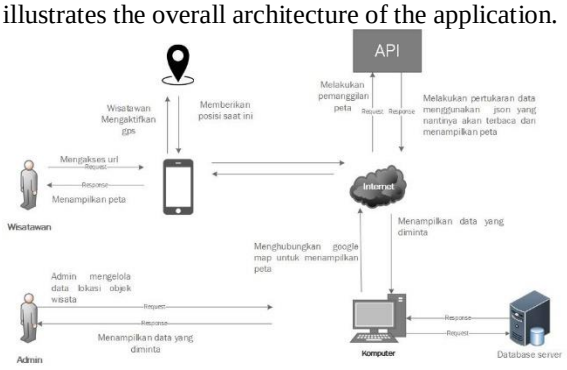
Gambar 2.1 Object Location Search Procedure

2.1.3 Analysis of the system to be built

Applications in the system that will be built are easier for tourists to search the location of archipelago flower garden attractions and become more effective. Tourists no longer need to see a manual map / road sign, tourists only need to access the virtual map application on the website.

2.1.3.1 Analysis of System Architecture

System architecture analysis aims to identify the system architecture that will be built based on the platform. The website platform is the system chosen for the development of this software. Software architecture on mobile platforms illustrates how software interacts with each other as illustrated in Figure 2.2 software architecture. The picture illustrates the overall architecture of the application.



Gambar 2.2 System Architecture

2.1.3.2 Map Analysis

Map analysis is how to create an archipelago flower garden map into a virtual map, along with a map in the archipelago flower garden.



Gambar 2.3 Map of Nusantara Flower Garden

2.1.3.2.1 Determine user location (initial position)

To find the user's initial position using the geolocation API, the way it works is:

1. The user activates GPS to find out the user's current position
2. After the gps is active, the geolocation function will take the user's current location

.2.1.3.3 Route search analysis

Analysis of route search is to find routes at the initial location to the final location of the archipelago flower garden attractions.

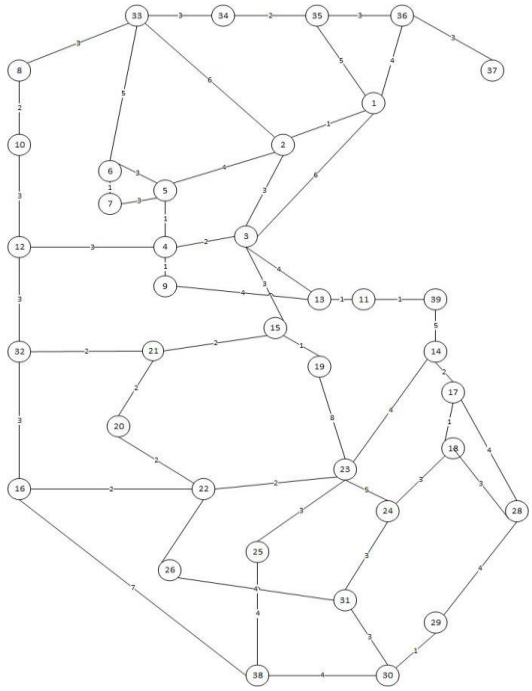
2.1.3.3.1 Dijkstra algorithm

This Djikstra dikstra algorithm is an algorithm that can solve the problem of finding the shortest path from a graph on each node that is not negative. dijkstra is an algorithm included in the greedy algorithm, which is an algorithm that is often used to solve problems related to an optimization. In the search for the shortest path, the dijkstra algorithm works by finding the minimum weight. To find the route in the virtual map application that becomes a node, that is the location points that will be calculated the closest distance to the tourist point, using the logic of Djikstra [13].

Tabel 2.1 Keterangan node nama lokasi wisata

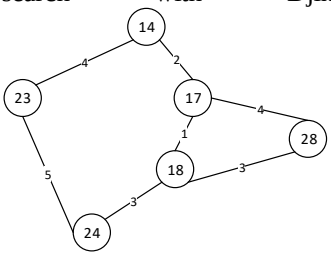
No	Name of location	Latitude	Longitude
1	Gerbang utama	-6.727073	107.077136
2	Lokasi parker	-6.727956	107.078909
3	Pintu masuk	-6.727753	107.079427
4	Stasiun b-wiri	-6.728388	107.079674
5	Bursa bunga	-6.728311	107.079213
6	Mushola	-6.728705	107.079653
7	Toilet	-6.728729	107.079502
8	Parkir bis	-6.728904	107.078969
9	Topiary merak	-6.728125	107.079977
10	Lokasi piknik	-6.729572	107.079419
11	Taman air	-6.727698	107.079792
12	Rumah kaca	-6.729641	107.080055
13	Display karpet bunga	-6.727391	107.080321
14	Koleksi bambu	-6.726370	107.080655
15	Jam taman	-6.727518	107.080630
16	Shelter	-6.728972	107.081726
17	Taman mawar	-6.725825	107.080974
18	Taman perancis	-6.726157	107.081538
19	Amphitheatre	-6.727308	107.081230
20	Danau angsa	-6.728260	107.081137
21	Food stall	-6.728553	107.081089
22	Taman mideterania	-6.727750	107.082219
23	Taman labyrinth	-6.726925	107.081702
24	Menara pandang	-6.727069	107.082374
25	Taman bali	-6.726951	107.082783
26	Taman palem	-6.728057	107.082418
27	Restoran	-6.725719	107.082063
28	Taman amerika	-6.726147	107.083396
29	Dahlia corner	-6.726628	107.083457
30	Air mancur musical	-6.726470	107.082619
31	Taman jepang	-6.729194	107.081187
32	PT. bina usaha flora	-6.728460	107.077665
33	Restoran saung aki	-6.727160	107.077702
34	Villa saung nini	-6.727681	107.077626
35	CV. AGROTANI	-6.726837	107.077136
36	PT.ABN(produsen bunga krisan)	-6.725865	107.078224
37	Alam imajinasi	-6.727253,	107.083252

As for the real estate plan described, a graph can be made from the placement of nodes and their weight as followsut



Gambar 2.4 Graf Djikstra on the archipelago flower garden map

In route search, further mapping is needed regarding node graphs and their weights. For that the determination of the relationship between nodes with each other will be done using a sampling of 6 nodes, the following is the node used in the analysis of route search with Djikstra algorithm.



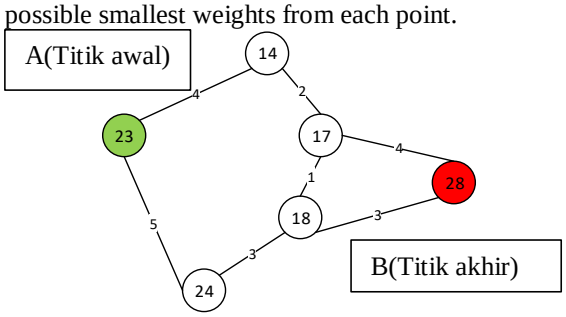
Gambar 2.5 Node Sampling

Table 2.2 shows the weight between the nodes connected to other nodes that refer to the sampling graph.

Table 2.2 Node Sampling

Node	Link to node	value
14	17	2
14	23	4
17	28	4
17	18	1
23	24	5
24	18	3
17	18	10
17	P	9
18	P	9
18	28	3

This algorithm aims to find the shortest path based on the minimum (smallest) weight from one point to another. The Dijkstra algorithm calculates all possible smallest weights from each point.



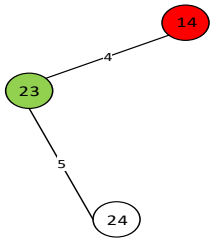
Gambar 2.6 Examples of linkages between points in Dijkstra's algorithm

First, determine which point will be the starting node, give the weight of the initial node to the nearest node one by one, Dijkstra will develop the search from one point to another and to the next point step by step. This is the logic sequence of the Dijkstra algorithm [13]::

1. Give the weight (distance) for each point to another point, then set the value 0 at the initial node and the value of the infinity to other nodes (not filled) [13].
2. Set all nodes "Untouched" and set the initial node as "Node departure" [13].
3. From the departure node, consider the neighboring node that has not been touched and calculate the distance from the point of departure. When we finish considering each distance to the neighboring node, mark the node that has been touched as "Touched node". Touchable nodes will never be checked again, the distance saved is the last distance and the least weight [13].
4. Set the "Untouched Node" with the smallest distance (from the departure node) as the next "Departure Node" and continue with returning to step 3 [13].

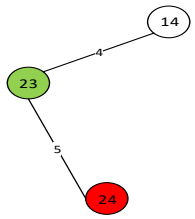
The following is an explanation of the steps from the initial node and then to the smallest node. Initial node 14 and destination node 28. Each edge connected between nodes has been given a weight value.

Dijkstra calculates the neighboring nodes directly connected to the departure node (node 23), and the results obtained are node 14 because the weight of the node 14 is the smallest compared to the value in the other node, the value = 4 (0 + 4). Can be seen in the following picture:



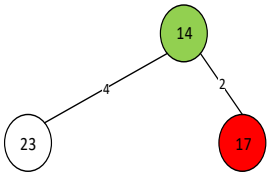
Gambar 2.7 Step- 1

Node 14 is set as the node that has been touched. Dijkstra recalculates the neighboring nodes that are directly connected to the nodes that have been touched. And the calculation of dijkstra shows that node 24 which is the next departure node because of the smallest weight of the last calculation result, the value 5 (0 + 5) is shown in green to red. Can be seen in the following picture:



Gambar 2.8 Step - 2

The calculation continues with node 17 marked as the node that has been touched. Of all the untouched neighbor nodes that are directly connected to touchable nodes, a value of 4 + 2 = 6.



Gambar 2.9 Step- 3

Node 17 becomes touchable node, dijkstra recalculates, and finds that node 28 (destination node) has been reached through node 14, because of the three previous checks the lines 14-17 became the shortest path. And the weight obtained is 6. Next, we proceed to node 18 because the minimum weight value is 1 (0 + 1)

Node 18 is set as touchable node, from all connected nodes which are 23-14-17-18 = (4 + 2 + 1 + 3) = 10

Then compare the total route

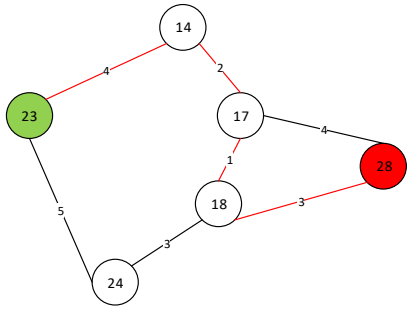
23-14-17 = 4 + 2 +4 = 10

23-14-17-18 = 4 + 2 + 1 + 3 = 10

23-24-18 = 5 + 3 + 3 = 11

23-24-18-17 = 5 + 3 + 1 + 4 = 13

Because there is the same amount of weight, in this case the number of weights that pass through many nodes is chosen. So the shortest path chosen is 23-14-17-18 with a distance value of 10. As can be seen in the following figure:



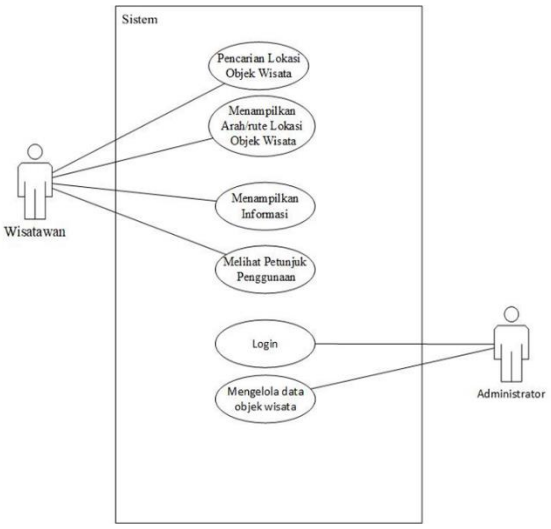
Gambar 2.10 The last step

2.1.4 Functional Needs Analysis

Analysis of functional requirements is modeled using UML (Unified Modeling Language). The diagrams used are Use Case Diagrams, Class Diagrams, Sequence Diagrams, and Activity Diagrams.

2.1.4.1 Use Case

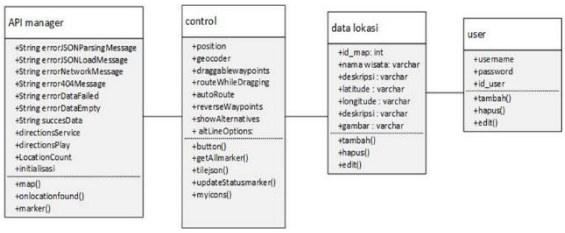
Use Case Diagram is a model for the behavior of information systems that will be created. Use case describes an interaction between one or more actors with the system to be created. The following is the design of the processes contained in the Virtual Map application on the archipelago flower garden tour [2]:



Gambar 2.11 Usecase Diagram

2.1.4.2 Class Diagram

Class diagrams are a specification that if instantiated will produce an object and is the core of object-oriented development and design. Class describes the state (attributes or properties) of a system, while offering services to manipulate the situation (method or function). Here is a class diagram of the archipelago flower garden map [2]



Gambar 2.12 diagram class

2.1.5 Black box testing

Blackbox testing focuses on the functional requirements of the software that is built. The stages of functional testing that will be carried out include black box testing scenarios, and case and test results.

2.1.5.1 Black Box Testing Scenario

Blackbox testing scenario is testing the functionality contained in this application, whether the functionality is as expected or not. Test scenario from the system built

Tabel 4. 6 Black Box Testing Scenario

No	Item Uji	Skenario Pengujian	Jenis Pengujian
1	Search for Routes / directions	Open the application	*Blackbox*
		Search for the location to be addressed	*Blackbox*
		Show the route	*Blackbox*
2	Show information	Open the application	*Blackbox*
		Click on Marker	*Blackbox*
		Show information the location	*Blackbox*
		-	
3	Login	Input username and password	*Blackbox*
		Choose button login	*Blackbox*
		Show admin page	*Blackbox*
4	Processing data on tourist locations	Choose button“tambah data”	*Blackbox*
		Input the form information location	*Blackbox*
		Choose button “ubah“	*Blackbox*
		Do changes	*Blackbox*
		Choose button “simpan”	*Blackbox*
		Choose button” hapus”	*Blackbox*
5	Display usage instructions	Open the application	*Blackbox*
		Click on menu petunjuk penggunaan	*Blackbox*
		Display usage instructions	*Blackbox*

2.1.5.2 Conclusion of Blackbox Testing

Based on the results of the blackbox testing that has been carried out, it can be concluded that the application of virtual maps on the Nusantara Flower Garden tourism functionality produces output that is in line with the expected results and has been running well. Of all that has been done in this test, it is hoped that it can represent the testing of other functions in the system being built.

3.CLOSING

Based on the results of research, analysis, system design, and implementation as well as testing in the form of a questionnaire, conclusions can be drawn on the virtual map application on the archipelago flower garden tour as follows:

1. The virtual map application can provide a more interactive and effective map visualization so that tourists are easy to read the map.
2. The virtual map application on the archipelago flower garden tour can make it easier for tourists to find their way to the destination location and the nearest route they travel.
3. The virtual map application on the archipelago flower garden tour is able to provide information on the location of tourist objects clearly.

Based on the above conclusions, the suggestions that can be put forward for future improvement and consideration are as follows:

1. Presenting more interesting information for example in the form of 3d images to make it more attractive.
2. To present information, it is better to scan the barcode of each archipelago flower garden tourism signboard, but for now not all tourism object locations have a nameplate, then a more complete nameplate is needed.

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