The Implementation of Tree Method in Geographic Information System of Mother Temple Mapping and its Linkages based on Web

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ABSTRACT
Mother Temple is one category of shrine trust places in tenet of Hinduism in Bali. Mother Temple is a holy place where Balinese Hinduism worship the ancestor based on their lineage ancestor. In the tenet of Hinduism, the worship of ancestors is a thing that should not be forgotten. Therefore, Mother Temple is special place as a place of worship of Hindus who have blood ties in accordance with the lineage. Mother Temple can be categorized into five, namely, Pedharman Temple, Kawitan Temple, Panti Temple, Merajan / Sanggah Gede and Merajan / usual Sanggah. Generally in Bali, there is more than one Mother Temple and those have a relationship regarding to the level with one another based on their offspring. The Implementation of Tree Method in Geographic Information System of Mother Temple Mapping and its Linkages is a useful idea in order to connect all levels of Mother Temple with its linkage in Bali and in order to provide correct and clear linkages information. The meaning of linkage in this context is a relationship that is created among the data with other data. The method applied as the connecting link is a Tree method which is a basic modeling concept that can maximize the linkage process.

Keywords
Geographic Information System, Mother Temple, Tree Method, Linkages

1. INTRODUCTION
Hinduism in Bali recognize holy place or temple as a place to worship for their ancestors namely Mother Temple. Mother Temple is a holy place of worship ancestral spirits of Hinduism who have wit relation or lineage ancestor, so Mother Temple is special place as a place of worship of Hindus who have blood ties in accordance with the lineage [1]. Every Hindus in Bali regularly worship in Mother Temple annually in order to commemorate a temple ceremony (temple's anniversary).

Figure 1: The example of worship in Mother Temple.

One kinds of information needed by societies at this time is geographic information. Geographic Information System (GIS) is a highly developed geographical technology. Geographic Information System is a specialized information system that allows for data processing of spatial and non-spatial become related information about the earth and used for collection, storage, manipulation, analysis and display of geographic data that is extremely useful for decision making in resolving a problem in space certain earth [2]. The development of Internet technology influences GIS technology. GIS technology can be built with Web-based. Web GIS is a form of a website that describes an area of geographic information, such as Mother Temple.

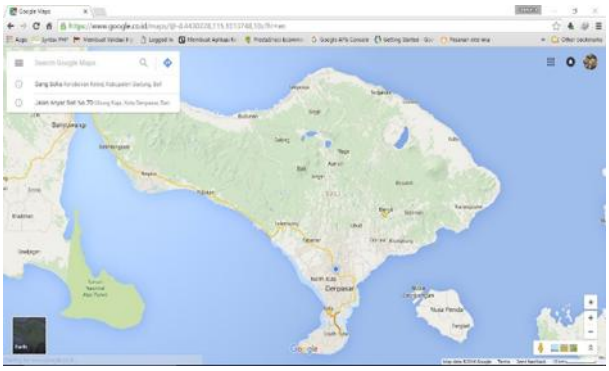

Figure 2: The example of Digital Google Maps.

The rapid development of science and technology makes the occurrences of systems that can help a wide range of human needs, especially the needs of information, where each system has had a different method. Then, one of it is a Tree method or Tree Theory. Tree Theory is a theory which is very useful in modeling the structure of the data on which the applications of the theory of this tree can be used as a data storage structure is excellent in certain cases [3], as well as linked of Mother Temple.

2. THE LITERATURE AND METHODOLOGY

2.1 Google Maps API
Google Maps is the online mapping service provided by Google. Google Maps has an open source platform that can be used freely, but IT must comply with the requirements that have been set. Google Maps also provides freedom for developers to develop technology based ON mapping IN THE Google Maps [4]. In 2005, google released Google Maps API. This application is applies in order to implemented digital map which can be used for various kinds of applications [5]. Google Maps platform development used a programming language with the name of the Maps JavaScript API. Google

Maps Application Programming Interface (API) is an application feature that is applied to facilitate the users who want to integrate Google Maps into their websites by displaying the data points of their own. Google Maps can be displayed on an external website using the Google Maps API. Maps API JavaScript must be entered in advance in order to allow the Google Maps app may appear on certain websites.

Displaying a map using the Google Maps API to the order is as follows.

a) Incorporate Maps API Javascript.

b) Conduct a div element as the location to ask questions.

c) Conduct some literal object to store properties are properties on the map.

d) Write Javascript function, to create the object map.

e) Initialize a map in the HTML body tag with onload event.

Displaying a map of Google Maps on the web and Google Maps functions can be learnt in https://developers.google.com/maps/ page. Some of the main functions that are often used are to ask questions, to ask marker, show info window, create a polygon, and make a circle.

2.2 Geographic Information Systems

GIS is a computer-based system applied in order to store and manipulate geographic information. GIS is designed to collect, store and analyze objects and phenomena in which the geographic location is an important characteristic or critical to be analyzed. GIS has the capability to handle referential geographic data namely data input, data management (storage and redial), analysis and manipulation of data, and output as the final result [6].

Data in GIS consists of two components, namely spatial data related to the geometry of spatial and attribute data that provide information about the spatial form [7]. The main components of GIS are a computer system, geospatial data and users. The computer system for GIS consists of hardware, software and procedures designed to support data entry, processing, analysis, modeling and display of geospatial data.

The location information or geometric property of spatial objects can be included in some form such as the following.

a) Point (Dimension Zero-Point): The point is a graphical representation or the simplest geometry for spatial objects. This representation has no dimension, but can be identified on the map and can be displayed on the monitor by using certain of the process is returned to web server and at last is accepted by the web browser. Symbols of building elements shown as polygons on a large scale map, while on the small scale are shown as point elements.

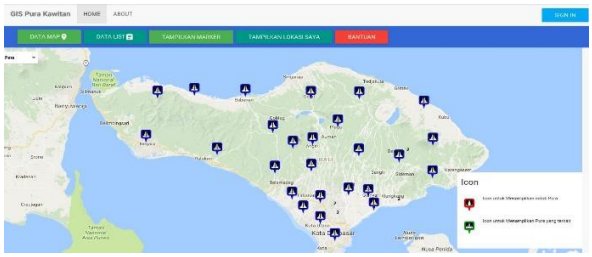

Figure 3: Spatial Data in Shape Point or Marker.

b) Outline (One-Dimensional polyline): The line is a linear geometric shape that connects at least two points and is used to represent objects that are one-dimensional.

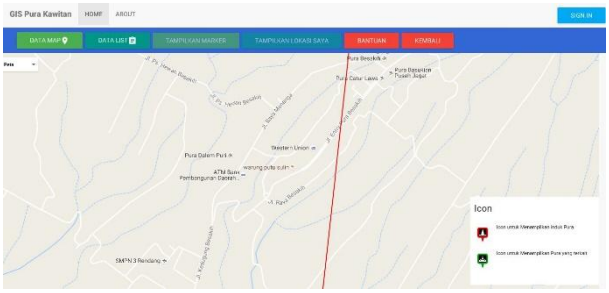

Figure 4: Spatial Data in the Form Line or Polyline.

2.3 Web-Based Geographic Information System

Web- based Geographic Information System is Geographic Information System application that can be run and applied into a web browser. The application can run in a global network that is the Internet, a local network or LAN network, and a computer that has a web server [2].

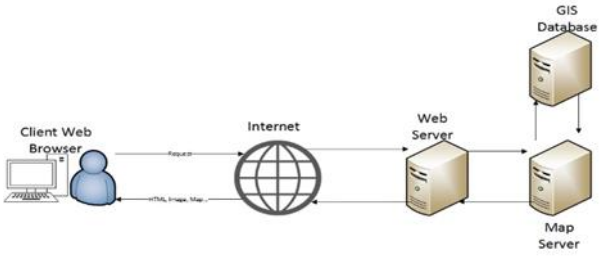

Figure 5: Architecture Geographic Information System Based On Web

Figure 5 shows the relation of the interaction between clients in the form of web browser with the server based on the scenario and response. Web browser sends request to web server. Web server requested the digital map through map server and map server ask the data from database. The result of those process will be returned back to web server and will be received by web browser.

2.4 Tree Method

Tree theory is quite old theory since it has been known since 1857, whereas the English mathematician Arthur Cayley used tree theory to calculate the number of chemical compounds. Actually, Tree Theory is a problem resolution mechanism by analogizing the problems into the structure of tree to facilitating in finding the solution of the problem [3]. Tree method is a method that is used in order to classify the data. This method is displayed by using tree as the model in which has relation data[8].

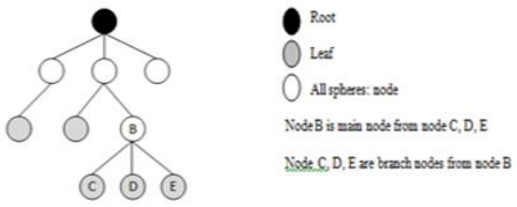

Figure 5: The Illustration of Tree Method.

Tree structure is a way in order to present "one to many concept" graphically. This tree looks like group of node on the top under of the area [9]. Tree method or Tree structure is data structure that resembles the shape of a tree which is consists of a series of nodes that are interconnected. Those nodes are connected by a vector. Each node can have zero or more children (branches). A node that has a child node is called the parent node. A child node has only one parent node. Regarding to convention computer science, tree grows downwards, unlike the trees in the real world which is growing up. Thus the child nodes will be described under the parent node. Node where is located at the base of the tree is called the root node while the node that is located in the tip of the pyramid called leaf node.

2.5 The Implementation of Tree Method towards the Relationship of Mother Temple

Tree Method can be applied to illustrate, since the information related Kawitan Temple can have subs which shaped like a pedigree with a certain level of depth and can do the process of addition or insertion, modification, and deletion.

Figure 6: The Design of a Structure of Data Table of Mother Temple with Tree Method

Unlike the relationship or lineage of parent-child in general, the relations on the tbl_Mother Temple merely use one table that is tb_Kawitan Temple directly, in which id_Kawitan Temple is a primary key which has relations to parent_id, an example of Kawitan Temple Data, if field parent_id has worth not null or not empty, then the Kawitan Temple Data is child Node, meanwhile if there is a Kawitan Temple Data which has worth field parent_id is null or empty, then the Kawitan Temple Data is parent node.

Table 1. Example of the data related to the Kawitan Temple

Id_pura_kawitan	The Name of Pura Kawitan	The Name of Ancestor	Parent_id
1001	Arya Tegeh Kori Temple	Arya Tegeh Kori	
1002	Arya Kenceng Temple	Arya Kenceng	1001
1003	Arya Belog Temple	Arya Belog	1002

First Data named Arya Tegeh Kori Temple with id_Kawitan Temple is 1001, the name of ancestor is Arya Tegeh Kori and parent_id is null. Therefore it can be concluded that Arya Tegeh Kori is parent Node since the worth of parent_id is null or have not Main Temple. Second Data named Arya Kenceng Temple with id_Kawitan Temple is 1002, the name of ancestor is Arya Kenceng and parent_id is 1001. Second Data can be concluded that Arya Kenceng Temple is child Node since it has parent Node that is Arya Tegeh Kori Temple. Third Data named Arya Belog Temple with id_Kawitan Temple is 1003, the name of ancestor is Arya Belog and parent_id is 1002. Third Data can be concluded that Arya Belog is child Node since it has parent Node that is Arya Kenceng Temple.

3. RESULTS

The result of the system design is displayed in a web form. This system is utilizing Bootstrap framework as a basis display and use the programming language PHP and JSON to translate the system.

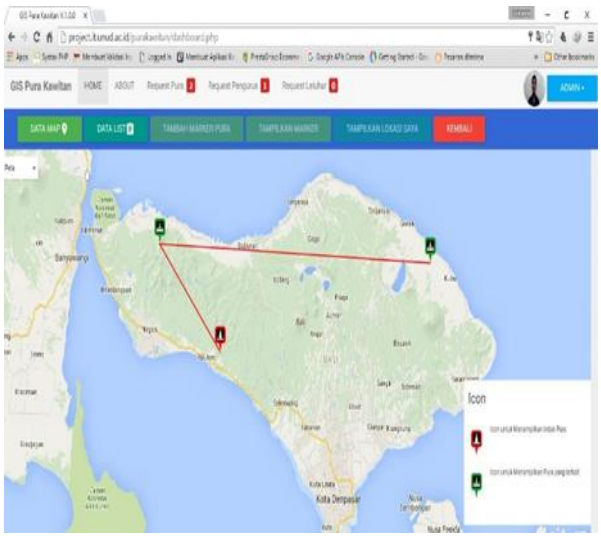

Figure 7: The Result of the Relations of Mother Temple in Geographic Information Systems.

The result of the relations of Mother Temple is acquired from the sample data which is inserted as in the sample of Table 1. The relation is displayed in the form of markers that are connected to each other by using a line or red polyline. Marker with red icon is Main Temple or Parent Node, meanwhile marker with green icon is Branch Temple or Child Node. Line or Polyline is connected through Parent node into Child Node.

4. CONCLUSION

Regarding to this research, it can be conclude as follows:

1. The formation related to the Mother Temple is being efficient and easier by utilizing Tree Method. The applying of Tree Method by utilizing concept of node which is related to each other conducts the relation to each temple. Parent node is a node that has one or more child node. Then, child node is the descendent of a parent node. In accordance with concept, it can be designed Mother Temple as parent node and the descendent of the mother temple becomes child node.
2. The display of Mother Temple and its linkage becomes more interesting and easier to be understood by applying the digital map from Google Maps and polyline as the connector for each mother temple.

5. REFERENCES

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