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E-GITHA, THE FOREST TREE MODEL ON INTEGRATED KEKIDUNGAN INFORMATION SYSTEM

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ABSTRACT

Kekidungan, often called *Gegithan* or *Nyanyian*, is a type of oral literary culture that Indonesia owns. *Kidung* or *githa*, especially in Bali are Traditional Balinese Song, where the details are in the form of *Panca Githa*, have a significant role in the implementation of a Yadnya Ceremony as well as daily entertainment. Many Hindu communities, especially Bali, do not know or understand the type, purpose, when, and where the song is used or sung. This is because lack of information about *Kekidungan*, and the inherited literature on this subject increasingly difficult to find. Based on these problems, it is necessary to develop an application that can accommodate information about *Kekidungan*, both related to the Yadnya Ceremony in Bali or merely the daily entertainment of Balinese people. This song or *gegithan* can stand alone or collaborate with other arts, such as drumming and dance. In addition to providing information quickly and efficiently about Balinese songs to the public, this information system aims to preserve the literature by using technology assistance. The system that has been successfully created is the *Kekidungan* Information System or E-Githa that integrated with the E-Yadnya System, which is made web-based and implements the Forest Tree Model as the basic structure of the hierarchical model.

Keywords: Forest Tree Model, Information Systems, Kidung, E-Githa, E-Yadnya.

1. INTRODUCTION

Culture is one of the most critical aspects of Hindu community life in Bali. *Kidung* and *Mantra* are some of the Balinese cultures that must be preserved. *Kidung* is a sound and musical art found in Bali (Taditional Balinese Song), which initially came from the Java Island in the 16th to 19th centuries. *Kidung* is often played together with instruments; the main songs of *kidung* are written in lontar. *Kidung* is usually sung during traditional and religious ceremonies, where the meaning and content of the song is the worship of God Almighty [1]. There are 5 types of *kidung* in Bali which are sung based on the *yadnya* of a ceremony, such as Dewa Yadnya, Bhuta Yadnya, Pitra Yadnya, Rsi Yadnya or Manusa Yadnya.

Mantram is a part of old literature because *mantrams* contain emotional elements, beauty elements in rhythm, and moral values. After all, mantras are assimilation between language and belief [2]. Mantras are also hymns dedicated to Ida Sang Hyang Widhi Wasa or God in Hinduism. One example of a mantra is the Tri Sandya Puja which is usually chanted by Hindus every day. The *mantram* is believed to be a revelation from Ida Sang Hyang

Widhi Wasa. Mantrams are sacred and have the power to protect those who recite them. Selfconfidence is the main factor and the most crucial factor so that the spell can be lucky. In addition to the importance of self-confidence, self-purity, cleanliness of mind, how to pronounce and rhythm of chanting mantras also significantly influence the success of a mantra. The ceremony (ritual) in Hinduism is an experience from implementing the five *yadnya*; the yadnya ceremony is five kinds of sacred offerings based on a sincere sense of sincerity. Yadnya is dedicated to Ida Sang Hyang Widhi Wasa/God which is called Dewa Yadnya. Rsi or Gurus referred to as Rsi Yadnya, the ancestors is Pitra Yadnya, fellow human beings is Manusa Yadnya, and the Bhuta or creatures lower than humans is Bhuta Yadnya [3].

The system can be interpreted as a collection or set of elements that are mutually organized, interact, and depend on each other [4]. Information is data that has been classified, processed, interpreted for use in making a decision [5]. An information system brings data management needs and then processes the data into useful information [6]. This information system will be developed to provide information about *Kidung* and *Mantrams* and their relation to the © 2022 Little Lion Scientific

easily, and efficiently.

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in the form of genealogies with different levels. Therefore, the tree structure is the suitable method to be used in the design of this information system. This information system was built to overcome the limited information regarding the existence of *Kahyangan Jagat* Temple and *Kawitan* Temple in Bali so that the general public, especially Hindus, could know more about the existence, events, and history that had previously occurred at the *Kahyangan Jagat* Temple or *Kawitan* Temple.

2. LITERATURE REVIEW

The literature review contains the theories used to support research and problem solving from the research made.

2.1 Information Systems

The system is a network of procedures that are interconnected, gathered together to perform an activity or complete a specific goal. An information system is a set of components related to one another and has the functions of collecting, processing, storing, and distributing information. The intended information is a collection of data that has been processed into a form that can later be useful for humans and can be used in making a decision.

2.2 Database

A database collects data stored systematically in a computer and can be processed or manipulated using software to produce information. The database is an essential aspect in the information system where the database is a data warehouse that will be processed further. Databases are important because they can avoid data duplication, unclear relationships between data, data organization, and complicated updates. MySQL (My Structured Query Language) is a SQL database management system software that can receive and send data quickly and use multi-users.

2.3 Tree Diagram

The tree method in computer science is a widely used data structure that resembles a tree structure with several connected nodes. A tree diagram is a method used to create a system modeling. The tree structure has specific characteristics and special properties that are used to connect the elements in a system [9]. Tree Diagram basically only starts from a condition separated by "yes" and "no" answers.

The tree data structure is similar to a tree. The tree data structure has roots, stems, and leaves. The difference between a natural tree and a tree structure

Yadnya ceremony in Bali. The aim is that the Hindu

community can find reliable information quickly,

system. The Forest Tree model was chosen because

the needs of the Model Tree in the Kekidungan System in the E-Yadnya System are very complex,

The Forest Tree model will be used in building the



images, videos, and animations.

Ratna Dewi, et al. [7] implemented a tree diagram with a case study of Bayuh Oton, which aims to provide information about the Bavuh Oton ceremony procession with offerings and the necessary facilities. Data Flow Diagrams (DFD) are used to assist in modeling and displaying processes that occur in the system. This method can describe the data mapping of the Bayuh Oton process connected to the offerings and the facilities for the ceremony. Ari Pinatih, et al. [8] conducted a study using a population census that implemented family tree modeling, which helped the management of Banjars in the population census process. One of the features of this information system is the management of Banjar organization data and the dissemination of information between communities, and carrying out a resume from the overall population census population graph. Manual population censuses can be converted into computerized and online ones to minimize paper usage and simplify the census process to save time, energy, and cost and become more efficient.

Research conducted by Oka Sudana [9] on a case study of tracing the history of the *Kawitan* and *Kahyangan* temples which implements a tree structure to search and collect temple data efficiently and quickly, and is also able to store data securely. Information from a temple has certain sub-subjects

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in computer science is that in computer science, a tree has roots at the top, contents, and leaves at the bottom. A tree can be static and dynamic. The static tree is a state where the shape of the tree has been determined, while the dynamic tree is a state where the tree's shape can change during the program run. The shape of the tree can change due to the operation of adding and removing nodes.

2.4 Yadnya Ceremony

The ceremony is the outermost layer of religion. Any religion has its ceremony, because the ceremony is an inseparable part of complete religious unity. The ceremony is a realization of religion or religious activities; a religion that does not have a ceremony does not appear to be manifested or its activities in society.

Yadnya is a Sanskrit word that comes from the root word "*yaj*", which means prayer. The root of this word "*yaj*" becomes the word *yadnya*, which means offering. The word Yajur Veda also comes from this root word "*yaj*". Yajur Veda means sacred knowledge about offerings. Thus the main content of the Yajur Veda scriptures are mantras regarding offerings to Hyang Widhi [3].

There is the term *Panca Yadnya* which means five sacred sacrifices that are shown to the creator or what we usually know in Hinduism, namely Ida Sang Hyang Widhi Wasa. Panca Yadnya has five types of ceremonies in Bali, namely, Manusa Yadnya, Dewa Yadnya, Pitra Yadnya, Rsi Yadnya, and Bhuta Yadnya, which have different debt redemption goals.

Dewa Yadnya is a form of offering, or sacrificial sacrifice, sincerely and sincerely addressed to the creator. Pitra Yadnya is a form of offering or sacrifice aimed at the spirits of the ancestors. Rsi Yadnya is a form of offering sacred works aimed at sages, saints, and teachers. Manusa Yadnya is a holy ceremony that aims to maintain life, achieve perfection in life, and human welfare during his life. Bhuta Yadnya is а sacred ceremony/ceremony aimed at Bhuta Kala or lower beings.

3. METHODOLOGY

Forest Tree is a scheme proposed by Leo Breiman in 2000 to build a predictive algorithm with some decision trees [10].



Figure 1: Simple Tree Algorithm

Forest Tree is a classification and regression method based on the aggregation of many decision trees, as shown in Figure 1. Specifically, a Forest Tree is an ensemble of trees built from the training data set and validated internally to generate response values from predictor values.

The Forest Tree model also has a copy logic that can be implemented in each entity. Copy logic is a logic in which a feature of an entity can be implemented into another entity without changing the parts of the original entity. In addition, to copy logic, the Forest Tree model also has reference logic. The difference between these two logics is in the reference logic; when a feature of an entity is implemented into another entity and the features of the entity that have been implemented are changed, the features in the original entity will also change.

Figure 2 is an example of implementing copy and reference logic. The picture on the left is the implementation of reference logic. When the features in entity D are changed, entity C, the originating entity, also changes. This does not occur in the logical copy process where the features of the original entity do not change even though the features of entity D are changed.

Forest Tree modeling is used in this system due to the complexity of the system to be created. Many involved entities are involved interrelated, and there are cases where a parent entity can be a child entity to another entity.

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Figure 2: Copy and Reference Logic in Forest Tree Model

The Forest Tree model built for this system consists of various entities that are connected to each other; these entities are kidung, mantram, percussion, gamelan, dance, and yadnya ceremonies.



Figure 3: Forest Tree Model

Figure 3 is the result of implementing the Forest Tree model on the created information system. Below is an overview of the system *Kekidungan* Information System. Figure 3 also shows a child-to-child relationship in which the Tari child entity has a relationship with the Tabuh child entity. The relationship between child-to-child is an advantage over the Forest Tree Model which makes this model the right model to be used in complex systems that have child-to-child relationships with many entities.



Figure 4:Ceremony Model

Figure 4 is a data flow Forest Tree that is built based on the combined results of the interrelated tree model. The implementation of the Forest Tree model was chosen because of the Copy-References function that can support the business process systems.



Figure 5: Overview of Kekidungan Systems

There is one entity in the form of a user, where there are privileges in Admin and User. The admin requests to send data about Kekidungan and mantrams data, then the data will enter into the system. Kekidungan and Mantrams Information System will request the database server with the internet as an intermediary. Here is a context diagram of this system:



Figure 6: Context Diagram

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Figure 7: Kidung and Mantram Model

Figure 7 depicts Kidung and Mantram based on the Forest Tree model in the information system that will be created.

4. RESULT AND ANALYSIS

4.1 Forest Tree Model Implementation Within the System

The implementation of the Forest Tree model on the system as a whole can be seen in Figure 8 below, where most of the Forest Tree modeling is shown. Figure 9 shows more detailed modeling where the entire Forest Tree model is shown.



Figure 8: Forest Tree Implementation Within the Information System

Figure 8 shows the results of implementing Forest Tree modeling on a system where almost all models are displayed. Yadnya is the root of this section, in which there are several entities, namely ceremonies, processions, dances, *gamelan* and *kidung*.



Figure 9: Forest Tree Implementation Within the Information System

Figure 9 is a detailed view of a yadnya ceremony; in this view, the entire modeling of the Forest Tree is shown. Detailed entities are part of the process which in Figure 8, Stakeholder Preparation is a process that includes detailed entities of process, dance, gamelan, kidung, percussion and mantra.

4.2 User Functionality

The following is a functionality or user privilege which consists of two types of users, namely administrators and normal users.



Figure 10: Dashboard View

Figure 10 is an administrator's dashboard. On that page, the Administrator can add, change, and delete data contained in the system, starting from dance data, gamelan, mantram, kidung, percussion, procession, and operators. <u>31st March 2022. Vol.100. No 6</u> © 2022 Little Lion Scientific



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7	Ceremony Procession Information Management	 4. Parenting Ceremony data with gamelan data, tari data, kidung data, tabuh data, also ceremony procession 1. Add ceremony procession data 2. Edit ceremony procession data 3. Delete ceremony procession data 4. Parenting ceremony procession data with gamelan data, tari data, kidung data, tabuh data, also mantram data
8	Tabuh Information Management	 Add Tabuh data <i>Edit</i> Tabuh data Delete Tabuh data
9	Validation Data	1. check the accuration data contained in the system

4.3.1 Black Box Testing Analysis

Black Box Testing is a testing technique that is carried out only by observing the execution results through test data and checking the software's functionality. Black Box Testing focuses on the functional specifications of the software. The following explains the black box type testing on the Balinese Song and Mantram Information System in the Integrated Yadnya Ceremony Information System using the Forest Tree Model.

Table 2.	Black	Box	Testing
----------	-------	-----	---------

Testing

Result

Name

4.3	System Testing	5	Login	The login process	Succeed
	The Kekidung	an Information System is	Process	will go to the	
tested	by running even	ry process in it. The test		dashboard page	
scenar	rio is as in Table 1			when The	
Т	able 1. Testing Sco	enario		Administrator	
No.	Process	Scenario		enters the	
1	Admin	1. Admin Registration		username and	
	Management	2. Edit Admin Data		nassword	
2	Gamelan	1. Add Gamelan data		correctly: if	
	Information	2. <i>Edit</i> Gamelan data			
	Management	3. Delete Gamelan data		wrong it will be	
3	Tari Information	1. Add Tari data		returned to the	
	Management	2. Edit Tari data		Login page	
		3. Delete Tari data		accompanied by	
4	Kidung	1. Add Kidung data		an alert for the	
	Information	2. Edit Kidung data		wrong username	
	Management	3. Delete Kidung data		and password	
5	Mantram	1. Add Mantram data	Dashboard	The dashboard	Succeed
	Information	2. Edit Mantram data	Page	nage will display	2000000
	Management	3. Delete Mantram data	i uge	data on the	
6	Ceremony	1. Add Ceremony data		uata on the	
	Information	2. Edit Ceremony data			
	Management	3. Delete Ceremony data		ceremonies from	
				each yadnya	

Figure 11 Upacara Yadnya View

Figure 11 is a data display from a yadnya ceremony, the display can only be accessed as a normal user. All data contained in the yadnya ceremony will appear on that page. The functionality of a normal user is only limited to viewing the data contained in the system without making changes to the data.

System Testing 4.3

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	accompanied by a			agrees to delete	
	navigation menu			the data, the data	
Yadnya	Yadnya	Succeed		is deleted.	
Ceremony	Ceremony page is		View	The Yadnya	Succeed
Page	a page that		Yadnya	Ceremony View	
	displays data for		Ceremony	displays data	
	each ceremony			ceremony name,	
	based on its			description of the	
	yadya; the data			ceremony, the	
	displayed is the			ceremonial	
	name of the			procession used,	
	ceremony and			dance, gamelan,	
	edit and delete			and kidung as	
	actions.			well as the mantra	
Add Yadnya	The Add Yadnya	Succeed		used	
Ceremony	Ceremony page is		Yadnya	The Yadnya	Succeed
Page	a page located in		Ceremony	Ceremony	
	the upper right		Procession	Procession	
	corner of the			displays data on	
	Yadnya			names,	
	Ceremony Page;			descriptions,	
	this page is used			details of the	
	to add ceremony			ceremonial	
	data, the display			procession,	
	that appears is a			dance, gamelan,	
	form			kidung, and	
Yadnya	The Yadnya	Succeed		mantras used	
Ceremony	Ceremony Edit			from the	
Edit Page	page is the page			ceremonial	
	that goes into			procession.	~ 1
	action on the		Yadnya	Details of the	Succeed
	page. The Yadnya		Ceremony	Yadnya	
	Ceremony Edit		Procession	Ceremony	
	page is the page		Details	Procession	
	that goes into			snowing the	
	action on the page			detailed name of	
	Yadnya			the procession,	
	Administrators			gemelen dence	
	con adit the			kidung and	
	vadnya ceremony			mantras used	
	data starting from		Kidung Bali	Kidung Bali page	Succeed
	the name		Page	is a page that	Succed
	description to the		1 age	is a page that	
	ceremony			data such as	
	nictures			kidung name	
Yadnya	The Delete	Succeed		data description	
Ceremony	Ceremony page is	Succed		or meaning of	
Delete Page	a pop-up page that			kidung, verse	
= 1 ugo	appears when the			kidung and audio	
	Administrator			data from kidung	
	deletes the			bali, besides that	
	yadnya ceremony			there are actions	
	data; when the			to view, add, edit.	
	administrator		L	, ,,	

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Kidung and The Kidung and Succeed Detail Mantra Mantra Details Page page for Users is for Users devoted to viewing the Balinese Song and Mantra detail data contained in the system

Based on black-box testing on all the features of each existing entity, the results show that all features can run well. Black box testing carried out on all existing features on the system has been successful because the system responds following the expected results.

4.4 Comparison of Model Tree Implementation

Table 3 explains the comparison of the Forest Tree Model in this system with the Tree model in previous research. This comparison is made to determine the advantages of implementing the Forest Tree model and the Tree model in information systems.

T-h1-2 Communication of Descent Descela

Table	Research Result	
Parameter	Forest Tree	Tree Model
	Model	
Case	Implementation	Implementation
Studies	of the Forest	of the Tree
	Tree Model on	Model on the
	the Balinese	Yadnya
	Kekidungan	Ceremony
	Information	Procession
	System	Information
		System on the
		Android
		platform
Background	Disinformation	Disinformation
	in society	regarding the
	regarding the	Yadnya
	use of Kidung	Ceremony
	and Balinese	Procession
	Mantras in	
	Yadnya	
	Ceremonies	
Advantages	– Only one	– There is only
	modeling is	one model, so
	needed that	the
	covers the	application of
	entire	the model
	business	becomes easy
	process of the	in information
	system	systems. The

Mantram	Mantram Bali	Succeed
Bali Page	page is a page that	
8.	displays mantra	
	data the category	
	of the mantra, the	
	description or	
	meaning of the	
	meaning of the	
	of the mantra, and	
	audio data of the	
	Balinese mantra;	
	besides that there	
	are actions to	
	view, add, edit,	
	and delete the	
	data of the	
	Balinese mantra	
Logout	Logout is leaving	Succeed
C	the system and	
	deleting the	
	session that was	
	formed during the	
	login process	
User	The User Home	Succeed
Homenage	nage displays five	Succed
Homepage	buttons	
	snaring the	
	yadnya	
	ceremony, and a	
	search bar and	
	menu bar	
Search Page	The User Search	Succeed
for Users	page is devoted to	
	users looking for	
	data on	
	ceremonies,	
	ceremonial	
	processions,	
	gamelan, dance,	
	kidung, to	
	mantras.	
Yadnva	The Yadnva	Succeed
Ceremony	Ceremony Details	
Details Page	page for users is	
for Users	devoted to	
101 00010	viewing the	
	Vadnya	
	Ceremony	
	Details which the	
	A dministration	
	Administrator	
	nad previously	
	added to the	
	system	

and delete kidung

bali data

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- There is a two-way integration between entities associated with the Forest Tree model	sustainability of this model is very easy to update.
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The comparison from the Table. 3 shows both of these studies focus on Balinese Gamelan and Yadnya Ceremonial Processions by using the Tree model as a basis.

5. CONCLUSIONS

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E-Githa, this information system aims of providing information to the public quickly and efficiently. E-Githa uses Forest Tree modeling that implements *Kekidungan* or Traditional Balinese Song information, which is integrated with the Yadnya Ceremony Information System. Forest Tree model allows child-to-child relation which the normal Tree model does not provide. It helps greatly in creating a system with many and complex entities where child to child relation is required. There are many entities and data in the system. From the black box testing, the result that the Forest Tree modeling is very suitable for modeling large, complex systems that have many entities.

However, the analysis has not discussed the completeness of other Yadnya ceremonies; for example, the modeling of Mantram, the connection with Tetabuhan and Tarian have a complexity similar to that of the Kekidungan system. In addition, the system needs to be complete with a reservation model for Hindu leaders who will lead the ceremony. The leader of this ceremony also consists of many types. The modeling of mantras and relatedness to Tetabuhan and Tarian requires a Forest Tree model similar to this e-Githa system.

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