

Case Service System at the Child Welfare Institution using the Case-Based Reasoning Method

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Abstract—The Child Social Welfare Institution (LKSA) is an institution tasked with providing relief services to meet the standards of living, health, education, and the social needs of both individuals and groups. An LKSA Robbani is one of the institutions that help in handling family and child cases by National Standards for Child Care. In solving child problems, the institution must open the previous case data to determine the appropriate solution, such that the service process becomes long. Therefore, an application software is needed that can help the institution to be faster. The developed system is using the Case-Based Reasoning (CBR) Method. The advantage of this method is how to adapt the solutions of the previous case, as well as in seeking similarity in each case that the most significant similarity value is considered the most similar case. The method is very suitable for building the application. The system that was built had to do a trial before being used by the user. The trial result was carried out of the system with manual calculations using the case-based reasoning method. Furthermore, from the results of the trial, it was produced by 87.5%.

Keywords — *child welfare institution, case service system, Case-Based Reasoning*

I. INTRODUCTION

The Child Social Welfare Institution (LKSA) is an institution tasked with providing relief services to meet the standards of living, health, education, and the social needs of both individuals and groups. LKSA is also the last alternative for abandoned children, no parents, and others. Not only that, LKSA is also a handling institution for every child and family problem. Based on the Republic of Indonesia Government Regulation No. 39 of 2012 article 1 [1], which states that the Implementation of Social Welfare is a directed, integrated and sustainable effort carried out by the Government, regional government and society in the form of social services to meet the basic needs of every citizen, includes social rehabilitation, social security, social empowerment, and social protection. The children's problems, it is categorized into several categories, one of which is child problems related to law (ABH). Condition for underage children who have committed criminal acts such as stealing and so on. The child categorized

as ABH must immediately receive service so as not to damage his future. An institution that assists the family is one of the improvement efforts, which is one of the LKSA that has recovery, protection, development, and improvement.

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In LKSA, there are case data stored in separate folders when facing new cases. The institution must open the old case data to find a solution to the problem based on the new case. In solving this problem, a suitable solution method is needed. The developed system is using the Case-Based Reasoning (CBR) Method. Because this method can group by similarities between new cases and old ones. The advantage of this method is how to adapt the solutions of the previous case, as well as in seeking similarity in each case that the most significant similarity value is considered the most similar case. So that makes it easier to provide solutions. So that makes it easier to provide solutions. This method is very suitable for building the application. This application uses the PHP programming language and MySQL database.

The objectives of this project are (i) contribution in determining case services for child problems appropriately and efficiently, (ii) Become a more effective service system, (iii) Facilitate public access to LKSA services and (iv) Helping to solve family and child problems.

II. CASE-BASED REASONING METHOD

Case-Based Reasoning (CBR) is a method for solving new problems by finding solutions to old cases that are similar then using the old case solution to solve new problems [2]. Case-Based Reasoning performs the process of remembering the resolution of the previous problem. Then when there are new problems, Case-Based Reasoning compares the

characteristics of new problems with problems that have been previously resolved [3], [4].

The processes involved in CBR can be represented by a schematic cycle as shown in Figure 1. CBR is typical as a cyclical process comprising the four R's [3], [5]:

- a. RETRIEVE the most similar case(s)
- b. REUSE the case(s) to attempt to solve the problem
- c. REVISE the proposed solution if necessary
- d. RETAIN the new solution as a part of a new case.

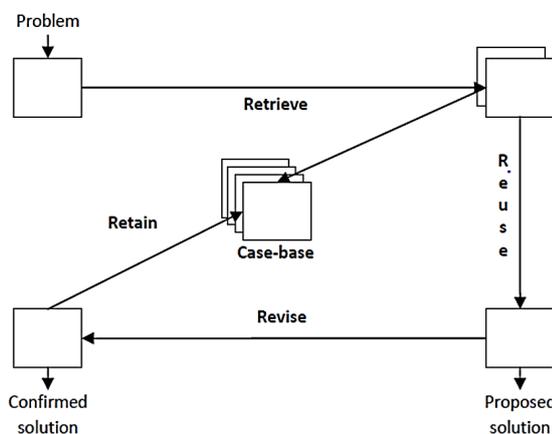


Fig. 1. The CBR Method Flow

Cases will be matched with cases in the CBR system, and one or more similar cases will be taken. Suggested solutions based on similar cases are then used and tested on new cases. Unless the case is suggested to be very suitable for the new case, then it is likely that revisions to the solution will be needed, and produce new cases to be retained/stored. The entire CBR process is carried out without human intervention or, in other words, automatically [4]. The advantages of using Case-Based Reasoning [6]:

- a. We are reducing the task of acquiring knowledge.
- b. Avoid repeating mistakes made in the past
- c. Provide flexibility in modeling knowledge
- d. Reasoning in a domain that is not yet fully understood, defined or modelled.
- e. Make predictions of the possible success of the solutions offered.
- f. Learning all the time
- g. Reasoning in a domain with little knowledge.
- h. Reasoning with incomplete or inappropriate data or concepts
- i. Avoid repeating all steps that need to be taken to reach a solution
- j. Provide an explanation tool
- k. Expanding many different goals
- l. Extending the reach of the domain
- m. Reflect on human reasoning.

In the training phase, the algorithm only performs vector storage of feature vectors and classification of sample training data. In the classification phase, the same features are calculated for testing data (the classification is unknown). The new classification point is predicted to belong to the most classification of these points [5].

III. PHP

PHP is a server-side script programming language designed for web development. Also, PHP can be used as a general programming language. Initially, PHP stands for

Personal Home Page. As the name implies, PHP is used to create personal websites. The PHP was developed in 1995 by Rasmus Lerdorf and is managed by The PHP Group, now. The official PHP site is located at <http://www.php.net>. The PHP is called the server-side programming language because PHP is processed on a server computer. The PHP is a different programming language compared to client-side programming languages such as JavaScript which are processed on a web browser (client). Within a few years of development, PHP has become a powerful web programming language. It is not only used to create simple web pages, but also popular websites that are used by millions of people like Wikipedia, WordPress, Joomla. Currently, PHP stands for PHP: Hypertext Preprocessor, a recursive extension, which is a word game where the abbreviation consists of the abbreviation itself: PHP can be used free (free) and is Open Source. PHP released in the PHP License, slightly different from the GNU General Public License (GPL), which is commonly used for Open Source projects [6].

IV. ROBBANI CHILD WELFARE INSTITUTION

The concepts of childhood problems, conceptually, there are terms of children who need social protection (CNSP) or children who need special protection. There are a number of things that need to be considered, among others: First, if children in the relationship between children and those around them are not scheduled or deliberately left behind. Second, if the child is in an environment that experiences conflict or war. Third, if the child is employed well informally or formally, the child does not get attention or approval. Fourth, if the child does work that has a high risk such as construction, mining, drilling etc. Fifth, if the child uses psychoactive substances. Sixth, if children are discriminated against because fission disability from birth is also an accident. Seventh, if the social status of vulnerable children is discriminatory because of their marital status. Eighth, if the child corrects conflict with the law and must correct it with law enforcement authorities.

To get service from the Robbani Child Welfare Institution (LKSA Robbani) in the form of assistance in handling child cases/problems/household education/counseling. The community must register so that they become assisted by the institution. After that, the community will be given documents to be filled out and surveyed by the institution. In the service of children, it is not uncommon for LKSA to require third parties, such as their immediate family, local village officials, or volunteers, to connect institutions with the community. Based on the analysis carried out, the institution needs an intermediary so that the community and institutions can communicate well. Moreover, accelerate the handling of cases experienced by the community, so that this project makes an application that can support the performance of the institution.

V. RESULTS AND DISCUSSION

The category table needs to develop and has contained categories of children and descriptions of explanations; the issues discussed are resolved based on the categories of children. Category Table can be seen in Table 1. While the Indicator data, as shown in Table 2 about the condition of the client. The system developed based on the client's problems based on the indicators and categories entered. After knowing the category and client indicators, the system provided

solutions as a basis for the institution to resolve client problems. Alternative suggestions can be seen in Table 3, while the database of the case problem collected in Table 4.

TABLE I. CATEGORY TABLE

Category_id	Category	Description
1	Displaced Children	Children who need special protection because of the environment condition that does not care
2	Street Children	Children who are employed either in formal or informal ties and spend more time on the streets, such as being buskers, car dyers
3	Children Face The Law	Underage children who commit criminal acts and must deal with law enforcement officers

TABLE II. INDICATOR TABLE

Indicator_id	Indicator	Weight
1	Orphans	3
2	Lie Often	2
3	Spend most of the time on the road	3
4	Basic needs are not meet	1
5	Often steal in the family environment	2
6	Wandering in public places and become traders, windshield wipers, street singers	3
7	Born because of rape	2
8	Smokers	3
9	Activities can endanger themselves	3
10	Commit a crime robbery, gambling, rape	3

TABLE III. SUGGESTION TABLE

Suggestion_id	Suggestion
1	Providing facilities to live in
2	Providing proper education
3	Guidance Parenting Skill, Productive economic business assistance, tracing and family reunification
4	Introduction to the community, meetings with the community leaders, program socialization
5	Bringing course, remedial course, skill training
6	Conduct social advocacy, legal advocacy, child psychosocial assistance

TABLE IV. DATABASE TABLE

Case_id	Category_id	Indicator_id	Category	Indicator
1	1	1	Displaced Children	Basic needs are not meet
		7		Born because of rape

2	1	1	Displaced Children	Orphans
		4		Basic needs are not meet
		7		Born because of rape
		6		Wandering in public places and become traders, windshield wipers, street singers
3	1	1	Displaced Children	Orphans
		4		Basic needs are not meet
		7		Born because of rape
		3		Spend most of the time on the road
4	2	1	Street Children	Orphans
		3		Spend most of the time on the road
		6		Wandering in public places and become traders, windshield wipers, street singers
		9		Activities can endanger themselves
5	2	1	Street Children	Orphans
		4		Basic needs are not meet
		3		Spend most of the time on the road
		6		Wandering in public

				places and become traders, windshields wipers, street singers
		9		Activities can endanger themselves
6	3	1	Children Face The Law	Orphans
		4		Basic needs are not met
		8		Smokers
		9		Activities can endanger themselves
		10		Commit a crime robbery, gambling, rape
7	3	2	Children Face The Law	Lie often
		4		Basic needs are not met
		5		Often steal in the family
		3		Spend most of the time on the road
		9		Activities can endanger themselves
		8		Smoker

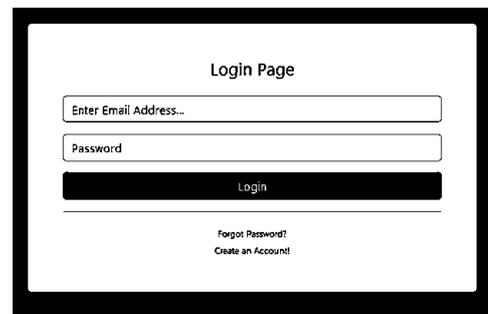


Fig. 2. The System Page Login

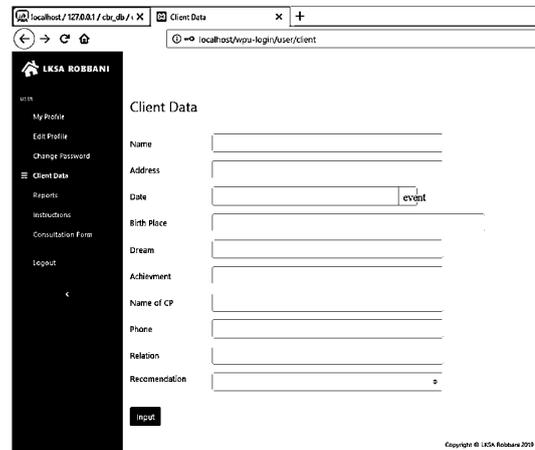


Fig. 3. The System Input Client Page

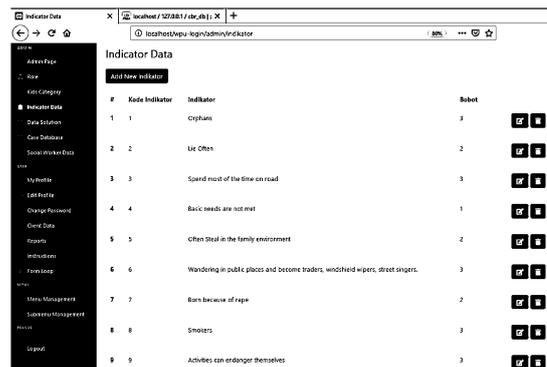


Fig. 4. The Indicator Data

In order to implement the application software cases based on the tables above, the First step, the login page, as shown in Figure 2 is created and has contained a username and password. If the user did not have an account, the user needs to register first. The main page that includes the menu and refers to other menus, on the left side, the list and the top right corner displays the user's main page view according to the below. Admin and social workers only can access admin pages. Pages to entry a client problem are provided. They are the indicator input page display, indicator data, and so on shown in Figures 4-9.

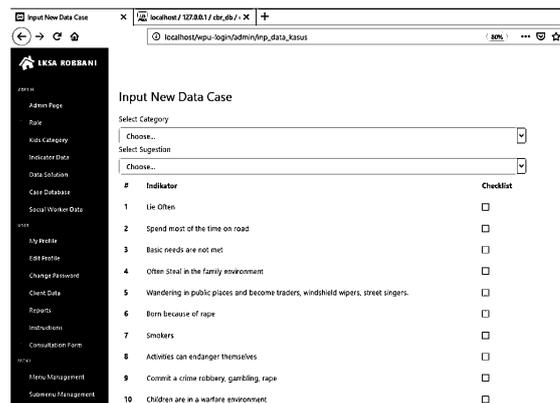


Fig. 5. The New Input Client Data

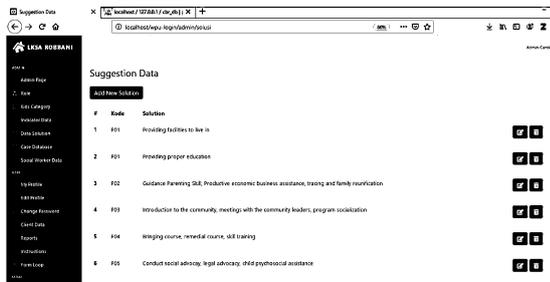


Fig. 6. The Suggestion Data

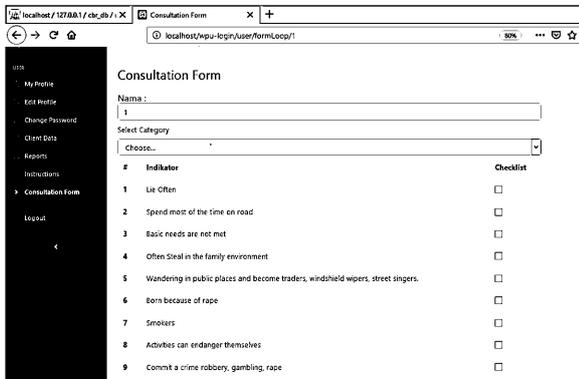


Fig. 7. The Consultation Form

The testing phase is to calculate the results of the system and be calculated with manual calculations. The first step is to select clients who will be reported to get service then select the category and indicator that matches the client's condition, click the consult button to get the results. The suggestion will be shown and can be printed by Admin. The admin will print the results and will convey to the client how to address the problem.

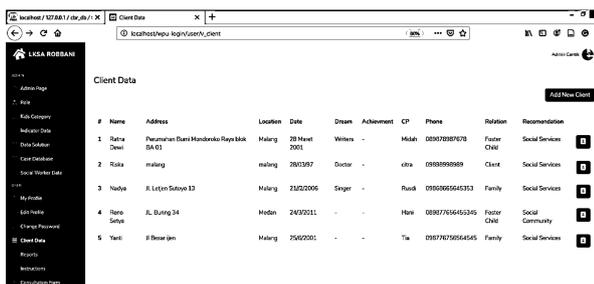


Fig. 8. The Client Data

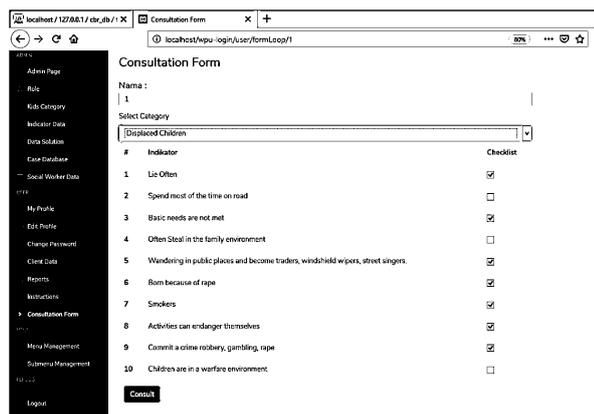


Fig. 9. The Consultation Form

The system built must be tested before being used by real users. The technology used in building the system has been developed, the system interface used, which consists of data used in the application of indicator data, category data, case data has been created. After some experiments have been carried out, using the CBR method obtained 87.5%.

VI. CONCLUSION

The purpose of this study is to facilitate institutions in providing services to troubled clients or children, a case service system based on a case-based reasoning method that is built into a solution to the problems faced by the institution. By inputting several indicators based on the client's conditions and categories, then a solution will be obtained for the client. And there is a percentage of similarities between the old case and the new case to facilitate the institution, so the institution does not need to open the old case document, which can slow down the service of the case. Case service systems based on the case-based reasoning method can be implemented in institutions, and trials have been carried out with a percentage similarity result of 87.5%. Even though this system gets good results, the institution can only read the results of the consultation because it does not issue information from the selected indicator. This system can also be applied by combining several methods so that the results obtained are more accurate.

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