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Implementation of String Matching Algorithm in Customer Data PT. PLN (Persero) Krueng Geukueh District

Oris Krianto Sulaiman\textsuperscript{1*}, Aldy Waridha\textsuperscript{2}, Dian Hendrawan\textsuperscript{2}, Susi Ekalestari\textsuperscript{3}, Purwarno\textsuperscript{3}, Andang Suhendi\textsuperscript{3}, Sri Wulan\textsuperscript{3}, Pardi\textsuperscript{3}, Devi Pratiwi\textsuperscript{3}, Zulfan Sahri\textsuperscript{3}, Safitri Hariani\textsuperscript{3}, Amrin Siregar\textsuperscript{3}, Muhammad Faith Suhadi\textsuperscript{3}, Purwanto Siwi\textsuperscript{3}, Asnani\textsuperscript{3}, M Manugeren\textsuperscript{3}, Muhammad Ali Pawiro\textsuperscript{3}, Nuzwat\textsuperscript{3}, Yanhar Jamaluddin\textsuperscript{3}, Syofyan\textsuperscript{3}, Nur M Ridha Tarigan\textsuperscript{3}, Alamsyah Lukito\textsuperscript{6}, Meri Susanti\textsuperscript{3}, Metrilitna Br Sembiring\textsuperscript{7}, Asnawati Matondang\textsuperscript{3} and Habibullah\textsuperscript{8}

\textsuperscript{1}Faculty of Engineering, Universitas Islam Sumatera Utara Medan, Indonesia.
\textsuperscript{2}Faculty of Agriculture, Universitas Islam Sumatera Utara Medan, Indonesia.
\textsuperscript{3}Faculty of Literature, Universitas Islam Sumatera Utara Medan, Indonesia.
\textsuperscript{4}Faculty of Social and Political Science, Universitas Islam Sumatera Utara Medan, Indonesia.
\textsuperscript{5}Faculty of Economics, Universitas Islam Sumatera Utara Medan, Indonesia.
\textsuperscript{6}Faculty of Medicine, Universitas Islam Sumatera Utara Medan, Indonesia.
\textsuperscript{7}Faculty of Teacher Training and Education, Universitas Islam Sumatera Utara, Medan-Indonesia
\textsuperscript{8}Faculty of Islamic Religion, Universitas Islam Sumatera Utara Medan, Indonesia.

* oris.ks@ft.uisu.ac.id

Abstract. According with the development of information technology and the expand of the internet in the community, the need for computers is very important to support the increasingly high utilization of information technology. Processing data and information requires speed and accuracy of data, to achieve it, it is requires an information technology that can support work so the work becomes more effective and efficient. PT. PLN (Persero) Krueng Geukueh District is a company that runs in the area of electricity and provides services to the community in the provision of services related to electricity, which has a large number of customers. The process of managing customer data at PT. PLN (Persero) Krueng Geukueh District has used a customer data system, but still has a disadvantage of requiring more time in searching customer data, to solving this problem, the author designed the development of the system using the string matching algorithm method, which is one of the most important parts in various processes related to data and text types, one of which is the search for words in customer data. The performance of the string matching algorithm is to match a letters per letter with the keywords given by the staff. The results of this study indicate that by using this method, searching for customer data can be easier. With the development of this system, it is expected that staff or admin in the company can do the work more effectively and efficiently.

1. Introduction
The development of technology in the computer world has progressed very rapidly, especially computer information technology, encouraging the emergence of new innovations in the presentation of information to fill information needs [1]. Presentation of data or information in the form of subjects or objects in a company or institution requires the existence of a database. A database is a complex
collection of data or information, where the data is organized into several groups with similar data types, where each data is interconnected with one another or can stand alone, making it easily accessible [2][3].

The advantage of databases is now widely used by companies or government agencies for various purposes [4], one of which is the use of handling customer databases owned by PT. PLN (Persero) Krueng Geukueh District. There is a lot of customer data that is owned by PT. PLN (Persero) Krueng Geukueh District, so it takes a long time to manage the data. At PT. PLN Krueng Geukueh District has a Customer system, but it still has weaknesses, which requires a long time to input data, search data, and print customer data.

String Matching method is part of the string search process plays an important role in obtaining documents that are in accordance with information needs [5][6]. String matching can be divided into two: exact string matching and string matching based on similarity (inexact String Matching / fuzzy String Matching) [7]. Fuzzy String matching (inexact String Matching) is a string match that searches for the same string and also the string that approaches the other strings collected in a container or dictionary. Matching strings based on similarities can still be divided into two, namely based on writing similarity (approximate String Matching) and based on phonetic String Matching [8][9]. In this problem the author used fuzzy String matching process approximate similarity approach and brute force which represent exact String Matching algorithm. As for this matching, the author is more centered on analyzing customer name strings because the name of the person (customer) is a string that has various forms of writing in one person's pronunciation in the input of customer data. For example in this problem a string of names of people has a form of writing letters that are varied but have the same way of pronunciation in one person's name, so that an appropriate rule and analysis is needed to analyze the problem of matching people's name string data.

2. Related Works
String matching algorithm or also called String matching or is a method used to find an accuracy or the result of one or several text patterns given. String matching is an important subject in computer science because the text is the main form of information exchange between humans, for example in literature, scientific work, web pages and so on [10]. String search can also be used to look for bit patterns in a large number of binary files. In string matching algorithms, text is assumed to be in memory, so if we search for strings in an archive, all the contents of the archive need to be read first and then stored in memory [11].

3. Research Methodology

3.1. Literature Study Method
The literature review is related to the issues discussed, such as designing information systems and analyzing information system feasibility [12]. The author conducts research into libraries and internet media that have to do with the applications that will be made, such as by reading books and studying the literature related to the system that will be created. Where at this stage the author designed a search system that is able to overcome existing problems, so that the system is made feasible to use.

3.2. Observation Method
The observation method is that the author makes a direct observation on the object of the problem, so the writer gets the data and information directly on the object of the problem at PT. PLN (Persero) Krueng Geukueh District Lhokseumawe.

3.3. Interview Method
The author conducts direct interviews with employees in agencies that aim to obtain accurate and correct data and information. This is done so that the system design is made according to the needs and requests of the users.
3.4 Programming Tools
In designing and developing an information system certainly requires several tools in the form of a programming language or a tool. In this information system using several tools, namely: Hypertext Preprocessor (PHP) and XAMPP as a web server, using a database from MySQL, Sublime Text for application coding, and HyperText Markup Language (HTML) and CSS to create an application display.

4. Result and Discussion
4.1. Former System Analysis
After conducting research on the former system (using manual methods) that are running, there are problems in the former system to be evaluated and designing a new system in order to overcome the problems that occur in the old system. From the author's observations while undergoing practical work at PT. PLN (Persero) Krueng Geukueh District, this company already has a customer data management system. But the system is still not effective and efficient in finding customer data, so it requires a very long time to find customer data. Therefore, the author tries to implement the string matching algorithm in the customer data of PT. PLN (Persero) Krueng Geukueh District which is an effective solution to help the staff in providing information quickly and precisely.

4.2. New System Analysis
The system to be built is a system by implementing string matching algorithms on customer data of PT. PLN (Persero) Krueng Geukueh District, which will be used by staff or admin at PT. PLN (Persero) Krueng Geukueh District. The implementation of the string matching algorithm aims to facilitate staff or admin in finding and managing customer data. With the existence of this system, the staff will be greatly helped and simplify the work in managing customer data effectively and efficiently.

4.3. System Design
The design of a system will be done after an analysis of a system has been skipped. Designing can be defined as drawing, designing and making a pattern or sketch of a number of separate elements into one whole unit or often called an interface. The design of this information system was built aimed at facilitating the staff or admin of PT. PLN (Persero) Krueng Geukueh District in managing and looking for customer data.

4.4. Unifield Modelling Language (UML)
The class diagrams show the relationships between classes in the system being built and how they collaborate with each other to achieve a goal. The following is a description of the class diagram of the Implementation of String Matching Algorithms in Customer Data of PT. PLN (Persero) Krueng Geukueh.

![Class Diagram](image)

Figure 1. Customer Class Diagram
There are 2 (two) different classes on one customer class diagram. The two classes are the User class and the Customer class. Each of these classes is related to each other, such as admin that regulates everything starts from managing customer data, to print customer data that has been inputted.

In the User class, it has attributes such as user ID, username, password, and fullname. Then there are also customer classes that have attributes such as customer IDs, addresses, rates, power, and substations. When the admin / user manages customer data then the class user will relate to the customer class, one admin / user can manage many customer data. Class diagrams are very helpful in visualizing the class structure of a system. This is because the class is a description of the group of objects with properties, behavior (operations) and the same relation. Referring back to the case of customer data above, the main focus in this case is the search for customer data. Therefore the focus on this class diagram is customer data

**Table 1. User Table**

| Nu | Field Name     | Data Type | Size | Information     |
|----|----------------|-----------|------|-----------------|
| 1  | customer_id    | Integer   | 13   | Primary Key     |
| 2  | idcustomer     | Varchar   | 13   |                 |
| 3  | name_customer  | Varchar   | 30   |                 |
| 4  | address_customer | Varchar | 80   |                 |
| 5  | rate           | Varchar   | 30   |                 |
| 6  | power          | Integer   | 11   |                 |
| 7  | substation     | Integer   | 11   |                 |

**Table 2. Customer Table**

| Nu | Field Name   | Data Type | Size | Information     |
|----|--------------|-----------|------|-----------------|
| 1  | user_id      | Integer   | 11   | Primary Key     |
| 2  | username     | Varchar   | 30   |                 |
| 3  | password     | Varchar   | 32   |                 |
| 4  | fullname     | Varchar   | 30   |                 |

4.5. System Implementation

Implementation is an application of a system that has been analyzed. Implementation steps cannot be carried out before the system analysis phase has been completed. The implementation phase starts with the interface process or the design of a system interface. This interface design will be a container for inputting, changing and deleting a data that will be managed. After the interface has been created, the system can also be used.

In the initial form or the start page of a system if a user wants to use the system, then the user is must enter or be called login in the first. This form functions for system user validation. If the user wants to enter the system, the first thing the user does is enter the username and password on the login form. After the user enters a username and password, the next thing the user does is press the login button. After pressing the login button, the system will automatically read the validity and data entered. Here there are two choices, if the data entered is invalid, the system will display an error message and return
to the login form. And if the data entered is correct or valid, the system will display the main menu of the system.

5. Conclusion
From research on the customer data system of PT. PLN (Persero) Krueng Geukueh District, the author draws some conclusions:

1. PT. PLN (Persero) Krueng Geukueh District already has a customer data system. However, the system does not provide forms to search customer data, manage customer data, and cannot print customer data. Therefore, the author tries to design a customer system at PT. PLN (Persero) Krueng Geukueh District which is an effective solution to help staff in providing computerized information, can speed up work in data collection and facilitate the process of finding data and information in the company and facilitate printing customer data.

2. Designing of Customer Data Systems PT. PLN (Persero) Krueng Geukueh District was built using PHP so that later it will have a more attractive appearance and use MySQL databases so that the customer database management at PT. PLN (Persero) Krueng Geukueh District becomes more effective and efficient.

3. Suitability of customer data can be searched with the keywords provided, this makes the system more effective in searching customer data.

4. With the Customer Data System PT. PLN (Persero) Krueng Geukueh District, the staff will be able to input customer data, search customer data, view customer data and print customer data. With this system, the staff will be greatly helped to make and store data quickly and efficiently.

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