Mobile Based Android Application Pharmaceutical Dictionary with Direct Search as Searching Process

Akbar Iskandar, Markus Dwiyanto Tobi Sogen, Jacky Chin, Erwinsyah Satria, Rohman Dijaya

Abstract: Searching in a dictionary is natural and must be done to facilitate the search for information that is desired, the search process varies and requires a good algorithm so that the search results are also maximum. Direct Search is an algorithm that is used to help the process of finding data that is input by the user so that the information needed by the user can appear correctly. The search process with direct search will match words that are inputted with data in a dictionary in sequence and of course with the application of algorithms the results obtained will be faster than random search.

Keywords: Android, Data Finding, Dictionary, Direct Search, Searching Process, Sequence, Sequence Search

1. INTRODUCTION
In an era of rapid development[1] of information and communication technology, most modern societies have been reluctant to find information in a book[2]. Along with the rapid development of Information Technology, the need for a concept and mechanism for IT-based teaching and learning becomes inevitable[3]. The concept known as e-Learning brings the effect of the process of transforming conventional education into digital forms, both in content and system[4]–[6]. Android is a Linux-based operating system that provides an open platform for developers to create their own applications[7]. This operating system is open source so that programmers can easily make the optimization. Prototype the Pharmaceutical dictionary application is one application that can be made on the Android platform so there is no need to use a manual dictionary in the form of books to find meaning from pharmaceutical terms[8], [9]. Direct Search String Matching method is a search method that is used as a special algorithm to simplify and speed up the process of finding data in a dictionary by comparing characters that are close to a word[10]. The application of Direct Search string matching method is expected to be able to provide good performance in the process of finding data in dictionary.

2. METHODS
Searching is an activity that is commonly carried out when doing daily work related to data and information[11]–[13]. Searching is performed to find out whether the data exists or not from a set of data, or maybe also to determine the position of the data sought for certain purposes. The simplest search can be described as follows: Suppose that a data line is X [1] - X [n], then the problem is whether Y (any data with the data type is the same as the data type in line A and is usually inputted or known in advance) is between X [1] - X [n] or whether Y is inside or not with Boolean results. Data search method can be divided into 2 parts, namely,

1. Methods of searching data without data placement such as,
   a. Linear / Sequential Search method.
   c. Interpolation Search method.

2. Methods of searching data with data placement such as,
   a. Direct Search method.
   b. Relative search method (Hash Search).

Each search algorithm has different prerequisites and methods and process times. The selection of search methods is based on the circumstances and desires of the method users who usually depend on the amount of data, the type of data and the data structure used.

Direct Search
Search can be done easily if at the time of placement of data in the row its position has been determined first by using a certain formula[14], so that when searching for data enough to use the previous formula to find out whether the data exists or not in that row[15]. By using the existing formula, it can be ascertained that if the data sought (X) is in the line then its position at the time of placement must be the same as when searching. The search process is only used to check whether the position contains or is empty or has been deleted. If the position contains it must be occupied by data X because the function (formula) used is (I - 1). In this way the direct search process can be performed on any X data either SUCCESS or FAIL with only one function calculation. The function used can be defined as follows:

1. For the size of a table starting at 0, that is,
   \[ H (X) = X \text{ div } [\text{table size}] \]
2. For the size of the table starting from 1, namely,
   \[ H (X) = X \text{ div } [\text{table size}] + 1 \]

with:

- \( X \) = data value
- \( H (X) \) = function result

For example, suppose that a number sequence is known: 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 40 with the amount of data = 12, and the number of locations used for data placement = 12. Process placement and data search is done by using a function that is (I - 1). Suppose that the function is \( F (X) = X \text{ div } 3 \) so that the process of placing data A sequence is as follows,

\[
F (X) = X \text{ div } 3 \\
X = 4 \rightarrow F (4) = 4 \text{ div } 3 = 1 \\
X = 7 \rightarrow F (7) = 7 \text{ div } 3 = 2 \\
X = 10 \rightarrow F (10) = 10 \text{ div } 3 = 3 \\
X = 13 \rightarrow F (13) = 13 \text{ div } 3 = 4 \\
X = 16 \rightarrow F (16) = 16 \text{ div } 3 = 5 \\
X = 19 \rightarrow F (19) = 19 \text{ div } 3 = 6 \\
X = 22 \rightarrow F (22) = 22 \text{ div } 3 = 7 \\
X = 25 \rightarrow F (25) = 25 \text{ div } 3 = 8 \\
X = 28 \rightarrow F (28) = 28 \text{ div } 3 = 9
\]
X = 31 → F (31) = 31 div 3 = 10
X = 34 → F (34) = 34 div 3 = 11
X = 40 → F (40) = 40 div 3 = 12

This is sample data how direct search process, If the sequence number A is sorted like the following, Suppose the data sought (X) = 15 then the process of finding data using the string method is as follows:

1. Search starts from the data of the first element in row A.

   N = 8: X = 3

<table>
<thead>
<tr>
<th>9</th>
<th>15</th>
<th>19</th>
<th>23</th>
<th>40</th>
<th>89</th>
<th>91</th>
<th>52</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

   I = 1: Found = False
   While (1 <= 8) And Not (False) → True
   If (15 >= 9) Then
   I = 1 + 1 = 2

2. Data is not found and the data sought (X) is greater than the data of the first element in row A, so the search process is continued to the data of the second element in row A.

   N = 8: X = 3

<table>
<thead>
<tr>
<th>9</th>
<th>15</th>
<th>19</th>
<th>23</th>
<th>40</th>
<th>89</th>
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<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

   I = 2: Found = False
   While (2 <= 8) And Not (False) → True
   If (15 >= 15) Then
   Found = True
   While (2 <= 8) And Not (True) → False
   If (True) Then
   Print 15

Data is found in the second position of the A number row and the success search

3. RESULTS AND DISCUSSION

The results of applying the direct search search algorithm to pharmaceutical dictionary applications are made in application prototype models such as the following:

Figure 1. Main Interface
This form is the main form when the application is run and can be used for admin and general users to see all data in the dictionary.

Figure 2. List of Pharmaceutical Data
Figure 2 is an interface that is used to display all data regarding pharmaceutical terms and also information in the form of a grid.
Figure 3 is a form used to display the data search simulation process that exists in the pharmaceutical dictionary database, the process results in the form of information on how the data is processed and searched until it is found.

4. CONCLUSION
The prototype application that is made based on Android can run with the emulator and by applying the direct search search process to the data that you want to display (if you find it) is quite good, it's just that the search process is very slow because you have to search the data sequentially and if the data you want to search at position 300 the data must be checked from positions 1 to 299 and of course this will require a long time and resource but in terms of the accuracy of the search for this algorithm it is quite good. The next development is expected to be combined with other algorithms that are faster than the search process and do not take up large resources.

References