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Product Search Information System Using Brute Force Algorithm in Website-Based Perfume Store

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Abstract: The aim of this research is to discuss a product search information system using a brute force algorithm in a website-based perfume shop. Search using a brute force algorithm, where the algorithm is used to search between text patterns in a website-based search. The research method used is the waterfall method, while the data collection method is by conducting interviews and observations. After testing, it was found that the average time was 0.001792355 seconds from 30 keywords resulting in 100% accuracy, thus the application of the brute force algorithm can be used to solve problems in searching for perfume products.

Keyword: product search, brute force, website.

INTRODUCTION

Technology is a development of hardware and software. With the development of technology that was previously still manual, such as correspondence, buying goods or products, now it can be done via short messages or SMS (Short Message Service), buying goods can be done via websites and applications. The word technology comes from the word "technologia" or it can also be from the word "techno". So the meaning of the two words is a skill or things related to knowledge. In essence, an information system is a development in the field of information in carrying out daily tasks, be it information or dissemination of information. One of them is website-based system technology, a website-based system is an information system or application that is accessed and run via the internet using a web browser. In this system, various functions and business processes are integrated into one unit that can be accessed by users from various locations and devices connected to the internet. Website-based systems offer various advantages, including ease of access, scalability, and easy use. Ren Perfume is a perfume sales business in Bekasi. Currently, the difficulty for Ren Perfume is not having its own website, in a significantly increasingly competitive business environment. Without a website, Ren Perfume may lose out to competitors who have their own websites.

Without a website, it is difficult for customers to find detailed information about products or services, such as product descriptions, prices, and how to order. Ren Perfume now relies solely on third-party platforms such as marketplaces or social media to sell their products, which can limit their reach and exposure to potential customers. Relying on third-party platforms also carries risks, such as sudden policy changes or unexpected additional costs that can affect the profitability of their business. In a study, Google sites were used as contact information to disseminate reports related to citizen portals for the comfort and security of the surrounding community (Sinlae, 2023). The evolution of web technology from Web 1.0 to Web 5.0 has brought significant changes in communication, business, education, and social life. Web 1.0 is static and informative, while Web 5.0 is more emotional and intuitive (Sinlae et al., 2024). Creating a website can also use WordPress CMS tools and Elementor plugins to facilitate content management and speed up the development process. This website provides various features such as news pages, career services, and alumni data that can be easily accessed by all members (Sinlae & Yasir, 2024). Information technology in recent decades has developed greatly into various aspects of life, one of which is in the field of education. In today's era, various sources of information on the internet can be utilized and used as learning media, such as searching for references for teaching materials, assignments, quizzes, and even school exams (Yasir & Sinlae, 2023).

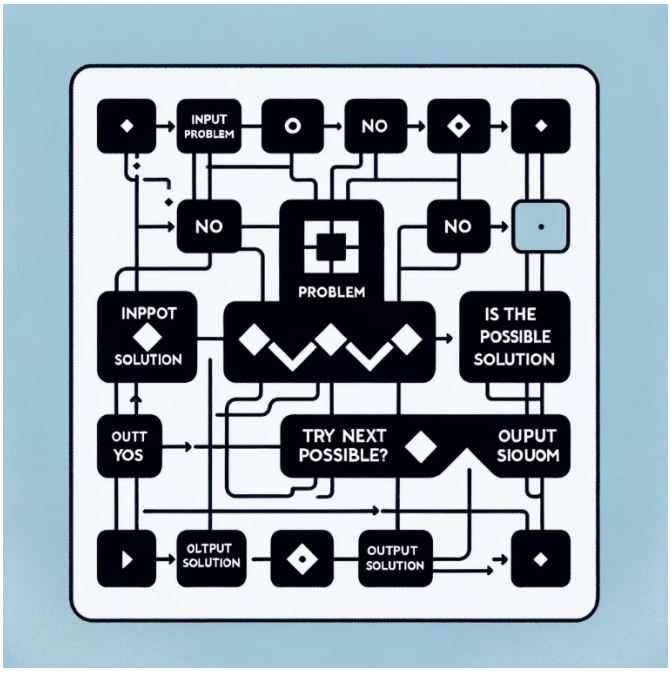
There is some literature that supports this research is: Development of an Android-based registration information system application using the waterfall method, brute force algorithm, integrated with a real-time firebase database and cloud firebase storage, makes it easier for prospective new students to access PMB information and register via the Android application (Suprapto et al., 2020). BRI Internal Training Management Information System using Agile Method, especially Extreme Programming Method (XP), and Brute force Algorithm as a tool. XP is used because it is known as a fast and flexible method in accommodating changes in user needs (Kurniawan & Fauziah, 2023). The Brute Force algorithm is a search algorithm used to match patterns with all texts in the health term dictionary application database. This algorithm works by comparing characters per character until a match is found or the text runs out (Pratiwi et al., 2016). The Brute Force and Knuth-Morris-Pratt (KMP) algorithms are algorithms that can be used to search for words or strings, where the KMP algorithm is proven to be faster in the search process than the Brute Force algorithm with a time difference of 0.03 seconds (Safitri et al., 2024). The Brute Force algorithm is used to search for strings in the form of 'photocopy' locations on the map, with a straight forward method that compares patterns in each character in the text. Although simple, this algorithm takes a relatively longer time than other methods (Zahra et al., 2024).

Brute Force Algorithm is a direct approach used to solve string matching problems in land systems, by comparing characters one by one until a match is found between the pattern and the text. The implementation of this algorithm helps facilitate land data searches quickly and efficiently (Rahayu et al., 2023). The Brute Force algorithm works by comparing each character of the string entered by the user with all the strings in the system until a string is found that matches the search keyword. The implementation of this algorithm on the news website is able to speed up the news search process with high accuracy (Andriansyah et al., 2021). The Brute Force algorithm is used to perform string matching by comparing each character in the searched string with all characters in the string in the database. The string matching results allow users to find news information quickly and accurately (Nainggolan et al., 2021). The Brute Force algorithm is used as a search method in this dictionary application to compare the strings entered by the user with all the strings in the dictionary database. This algorithm is able to produce search results quickly and efficiently, making it easier for users to find computer and informatics terms accurately (Rismayani et al., 2021). The Brute Force algorithm is used in this study to solve the problem of optimal tourist routes in Yogyakarta. The results of the implementation of this algorithm show that the most optimal route has a total

cost of Rp 100,300.00, while the least optimal route costs Rp 131,000.00 (Condro Wibawa, 2022). The Brute Force algorithm allows the missing person search system to match keywords entered by the user with data in the database. The matching process is done by comparing string patterns with text, thus allowing for accurate and relevant search results (Azis et al., 2021).

METHOD

In accordance with the title of the research on the product search information system using the Brute Force algorithm based on the website. So from this research a website-based perfume sales system will be designed, this research will be focused on product searches using the Brute Force algorithm. By creating this system, it will make it easier for customers to find a product and find out detailed information about the product they are looking for.



Source: Research Results

Figure 1. Brute Force Algorithm

Here is an example of a brute force algorithm in a search:
Text (X) : HORIZONTAL
Pattern (Y) : ASYCHORIZONTAL

Table 1. Step 1 Brute Force Algorithm

X	**H**	**O**	**R**	**I**	**Z**	**O**	**N**	**T**	**A**	**L**				
Y	A	S	Y	C	H	O	R	I	Z	O	N	T	A	L

Source: Research data

In the first step, the first character is different from the specified pattern, then it is shifted from left to right once.

Table 2. Step 2 Brute Force Algorithm

X		**H**	**O**	**R**	**I**	**Z**	**O**	**N**	**T**	**A**	**L**			
Y	A	S	Y	C	H	O	R	I	Z	O	N	T	A	L

Source: Research data

In the second step, if the first character in the text still does not match the second character in the pattern, then it is shifted one time to the right.

Table 3. Step 3 Brute Force Algorithm

X			H	O	R	I	Z	O	N	T	A	L		
Y	A	S	Y	C	H	O	R	I	Z	O	N	T	A	L

Source: Research data

In the third step, if there is still no match between the first character in the text and the third character of the pattern, then shift it once to the right.

Table 4. Step 4 Brute Force Algorithm

X				H	O	R	I	Z	O	N	T	A	L	
Y	A	S	Y	C	H	O	R	I	Z	O	N	T	A	L

Source: Research data

In the fourth step, the first letter of the text with the fourth character of the pattern has not been found, so shift it one time to the right.

Table 5. Step 5 Brute Force Algorithm

X					H	O	R	I	Z	O	N	T	A	L
Y	A	S	Y	C	H	O	R	I	Z	O	N	T	A	L

Source: Research data

In the last step, a match is found between the text and the pattern. The example above shows how the brute force algorithm works. The brute force algorithm will match the string from left to right if it does not match then it continues to be shifted to the right until the searched string matches the pattern.

Input : m, n as length of pattern and text, x as text, y as pattern
Process : Loop i=0 to m-n then j=0, If smaller than n and x[i+1] = y[j], Then J = j plus 1, End if j is greater than or equal to, n then pattern = true (found), End loop
Output : Pattern found

RESULTS AND DISCUSSION

The following is an application of the Brute Force algorithm in conducting product searches.

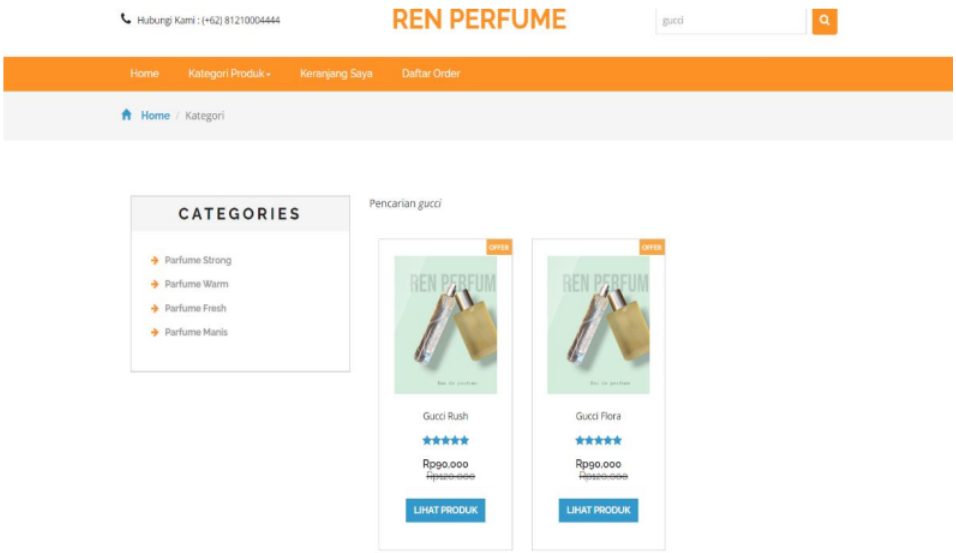
```
<div class="agile_top_brands_grids">
<?php
//
if(isset($_POST["Search"])){
$ar=BruteForce($cari);
$gab="";
$j=0;
for($i=0;$i<count($ar);$i++){
    $txt=$ar[$i];
    $brgs=mysqli_query($conn,"SELECT `idproduk` from `produk` where `namaproduk` like '%$txt%'");//or `deskripsi` like '%$txt%'
    while($p=mysqli_fetch_array($brgs)){
        $idp=$p['idproduk'];
        $arID[$j]=$idp;
        $gab.="$idp, ";
        $j++;
    }
}

$arf=getDist($arID);
$JD=count($arf);
$i=0;$list="<ol>";
$arID=array();
for($h=0;$h<$JD;$h++){
    $idproduk=$arf[$h];
    $cr = mysqli_query($conn,"select * from `produk` where `idproduk`='$idproduk'");
    $p = mysqli_fetch_array($cr);
        $arID[$i]=$p['idproduk'];
        $arGB[$i]=$p['gambar'];
        $arNM[$i]=$p['namaproduk'] ;
        $arR[$i]=$p['rate'];
        $arH[$i]=$p['hargabefore'];
        $arHB[$i]=$p['hargaafter'];
        $list.= "<li>$idproduk : $arNM[$i]</li>";
        $i++;
```

Source: Research Results

Figure 2. Source Code Brute Force Algorithm

There is a source code for the Brute Force algorithm, this implementation uses the PHP programming language and uses Visual Studio Code as a code editor. The following is a display of search results based on the name of the perfume product available on the product search information system using the Brute Force algorithm on a website-based perfume store.



Source: Research Results

Figure 3. Perfume Product Search Results Source: Research Results

There are search results for perfume product names, on this page customers can view products by entering keywords in the available search bar. In the search results the system will display search results with the keywords searched.

The brute force algorithm is used in this study to perform the string matching process. Implementation into a product search information system using the brute force algorithm in a website-based perfume store. Can make perfume product searches more accurate and faster. In this way, it can make product purchases more effective and efficient. The following is an example of a brute force algorithm case in searching for a product on the Ren Perfume website-based store:

Text (X) : GUCCI FLORA
Pattern (Y) : FLORA

Table 6. Step 1 Implementation Brute Force Algorithm

X	**G**	**U**	**C**	**C**	**I**		**F**	**L**	**O**	**R**	**A**
Y	F	L	O	R	A						

Source: Research data

In the first step, the first character is different from the specified pattern, then shifted from left to right.

Table 6. Step 2 Implementation Brute Force Algorithm

X	**G**	**U**	**C**	**C**	**I**		**F**	**L**	**O**	**R**	**A**
Y		F	L	O	R	A					

Source: Research data

In the second step, if the first character in the text still does not match the second character in the pattern, then it is shifted one time to the right.

Table 6. Step 3 Implementation Brute Force Algorithm

X	G	U	C	C	I		F	L	O	R	A
Y			F	L	O	R	A				

Source: Research data

In the third step, if the first character in the text still does not match the third character of the pattern, then it is shifted one time to the right.

Table 6. Step 4 Implementation Brute Force Algorithm

X	G	U	C	C	I		F	L	O	R	A
Y				F	L	O	R	A			

Source: Research data

In the fourth step, if the first character in the text still does not match the fourth character of the pattern, then shift it one time to the right.

Table 6. Step 5 Implementation Brute Force Algorithm

X	G	U	C	C	I		F	L	O	R	A
Y					F	L	O	R	A		

Source: Research data

In the fifth step, if the results do not match the first character in the text with the fifth character of the pattern, it will be shifted one time to the right.

Table 6. Step 6 Implementation Brute Force Algorithm

X	G	U	C	C	I		F	L	O	R	A
Y						F	L	O	R	A	

Source: Research data

In the sixth step, if the results do not match the first character in the text with the sixth character of the pattern, it will be shifted one time to the right.

Table 6. Step 7 Implementation Brute Force Algorithm

X	G	U	C	C	I		F	L	O	R	A
Y							F	L	O	R	A

Source: Research data

In the last step, a match is found between the text and the pattern. The example above shows how the brute force algorithm works. The brute force algorithm will match the string from left to right if it does not match then it continues to be shifted to the right until the searched string matches the pattern.

CONCLUSION

Designing a product search information system using a website-based brute force algorithm can be useful for facilitating the process of searching for perfume products and being able to see detailed product information, so that the search process will be faster and get accurate results. The results of the product search information system design trial using the brute force algorithm on a website-based perfume shop, using black box testing, showed that the system ran well and shortened product searches.

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