Comparing and Analyzing the Effectiveness of Various String Matching Algorithms Across Different Domains

Research Question - How do different string matching algorithms perform across various application domains, and what factors contribute to their varying effectiveness?

Words: not enough

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1 Introduction

The impacts and applications of string matching algorithms extend far beyond their immediate textual applications; its quotidian use in domains such as bioinformatics, web crawling and security systems make it a pertinent area of study within computer science. There is also constant research being carried out to identify more efficient algorithms, and find ways in which to combine them with other disciplines to carry out certain tasks.

For instance, multiple studies have been recently published performing various comparative analyses of new string matching algorithms [5], and their applicability to a wide range of domains such as biological sequences [6], quantum computing [7], and instrusion detection systems [8]. These findings indicate the modern-day relevance and applicability of string matching algorithms and demonstrate its worthiness as a subject of investigation.

Similarly, this paper seeks to adopt an investigative style by examining **how different string matching algorithms perform across various application domains, and the factors that contribute to their varying effectiveness**. The choice of this research question is both relevant and justifiable, reflecting the persistent demand for evaluating and optimizing string matching algorithms across a range of applications.

To examine this subject, three popular string matching algorithms were programmed and tested on their ability to carry out three tasks from three different domains. They are then evaluated on their efficiency, and applicability. To maintain focus on the research question, the reasoning and rationale behind all the decisions will be explained to demonstrate how they directly address the question.

2 Theoretical Background

2.1 Topic Overview

2.2 Naive Algorithm

2.3 Knuth-Morris-Pratt Algorithm

2.4 Rabin-Karp Algorithm

3 Experimental Methodology

3.1 Research Question Decomposition

3.2 Measuring Performance

3.3 Application to Domains

4 Experimental Results Analysis

5 Conclusion

6 References

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Question 1

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(a) Do this.

(b) Do that.

(c) Do something else.

6.1 Algorithmic issues

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Algorithm 1: `FastTwoSum`

Input: (a, b), two floating-point

numbers

Result: (c, d), such that

$$a + b = c + d$$

if $|b| > |a|$ **then**

$\quad |\quad$ exchange a and b ;

end

$c \leftarrow a + b$;

$z \leftarrow c - a$;

$d \leftarrow b - z$;

return (c, d) ;

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Question 2 *(with optional title)*

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7 Implementation

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hello.py


#! /usr/bin/python


import sys
sys.stdout.write("Hello World!\n")
```

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Command Line
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$ chmod +x hello.py

$ ./hello.py


Hello World!
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