COSC 320 – 001
Analysis of Algorithms
2022/2023 Winter Term 2

Project Topic Number: #2

Milestone 4

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DataSet and Laguange used:

We used - Dataset, which is a dataset about This dataset containing 2,688,878 news articles and essays from 27 American publications. It contains .txt files. We trimmed the data because of the lack of computation power of our system. We had 500 articles in our dataset which has over 5 million characters. We initially decided to implement our code in

GitHub Repository:

https://github.com/Sumer26/project-cosc-320.git

Summary:

- **Milestone 1**

For Milestone 1, our group worked on the analysis of the Knuth-Morris-Pratt(KMP) algorithm. We explained the pseudo-code, the proof of correctness. In order to detect plagiarism, Due to the fact that the algorithm was not discussed in class, our group had to conduct initial research. We divided the tasks equally among the team members. The process involved looking for a pattern in a master array and determining where the pattern occurs. The algorithm's complexity was examined, and its runtime was found to be O(n+m).

- **Milestone 2**

For Milestone 2, our group worked collaboratively to analyze and document the LCSS algorithm. We included pseudo-code, algorithm analysis, proof of correctness, unexpected cases/difficulties, and citations. We divided tasks equally among three members, with each member was responsible for a specific aspect of the project. We faced some difficulties in understanding the algorithm, but we did thorough research to overcome those difficulties. We found that The algorithm's runtime was O(nm).

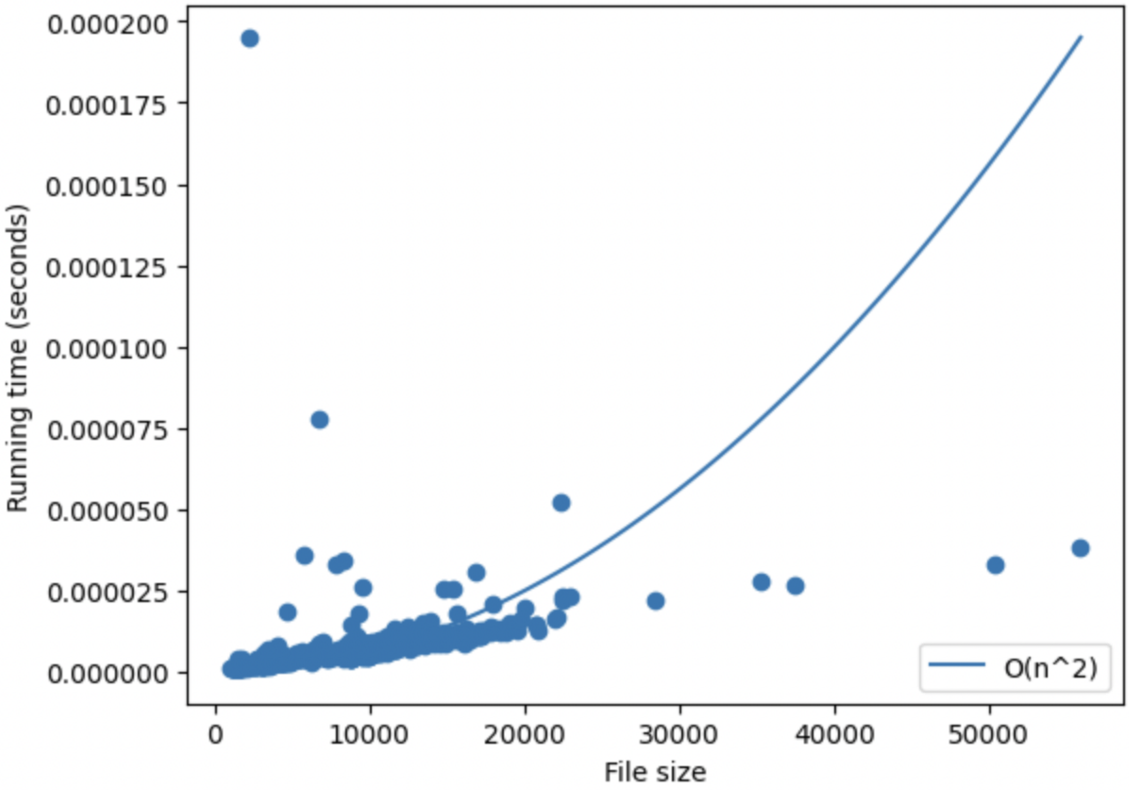
- **Milestone 3**

For Milestone 3 we did the implementation of KMP. We trimmed the data because of the lack of computation power in our system. We used KMP to detect what part of the algorithm is plagiarised by making an input string and searching it in all the articles to detect from where the input string was taken. Various test strings were tested and searched across the articles in our dataset. We also tested empty strings to see the effect of how the KMP algorithm works. To compare the performance of the algorithm in various cases, we have plotted the graph of the number of iterations the KMP algorithm needs to search a pattern to the varying lengths of the patterns.

- **Milestone 4**

For milestone 4, we have completed all three algorithms with implementation and graphs. The LCSS algorithm is the longest subsequence finding algorithm that is one of the many algorithms needed for plagiarism detection. Then we also implemented the Rabin-Karp Fingerprints Algorithm. This is one of the best string matching algorithms which is used when any kind of plagiarism is to be detected. This is based on the hash mapping technique. This technique is chosen because of its efficiency and can detect matches in a very constant time. Furthermore, taking the help of graphs, we tried to answer some of the questions that were

Results (Milestone 4):



Unexpected Cases/Difficulties:

One unexpected difficulty we encountered during the implementation and testing of the KMP algorithm was our group member got ill and it caused us some delays during the milestone but we figured and managed to complete the project collectively as a group. The graph showed a linear relationship between the length of the pattern and the number of iterations required for the algorithm to search for it.

Task Separation and Responsibilities:

We divided tasks equally into 3 members as:

- Sumer Mann: Implementation and graphs
- Jay Bhullar: Implementation and Dataset collection.
- Dhairya Bhatia: Documentation and Implementation.

Citation(s):

All the News 2.0 — 2.7 million news articles and essays from 27 American publications. (n.d.). Components. https://components.one/datasets/all-the-news-2-news-articles-dataset