**Abstract**

**Introduction**

Damerau-Levenshtein is a string metric algorithm used in computer science to measure how different two string sequences, or simply their edit distance. It aims to retrieve the minimum number of operations required to change the first string into the second. The 4 basic operations are insertion, deletion, substitution, and transposition of two adjacent characters.

The definition of the Damerau-Levenshtein distance between two strings *a* and *b,* and a function da,b(i,j), whose value is a distance between the symbol prefixes *i* and *j*, is:

* refers to the deletion operation (*a to b*)
* refers to the insertion operation (*a to b*)
* compares whether the respective symbols   
  match or mismatch.
* refers to the transposition of two adjacent symbols

The algorithm was named after Frederick J. Damerau and Vladimir I. Levenshtein, on which the latter introduced the edit distance concept and algorithm, while the former further improved the evaluation by integrating the comparison and transposition between adjacent characters. Damerau thought that transposition is also one of the most common operations in human misspellings.

The common applications of this algorithm include taking on a significant role in natural language processing. In natural languages, the number of errors usually do not exceed 2 as the strings involved in this processing are short. These circumstances put great impact on the difference between restricted and the real edit distance, making them almost similar. Another application is DNA sequencing and checking. Most of the time, the DNA gets edited and manipulated through insertions, deletions, substitutions and transpositions, and usually all of them occur at the same time. Damerau-Levenshtein can be used to compare strands of DNA to the target DNA to check the variation.

**Algorithm**

*Serial*

*Parallel*

Comparison

Conclusion