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A novel optimization algorithm (Lion-AYAD) to find optimal DNA protein synthesis



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ABSTRACT

In this paper, we present a new algorithm to find the optimal proteins generated through DNA synthesis. The algorithm executes in five stages: in the first stage, it takes a DNA sequences and consider it as the initial populations of lions, determined the main positions of each lion and the main distances among lions and goal point then consider this distance as fitness of that lions, after that sort the lions based on their fitness to preparing it to the second stage. The second stage develops lion optimization algorithm (LOA) by adding four new features on it, each feature performance one task, a replacing the kernel of LOA (i.e., searching machnizam) by spirally searching & Bubble net searching to increase the accuracy, at the same time reduce the execution time to reach of the goal achieve by A Smart feature. The main purpose of the third stage is determining lion active or more yauld where each lion in population need update the positions and fitness after each move in searching space to reach of their goal., this achieved through Yauld feature. The fourth stage applies the Cooperative features to convert the active sequence of DNA (i.e., Yauld lion) into mRNA after that built tRNA from it after splitting it into triplet to start to generate the proteins. Synthesis of all triplet of tRNA to generated final proteins result by new optimization algorithm achieved based on deep composite that satisfies the four rules, this feature called Deep feature and represent the final stage of the algorithm. The new algorithm appears as a pragmatic optimization model, it proves their robust to work with dynamic length of DNA sequence. It increases accuracy and reduces execution times.

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1. Introduction

DNA replication is semi-conservative in nature. DNA is comprised of a double-stranded helical base of nucleotides. This double strand “unzips” at the beginning of the replication process, separating into two single strands, which can be copied. Each of the two strands is then replicated, resulting in two new daughter strands of DNA from the parent helix, while conserving the original

base sequence of the parent strand. **(a) Continuous DNA Replication**, and **(b) Discontinuous DNA Replication**.

Optimisation is an overall term used in many areas, intelligent computation in different types also in different sciences to reach of the best values (i.e., These values take multi names such as minimum, maximum, less cost, high performance, etc.) Based on the nature of the problem and what the researchers need to prove from this problem (i.e., Based on the objective function/functions of the problem). Sometimes the field of used determined the specific definition of term optimization.

In this paper, we will focus on optimization of the side algorithms by enhancing the search machnizam and add new capabilities into one of the optimization algorithms that begin search on optimal values based on specific strategy apply on initial population and in each step attempts to find the best path and values allowed it to near from their first sub goal, Then Second etc. to reach of the final goal (i.e., search sequence of sub goals to reach of the final solution of problem). The main properties should con-

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