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Binary Monkey-King Evolutionary Algorithm for single objective target based WSN

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Abstract

INTRODUCTION: Target based WSN faces coverage issue in which many targets could not be efficiently covered by static deployed sensors.
OBJECTIVES: This paper covers the issue of coverage problems by deploying the sensors to cover all the targets with minimized sensors in number.
METHODS: This paper proposes a Binary based Monkey King Evolutionary Algorithm for solving target based WSN problem, the proposed model consist a Binary method for converting the continuous values into binary form to solve the choice of potential position to place the sensors.
RESULTS: The proposed algorithm is evaluated in a 50x50 grid and 100x100 grid to track the performance and the performance of the proposed is compared with GA and PSO.
CONCLUSION: This paper utilized the MKE algorithm for improving the efficiency of the target coverage problem in WSN. It mainly focused on a single objective-based solution providing for small scale problems. From the simulation results, it is provided that the proposed MKE algorithm obtained 1.86 % of the F-value, which is higher than the other optimization algorithms such as GA and PSO.

Keywords: Single objective WSN, Genetic Algorithm, Particle Swarm Optimization, Monkey King Evolution Algorithm

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1. Introduction

Recently automation has been boomed drastically in our day-to-day lifestyle. Some of the real-life examples which include automation are driverless cars, houses without human security, etc. These automation techniques are highly used in various kinds of monitoring applications like monitoring, tracking, and measuring various environments. When comes to sensor networks the basic component used in the network is the sensor. Sensors can be deployed in any network, without changing the existing infrastructure can move, and communicate with one another using wireless communication mediums. It is also called Wireless Sensor Networks (WSN). The key point in WSN is coverage which means occupying the entire sensor field without any lack of performance. For the deployment strategy of WSN efficiently is still existing as a big task for the researchers. Many algorithms are proposed in either exact methods or as optimization techniques.

The exact method includes Dynamic Programming, Divide and Conquer Approach, etc. This algorithm works exhaustively. It generates and compares all the possible combinations of input values to obtain the best output. These kinds of exact algorithms are highly suitable for small scale problems or problems with less dimensional data. But for large scale problems, the time complexity of finding the best solution increases exponentially. Then