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# Sparrow Search Algorithm-based Resource Management in Internet of Things (IoT)

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## Abstract

INTRODUCTION: The principle of Internet of Things (IoT) completely concentrates on integrating heterogeneous entities for establishing seamless cooperation among virtual and physical entities. IoT has facilitated a paradigm shift of the Internet from collaborating networks to physical world interaction. The IoT devices are potent in sensing, processing, communicating and data storing that are derived from the physical world. The majority of the IoT applications are considered to be pervasive in characteristics and face huge challenges due to unattended IoT devices and constrained resources.
OBJECTIVES: The proposed Sparrow Search Algorithm-based Resource Management (SSARM) targets on the potential assignment of resources to gateways in an IoT environment with better establishment in maintaining the tradeoff between intensification and diversification. It concentrates on the reduction of total data transmission cost in the IoT environment.
METHODS: In this paper, Sparrow Search Algorithm-based Resource Management (SSARM) is proposed based on the inspired by the foraging, group wisdom and anti-predation characteristics of sparrow for potential assignment of multiple resources to gateways in IoT. This SSARM balances the degree of exploitation and exploration in the optimization search space to an acceptable level.
RESULTS: The simulation results of this proposed SSARM confirmed better throughput of 23.82%, reduced delay of 18.21% and minimized energy consumption of 20.28% when compared to the existing schemes.
CONCLUSION: This SSARM offers better accuracy in stability, convergence rate, precision in searching and preventing the value of local point of optimality.

**Keywords:** Internet-of-Things (IoT), Resource Allocation, Sparrow Search Algorithm, Gateways, Optimization search space

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## 1. Introduction

The rapid proliferation emerging in the domain of Internet of Thing (IoT) and its associated application has introduced a challenge to its users with respect to the scalable number of devices deployed in the environment [1]. The management of physical sensing resources, data formats and a large variety of protocols need to be handled with the objective to derive maximum merits from the deployed equipments [2]. However, the process of provisioning and efficiently managing the IoT devices is cumbersome in most of the situations [3]. This management also in turn depends on the concept of resource sharing, resource pooling, elasticity characteristics and on-demand provisioning [4]. The IoT device resources are generally linked statically to particular applications and users as they necessitate huge efforts during their management, configuration and deployment [5]. Moreover, low utilization and high costs incurred during the management of resources also pose