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Collision Mitigation algorithm for tracking of RFID based assets in Defence

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Abstract

INTRODUCTION: Asset tracking plays a crucial role in Military warehouses, deploying RFID system will be beneficial. When an RFID reader scans multiple tags in the Military warehouse, the missing tags and redundant tag problem occurs due to the signal interferences. To overcome these issues of missing tags and redundant tags, we proposed Cuckoo Search-based Clustering Protocol (CSCP) followed by linear classifier algorithm.
OBJECTIVES: The primary objective of this paper is reducing the collision problems in military warehouse
METHODS: In this paper, we propose Cuckoo Search-based Clustering Protocol (CSCP), where cluster heads delete duplicate data and sends processed data to the base station, Later the TDMA-based graph colouring technique is implemented to prevent reader collision issues in the RFID network. The Linear Classifier algorithm first separates similar data for classification, which in turn reduces the collision occurrence of missing tags and redundant tags.
CONCLUSION: In the RFID deployed military warehouse, cluster head readers are selected, and clusters are created. Readers are scheduled to read information from tags in the cluster using the TDMA-based graph coloring algorithm. The linear classifier algorithm classifies the weapon's data and filters the redundant weapon's data in RFID deployed military environment.

Keywords: RFID, Reader Collision, Tag Collision, Cuckoo Search based Clustering Protocol, Linear Classifier, Hill Climbing

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1. Introduction

RFID is a technology which uses radio frequency waves for transferring data between readers and tags. Typically, the tag is attached to an object, that helps RFID system to detect, categorize and track objects. RFID is speedy, reliable and needs no physical line of sight or contact between reader and tagged item. RFID System has two components: Tag and Reader. The RFID tag has two parts such as microchip and antenna. The microchip is used to store the information and can be accessed when required and antenna is used to receive and transfer the signal from reader. The tag possesses separate serial number for each item. RFID Reader is used to scan the items containing tags. Interrogator or readers also called two-way radio transmitter – it receives the information from tags and transmits the information to the computer. There are two types of tag Active Tag and Passive Tag.

Now a day a common problem faced in Military warehouse scenario using RFID system is collision. Some weapons might not get scanned using reader which results in missing tags or else scanning the same tags repeatedly