An Efficient Tag Identification Scheme in RFID Systems

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Abstract

RFID is a generic term for technologies which use RF waves to identify, track, or categorize any object. One of the research areas in RFID systems is a tag anti-collision protocol; how to reduce identification time with a given number of tags in the field of an RFID reader. There are two types of tag anti-collision protocols for RFID systems: tree based algorithms and slotted aloha based algorithms. Many anti-collision algorithms have been proposed in recent years, especially in tree based protocols. However, there still exist challenges on enhancing the system throughput and stability due to the underlying technologies having faced different limitation in system performance when network density is high. Recently, a Wrap-Around Scan (WAS) technique, which is a tree based approach, was proposed and aims to speedup tag identification in large scale RFID systems. The main idea of the Wrap-Around Scan is to limit the number of collisions by moving to next level as the number of collisions exceeds a predefined threshold. The WAS method indeed improves the efficiency in high density RFID systems. However, the reader using WAS scheme will spend some unnecessary queries for the idle response. In this paper, we proposed an intelligent wrap-around scan technique, which is called the iWAS scheme, to avoid those unnecessary queries. The simulation results show that the proposed techniques provide superior performance in high density environments. It is shown that the iWAS is effective in terms of increasing system throughput and minimizing identification delay.

Keyword：Tag anti-collision; query tree; wrap-around scan