

Radio Frequency Identification in Supply Chain

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Overview

Radio frequency identification (RFID) describes a wireless non-contact application of radio frequency electromagnetic fields in transferring data in an attempt to automatically identify and track tags that are attached to objects. Usually, the tags are comprised of electronically stored data. Some tags can be powered and read at close proximity through magnetic fields, while others utilize local power source like battery. The battery-powered tags can operate at exceedingly vast distances. The tags do not necessarily require to be within a line of sight of a reader, but can be embedded in the object being tracked (Bidgoli, 2010). RFID has many uses and most companies have come to a decision on an application of the RFID technology in their industries of operation. RFID has a principal role in the supply chain. As smart companies are striving hard to minimize costs and improve their services, they consider the application of RFID technology as a chief force in boosting their operations. It has become exceedingly cumbersome to manage what people cannot see; however, with the emergence of RFID technology, management of distant business operations has become straightforward. Such simplification was acquired due to the role of the RFID technology in streamlining the supply chain (Bidgoli, 2010).

History

An early idea of the RFID came from Harry Stockman through his work published in 1948. Although the idea came long ago, there were other innovations that were required to work for the RFID technology. These inventions included the transistor, integrated circuit, microprocessor, and development of communication network (Miles et al, 2010). In the 70s, inventors, developers, academic institutions, government laboratories and companies became actively involved in the working of RFID. Notable advances became realized by various

academic institutions and research laboratories. The development of short-range radio telemetry signaled the beginning of completely passive tags having operational range of several meters. During the 70s, most of the work involved the development of RFID technology. Most applications were intended for factory automation, vehicle tracking and animal tracking. Examples of animal tagging works included the microwave systems in Los Alamos and the inductive system in Europe. Since animal tagging was high in Europe, Nedap, Alfa Laval and others became interested in the development of RFID systems. The 80s became the decade, when there was full implementation of the RFID technology. Although there were various purposes of the RFID technology use, the greatest interests in America were for personnel access, transportation, and animals. On the other hand, in Europe, vast interests were in short-range systems for industrial applications and animals as well as transportation. The personal computer was the key to the swift expansion of the RFID technology. The reason was that personal computers permitted economical and convenient collection and management of information from RFID systems. The 90s saw a significant, large-scale application of the RFID technology. Researches and developments during the 90s together with new technologies expanded the functioning of the RFID technology (Miles et al, 2010).

Application of RFID Technology

Product Tracking

The technology has a wide variety of uses. One of the purposes is tracking of goods. Most companies use the technology in tracking goods such as vehicles and phones. Automobile companies and phone companies usually make their commodities with devices that are capable of using the RFID technology in case of loss or theft (Hunt et al, 2007). Goods that are to be transported over a long distance can be tracked using this technology.

Inventory and Asset Management

The technology can also be used in access management. Operational anomalies usually occur, since it is cumbersome seeing distant operations. However, RFID technology helps in increasing equipment, inventory and business operations and process visibility. Through increasing business process visibility, the technology resolves business anomalies leading to increased access management (Hunt et al, 2007). Besides, it increases efficiency through optimizing business processes as well as automation of inventory and asset management. Further, through providing real-time and updated information to the entire supply chain, the technology aids in the management of business operations.

Transport and Logistics

The RFID technology is also used in transport and logistics. In the railroad industry, tags that utilize the RFID technology are usually mounted on the locomotives and aid in the identification of the owner, equipment type and identification number. The technology can be used in identifying the origin, lading and destination among other things of the commodities carried. In commercial aviation, the technology is used in supporting maintenance of commercial aircraft since it helps in identifying cargo and baggage at several airlines and airports. In addition, RFID technology is used in access control; consequently, identification badges and cars are fitted with RFID tags, which aid in authenticating the holder accessing a certain controlled area (Hunt et al, 2007).

Case Studies

IBM Company

IBM Company utilizes RFID technology in tracking conference attendees. The company ensures that the tags worn by attendees have RFID tracking systems. This aids in automatic

tracking of their meal and session attendance. The RFID system utilized by the company helps in offering a lot of raw data. The data helps the company in providing information regarding future conference planning like optimizing sessions around demands and interests of conference attendees (Thibodeau, 2007).

Blue C Sushi

This is five chain kaiten restaurants. Blue C first utilized the RFID technology as a way of dealing with the common challenge in the kaiten restaurants; notably, monitoring the time a certain plate of sushi has stayed on a conveyor. Such procedure was intended to ensure that everything eaten by diner was fresh. Through placing RFID tags on the plates, the company was capable of eliminating challenges. Besides, the company was capable of eliminating wastage of food through using the RFID technology since chefs were capable of telling when sales were decreasing (Totty, 2009).

Sughrue Mion PLLC

This is a vast law firm in Washington. The company keeps a record of its work in approximately 20,000 paper files. This implies that the records can be buried in piles or lost on an attorney's desk. In managing this gigantic paper trail, the company's library utilizes the RFID technology. Various files contain different RFID tags, which help an attorney in accessing files fast. Therefore, the RFID technology has aided the company in enhancing its services since files can be located swiftly (Totty, 2009).

Challenges

Technical Challenge

Some frequencies used in one country are not compatible with frequencies in the other country. For instance, RFID frequencies used in America are not compatible with RFID

frequencies used in Japan or Europe. In order to address international trade issues, it is critical to use RFID tags that are operational within the international frequency domain. The lack of compatibility of the RFID frequencies implies that tracking of some information may become rendered void in some countries. Therefore, there is a technical challenge of compatibility.

Security Concerns

The use of RFID tags on products helps in providing security in vast firms such as Wal-Mart since when a product having an active RFID tag is passing the exit scanners, it sets off an alarm and tells security personnel about the product to find in a shopper's cart. RFID tags can be tracked implying that if a person buys a product having a RFID tag, it is possible for people to track and know the exact location of the person. This is a security concern since it poses a threat to personal security.

Data Flooding

Although the use of RFID is beneficial since it provides a lot of information, however, not every observation is useful to a business. A vast amount of data, which is generated, is not useful. Therefore, the use of RFID causes flooding of information that is unnecessary. This calls for data filtering to reduce the flooding of unnecessary data.

Conclusion

Radio frequency identification (RFID) involves a wireless non-contact use of radio frequency electromagnetic fields in transferring data so as to automatically identify and track tags that are attached to objects. This technology has an application in the tracking of commodities that contain the RFID tags. For instance, tracking of automobiles and phones can be done through using this technology. Besides, the technology can be used in the transport industry

and asset management. Although the technology has various applications, it has some challenges. Data flooding and security risk are the principal challenges.

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