

RFID – A Disruptive Technology

Mrs.Pratima Kadam

¹Bharati Vidyapeeth's College of Engineering, Lavale, Pune.

Abstract - Radio Frequency Identification System (RFID) is an involuntary technology and assist ports or computers to identify objects, record metadata or control individual target through the radio waves. Connecting RFID reader to the terminal of Internet, the readers can identify, track and monitor the objects attached with tags worldwide, automatically, and in real time, if needed. This is also the recent famous trend of Internet of Things (IOT). RFID is often seen as a must for the IOT. RFID is the latest trend in current virtual world.

Key Words: Key Words: RFID, RFID Reader, RFID Tags.

1. INTRODUCTION

RFID is technology which works on radio frequency and it is utilized for the auto-ID for the diverse item. The goal of this paper is to unfurl the significant parts of the Radio Frequency Identification innovation. Radio Frequency Identification (RFID) is automated identification recognizable proof innovation having more noteworthy identification abilities than standardized tags. Around the world, the RFID innovation goes about as a base in robotized information assortment, recognizable proof and investigation of dynamic frameworks. RFID has discovered its significance in a wide scope of business sectors including animals distinguishing proof and Automated Vehicle Identification (AVI) frameworks due to its capacity to follow moving items.

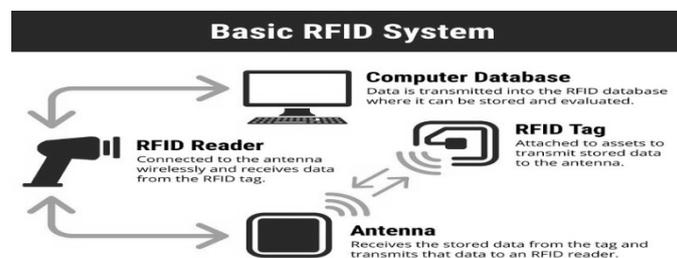
RFID is technology which works on radio frequency and it is used for the auto-identification for the different object.

The RFID system mainly consists of two parts:

- 1) RFID Reader or interrogator.
- 2) RFID Tags.

RFID Reader: It is also known as transceiver (transmitter/receiver). RFID reader incessantly sends radio waves of particular frequency. If the object on which this RFID tag is mounted is within the range of this radio waves then its sends the acknowledgment back to this RFID reader. And based on this feedback, RFID reader identifies the object.

RFID Tags: Is also known as transponders (transmitter/responder), are attached to the objects to count or identify. Tags could be either active, passive or semi-passive. Active tags are those that have partly or fully battery powered, have the capability to communicate with other tags, and can initiate a dialogue of their own with the tag reader. Passive tags, on the other hand, do not need any internal power source but are powered up by the tag reader. Semi-passive tags are battery powered. Semi-passive tags do not transmit active signals. Tags consist mainly of a coiled antenna and a microchip, with the main purpose of storing data.



1.1 METHOD

How RFID works?

RFID Reader:

RFID Reader mainly consists of three components. RFID Reader is a RF signal generator so this signal generator generates radio wave which are transmitted using this antenna also to receive the feedback signals which is coming from the tag. The RFID reader also have a signal detector or receiver to process the information which is being send by the RFID tag. This RFID reader also have microcontroller. Many times this RFID reader is directly connected to the computer.

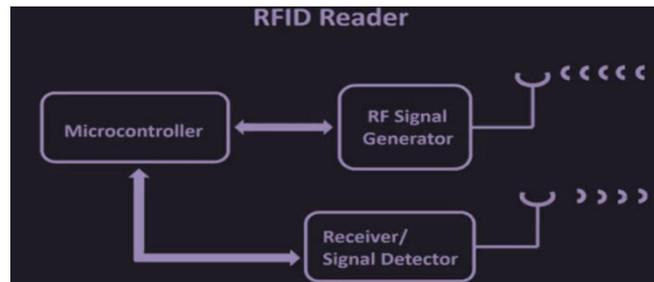


Figure. RFID Reader

RFID Tag:

First component in the RFID tag is the transponder which receives the radio waves which are coming from the Reader and send the feedback signal back to the reader as the passive tag do not have their own supply so they use the radio waves which are coming from the reader as a energy. Using this rectifier the energy which is coming from the radio waves is stored across the capacitor. And this energy is use as a supply for a controller and the memory element inside the RFID tags.

Most of the tags which are being use today are passive tags because this passive tags are quiet cheaper than active tags. As well as they do not require power source so they are quiet compact[5].

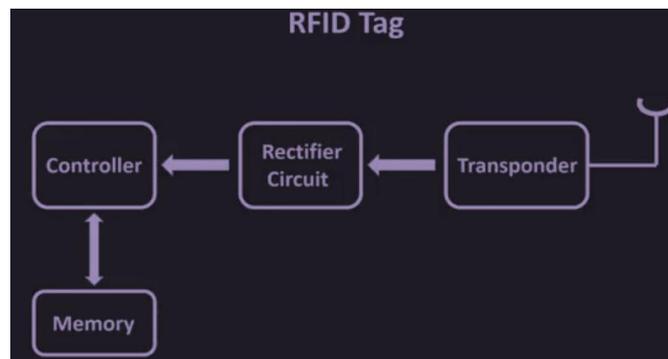


Figure. RFID Tag

1.2 Frequency of Operation:

This RFID system is mainly operated in three frequency band. These frequencies are as follows[5] :

Low Frequency: 125kHz or 134kHz, **Range:** up to 10 cm.

High Frequency: 13.56MHz, **Range:** up to 1 m

Ultra High Frequency: 860-960MHz

Hence we get to know that How RFID is useful than other existing identification and data-carrying technologies like magnetic stripes, barcodes, vision systems and contact memory. RFID has high data capacity, high robustness, low cost and high operating distance. Moreover, specifically, RFID is often positioned as the next generation barcodes or intelligent barcodes due to its real benefits over other existing competent technologies like barcodes.

Barcodes specifically when compared with RFID possess hardly any write or read facility, i.e. there cannot be any addition to the information already available on a barcode which is printed. Moreover, barcodes specifically require line of sight, the barcode must be carried on the outside of the product, where it is subject to wear and tear. This further imposes a limitation on the ruggedness of barcodes as compared to RFID. Reading barcodes is much more time consuming in the sense that since if the item is not properly oriented, then it may take seconds to read an individual tag.



Figure. Barcode

2. THE FEATURES OF RFID

- Provides Unique Identity
- Multiple Tag Reading
- No Power
- Multiple-Read speed
- Read/Write-Update
- Robustness
- High Reliability
- Low cost

RFID Theory is also employed in various areas:

1. Auto-ID is a mechanism that uses identification technology like RFID and manages automatic data capturing and storage of this information over the internet.
2. Inventory management, Asset Tracking, Supply Chain Management in Industry, Counterfeit prevention in pharmaceutical industry.
3. Electronic Product Code (EPC) is designed to be stored on RFID tag to provide unique identification for a product[4].

3. CONCLUSION

This paper presents a concise real-time picture of the RFID technology. It introduced the RFID technology which will be helpful in understanding the capabilities and constraints of the technology. The Technology had effectively taken out RFID with its embedded benefits over other existing identification technologies.

REFERENCES

1. Fu, B., B. Li, and R. Yuan. Introduction to the RFID Technology in the Application of the Smart Supermarket. In MATEC Web of Conferences. 2016. EDP Sciences.
2. Qianli, D. and M.Y. Zhang, Usage of RFID Technology in Supply Chain: Benefits and Challenges. International Journal of Applied Engineering Research, 2016. 11(5): p. 3720-3727.
3. Adrian McEwen, Hakim Cassimally, Designing the Internet of Things", Wiley, 2014, ISBN: 978-1-118-43063-7

4. Christopher Hallinan, Embedded Linux Primer”,Prentice Hall,ISBN:13:978-013-167984-9
5. <https://youtu.be/Ukfpq71BoMo>