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TRACING OF AVIATION BAGGAGE WITH RFID TECHNOLOGY

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Abstract

RFID (Radio Frequency Identification) has been identified as one of the greatest technology in aviation baggage. RFID is a method of uniquely identifying items that uses barcodes to interact and exchange data between tags and readers. The RFID tag is embedded in the back of the barcode, here the 2D barcode is commonly used solution .But the most advanced barcode is 3D barcode. In this 3D barcode it stores large amount of information and it is small in size. The 3d barcode is scanned by the mobile phones like Nokia N96 or N85 and shows the information stores in the barcode. Using this system provide security with an additional level of identification of baggage to the passenger.

Index Terms: *RFID, Barcode, Mobiles.*

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1. INTRODUCTION

Radio Frequency Identification (RFID) is an automatic identification method that utilizes small devices known as RFID tags or transponders to store and remotely retrieve data. These RFID tags possess an internal antenna allowing them to receive and respond to radio-frequency queries sent out by a RFID transceiver. One of the industries that should consider RFID tracking technology is the airline industry. Currently, airlines typically use barcode scanners to track luggage and have so far only had mediocre success with it. There is no doubt that a stigma is attached to the airline industry for consistently losing their patrons luggage. This cost is significant enough for airlines to seek out ways to improve their accuracy in tracking luggage in order to improve customer satisfaction as well as greatly reduce unnecessary costs. Unlike conventional barcode systems that require line of sight for their scanners to work, RFID systems only require the tag to pass within range of the RF transceiver resulting in an increase in accuracy and speed.

1.1 RFID Technology

RFID systems have three main components as shown in Figure 1.

• The tag: RFID tags are chips embedded in items which store and transmit information about these items. Most RFID tags store data that identifies a specific item.

•The reader: RFID readers are radio frequency transmitters and receivers that communicates with the tags. Readers, using an attached antenna, receive data from the tag and then pass it to a computer system for processing.

• The computer system: The computer system receives the data from the RFID reader through a cable or wireless connection for storage, interpretation and action.

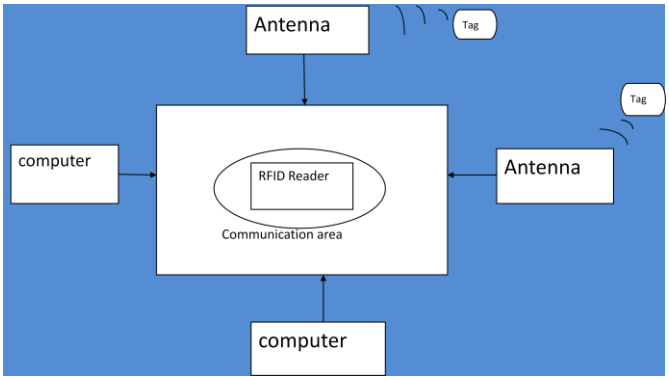

Fig- 1: A Simplified View of an RFID system

1.2 2D Barcode with RFID Tag

In the aviation baggage they uses a RFID tags, this tags are embedded in the back of the barcodes. Here the 2D barcode is commonly used solution, as show in figure the RFID tag is embedded at the back of the 2D barcode. The 2D barcode contains black lines running across white back ground and embedded the data inside the barcode .when you scan the barcode it will give the information which is embedded in the barcode.

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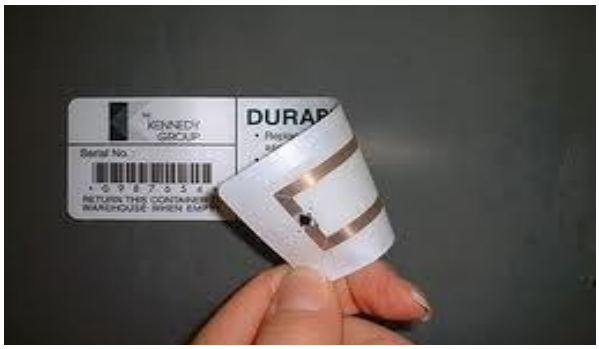

Fig-2: 2D barcode with RFID tag

The 2D barcode stores the data in horizontal direction so it has a less storage capacity. Now the barcode is attached to the baggage, the barcode stores the data about the passenger details in the aviation baggage, So when you scan the barcode it give the information about the baggage. Presently the most advanced barcode is 3D barcode, now the 3D barcode is implemented instead of a 2D barcode because it stores more data then 2D barcode and it is small in size. As same as 2D barcode the 3D barcode is apply to the aviation baggage then it is so easy to find the mislaid bags and we can provide smoother travel experience to the passengers.

2. BARCODE

A barcode is a very important thing in the world. It can be described as a code which contains a large amount of data. When you scan a barcode, it will give you the information regarding a product or service or any other information which is embedded in the barcode. The data that you scan from the barcode is stored in the database for present and future use.

When the first barcode was developed, it was a 1D or linear structure. The data is embedded in the spaces and thickness of the lines. As technology improved, the new invention was 2D barcode. These barcodes use geometric patterns like hexagon and rectangles to embed data. Presently, the most advanced barcode is the 3D barcode.

2.1 3D Barcode

The three dimensional objects must have thickness and must be measurable on the x, y, and z-axis. Therefore a 3D barcode is usually engraved on a product or applied on a product so that the barcode has depth and thickness. Check out this picture of a 3D barcode, The bars in a 3D barcode are read by a scanner that reads the differences in the height of each line. Other types of barcodes are read by the variances in reflected light as the light scans the code. The 3D barcode scanner uses a laser that calculates the height of the barcodes lines based on the distance and time it takes for the laser to read it. The labeling of parts with 3D barcodes is called direct part marketing or DPM. A direct pat mark barcode reader contains a laser like the ones that are contained in home and office scanners that scan pictures or documents in a computer. DPM readers only read the height variances of the bar code, therefore there is no need to make the barcode black and white.

Fig-3: 3D BAR CODE

3D Bar Code is a beautiful way of storing & exchanging text/numbers/sms/ information inside images. By See the image What do you find in those black & white dots or lines or squares ?It makes no sense to the human eye but the information contained inside the image can be extracted instantly on the desktop or a mobile phone like Nokia FP1 & FP2 phones using free decoders or Barcode readers. A 3D Bar Code stores data in both the vertical and horizontal directions and hence have more storage capacity per unit area. Denso Wave , the company that introduced bar Codes to the world, says that bar codes are readable from any direction and that data stored inside bar codes can be restored even if the corresponding image is partially damaged.

3. LITERATURE SURVEY

RFID tags embedded in the back of barcode paper: some airports and airlines have adopted it.The key problems with the 2D barcode and scanner is as follows:

• The barcode needs optical sight, without the line of sight, it cannot be read.

• Concurrently the scanner is able to read only a single barcode, which is time consuming.

• Barcode is printed on a paper that easily crumples, thus the scanner is not able to decode the information properly.

• After printing the barcode it is not possible to overwrite the information (only by printing a new one).

• The paper of the barcode is long, full of information that comes off easily, thus making it impossible for the stevedore to identify where the luggage is supposed to be sent and the airline is unable to find it in the computer database. It will be regarded as the airline's mistake, and the airline has to compensate the passenger.

• Figure shows that the barcode is printed on a long-hanging paper, which is only attached at the middle or at a suitable part to the luggage. The most important part of the paper is just hanging down – without being fixed to the luggage- so it can easily come off or someone can tear it away.

Fig-4: Today's Baggage barcode solution

4. IMPLEMENTATION

Now in the aviation baggage we are implementing a 3D Bar code instead of a 2D bar code because in this 3D bar code it can stores more data as compare to the 2D bar code. 2D barcodes are a series of black lines running across a white background with numbers at the bottom and a 3D barcode is an arrangement of black boxes. 3D Bar Code stores data in both the vertical and horizontal directions and hence have more storage capacity per unit area. Denso Wave , the company that introduced 3D bar Codes to the world, says that 3D bar codes are readable from any direction and that data stored inside 3D bar codes can be restored even if the corresponding image is partially damaged.

• There is difference between traditional 2D barcode and 3D bar codes, can see that in below image.

Fig-5: 3D & 2D Barcodes

Now to decode these 3D bar code images, either use your Nokia Mobile phone or download a small Java app for desktop or get this reader if you have a Java enabled mobile phone like Nokia, Sony Ericsson, LG, Motorola etc. If you wish to download sambaing application for your Nokia N96 or N85, here is the direct download link for Nokia Barcode reader .

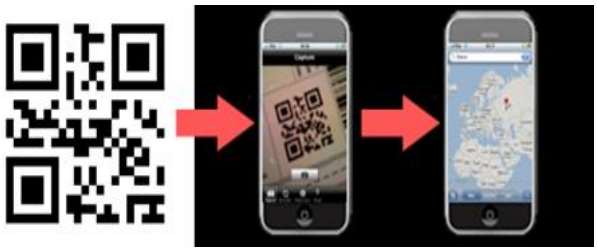

Fig-6: Mobile Scanner

As by applying 3D barcode to this aviation baggage it is used to find mislaid bags. Here the 3D barcode stores the data about the passenger details and the destination of the bag, where the bag as to go and to which container as to receive. As knowing that the 3D barcode is small in size is directly apply on the product but here we are attached to the RFID tag, then the tag is read by the RFID reader.

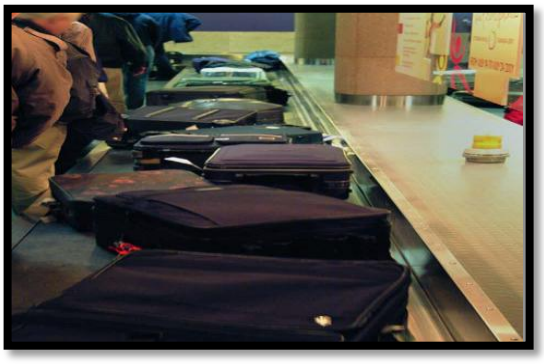

Fig-7: Luggage Carrier Escalator

In this aviation baggage if the same colour bags are coming from the luggage carrier escalator then you can't find bag whether it is us or others. So by scanning this 3D barcode with mobile phones we can see the information embedded inside the barcode. Then the barcode give the information about the passenger details and can easily find out bag without confusion or exchanging. As per as the 2D barcode we can't scan by the mobile phones.

CONCLUSION

RFID technology has been proven successful in tracing of aviation baggage. By embedded the RFID tag back of 3D barcode in the aviation baggage it is very easy to find out the mislaid bags. we can store more data about the passenger details and its destination. It can be scan by the mobile phones and gives the information about the bag without getting exchange in the luggage carrier escalator. That the data stored inside bar codes can be restored even if the corresponding image is partially damaged.

REFERENCES

[1] Koczor Z., Takács A., "Engineering Evaluation about the Role of Innovation in a Globalized Economy, Acta Polytechnica Hungarica , Vol. 5, No. 3, 2008, pp. 65-73.

[2] Lesakova L., "Innovations in Small and Medium Enterprises in Slovakia",
Acta Polytechnica Hungarica, Vol. 6, No. 3, 2009, pp. 23-34

[3] Bondarenco, N. & Price, A. (2009). Baggage Improvement Programme Strategy Paper – 2009, *IATA Simplifying the Business Programme*, IATA, p.4.

[4]IATA a. RFID Trials for Baggage Tagging, IATA, http://iata.org/NR/rdonlyres/D319ADC0-ED5D-447E-9EEB-6CA1179C6BD9/0/RFIDtrialsforbaggagetagging.pdf (September 2009)

[5]IATA b. Simplifying the Business programme, www.iata.org/stbsupportportal (September 2009)

[6] Ornellas, T. (editor) (2009). More RFID tags for Hong Kong. *Ground Handling International*, Vol 14, No 3 (June 2009) p. 6, ISSN 1364-8330 .

Additional Web Resources
<http://www.dot.gov>, Department of Transportation
<http://www.bts.gov>, Bureau of Transportation Statistics etc.