



Baggage Tracing and Handling System using RFID and IoT for Airports

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Abstract:

Airline industry is one of the areas which have a strong potential to benefit from Radio Frequency Identification (RFID) and the Internet of Things (IoT). The most common mistakes experienced in Airline industry for Baggage Handling are mislaid baggage and lost baggage. So for providing a better security to the passengers, we have proposed a design of baggage tracing and handling system using smart RFID tags and IoT which is based on cloud server. We have designed a device at two airports having both check-in and check-out processes. A secured algorithm is used for generating tags that are attached to baggage with the details of passenger and airline stored in it. RFID readers in the check-out areas facilitate step tracking of baggage which prevents baggage loss. The baggage's details and GPS details (latitude longitude) stored in a cloud using IoT and unique ID can be retrieved by the passengers wherever and whenever necessary. The same ID can be used while collecting bag at check-out counters. The system provided ensures less consumption of time and security for baggage.

Keywords: RFID, internet of things, object identification, air transport, GPS (latitude & longitude)

I. INTRODUCTION

Airport is the most important in transportation and traveling by observing it every year 29 million passengers and 44 million bags are mishandling. A passengers wastes around 2 days of his vacation waiting for the mishandled bag. The RFID is most cost effective technology for objective identification. An RFID tag consists of unique serial number to identify the object by the RFID reader and also stores the information to cloud server which was read by the RFID reader Automatic Identification and Data Capture (AIDC). AIDC methods automatically identify objects, collect data about them, and locate the latitude and longitude through GPS, and write those data directly into computer systems with little or no human intrusion. RFID methods utilize radio waves to read the RFID tag. The reader consists of the RF module, control unit, and coupling element to interrogate tags via RF communication. It has a secondary interface to communicate with backend systems for the transmission of the information stored in tags. The backend applications not only aggregate, filter, and calculate the data gathered by readers (e.g. location, history and current analysis).The RFID virtually creates a remote database which travels with the item by making use of RF communication to exchange data between tags and backend applications. The RFID innovation is being promising not as it were in supply chain administration but too in the flying co ordinations industry. It gives a noteworthy change in productivity and security over the standardized identification that is utilized in most airplane terminals around the world. Worldwide Discuss Transport Affiliation (IATA) has created the arrange for the selection of RFID in the flying industry (e.g. stuff tag, things track, boarding pass, and representative pass).When RFID innovation is implemented, losses in flying industry will diminish by 10% which incorporate lost stuff, misplaced things and harmed. RFID collects data wirelessly as the labels are examined by the per user, the gotten information is to be handled and controlled remotely and this is where IoT comes into play. The IoT

permits objects to be detected and controlled remotely over existing arrange foundation, making openings for more coordinate integration of the physical world into computer based frameworks which make a difference lessening labor included reduces the complexity. IoT is one of the emerging technologies for future because it has wide application and spin-off. In system processors by 2020 IoT will be the second or third industrial revolution and first or second digital revolution behind the Internet. However the use of RFID brought good results hardly 2 or 3 out of 1000 bags were misplaced due to improper input data, but along with these advantages RFID has some problems such as weak safety function and risk via device/tag damage. This is why Airports are using RFID for custom clearance or terminal only, some airlines are using RFID for their domestic flights. This paper proposes an IoT based airbaggage tracking system for cost reducing and improving convenience.

II. METHODOLOGY

The RFID labels are joined to the things after security checks. The things data such as the proprietor, the beginning, the goal and the aircraft number is put away in the tag the same data is put away in the server at the airplane terminal. All the servers at diverse air terminals are associated to a central server After the making of labels and staying them on stuff, it is passed through a entryway counting four RFID perusers.

In the case of the details related to the things not affirmed in the framework, such stuff is returned to the past arrange and its tag is examined and a unused tag is stuck to it in the event that essential. All the stuff is passed through EDS (Electronic Information Framework) to watch their substance and sort them concurring to their flight number. The stuff is at that point stacked to the particular flights and for adjusting that the stuff is being stacked on the flight, things is once more passed through RFID perusers at the time of stacking and the data is put away at the neighborhood server.

A. Process on arrival at the Airport.

This RFID, GPS and IoT system at Airports uses UHF RFID passive tags for storing information and identifying baggage and GPS for storing location

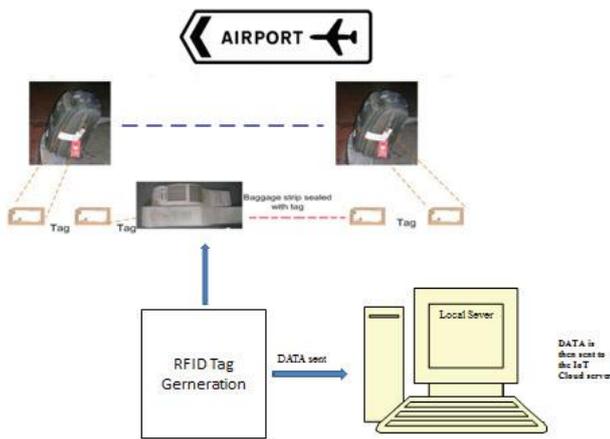


Figure.1. Process at the time of check-in at Airports

1) Input and Enrollment of Data: When travelers arrive at the Airplane terminal they to begin with head to the check-in segment to provide their gear. At check-in area, the data and area of each and each traveler is taken and put away in server. The server comprises of four vital things counting the title of the individual, flight number, sack nature and versatile number of the traveler along with the distinguishing proof number which is impossible to miss to each individual. This recognizable proof number is put away in the memory of the RFID tag along with the other points of interest of the traveler for any assist examination and referral to the data approximately the individual and their baggage. The same recognizable proof number is sent to the traveler through SMS in arrange to keep it individual. After completing all the security conventions the stuff is headed to the transport belt for advance dealing with.

B. The process at the Destination Airport.

1) Baggage Sorting: After the travelers arrive at their destination and the stuff is prepared for offloading they are the labels studied by the perusers are put away in the neighborhood Server of Airplane terminal, which affirms the offloading of things at the goal Air terminal. The stuff is passed through a door counting four RFID perusers on the conveyer belt and at the same time will educate the traveler

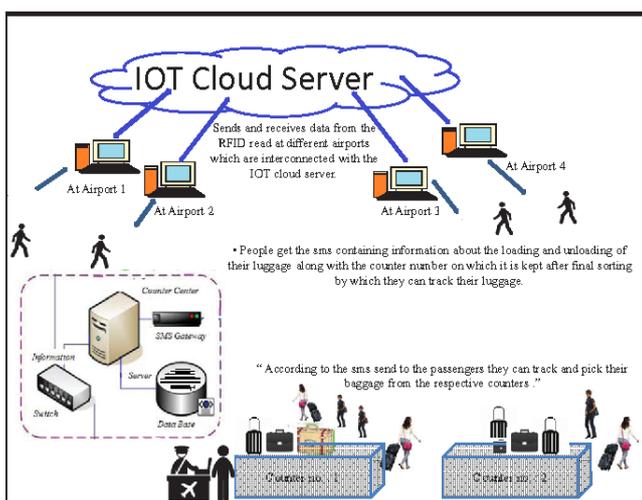


Figure.2. Process at the time of check-out at Airports

III. IMPLEMENTATION AND RESULTS

We have executed the model at two areas for the execution examination of the proposed framework, a few individuals with their things checked in at one area. Since our fundamental center is on tag era at check in and perusing ID and checking on the information on cloud amid check out we have talked about the taking after stages in more detail.

A. Design for Check-In

When the travelers arrived at the area 1 their fundamental data like number of packs, their portable number, the serial number (s) of RFID connected at each pack, goal, recognizable proof code and area (longitude and scope) of the airplane terminal was put away on a neighborhood separate. The travelers were given with a one of a kind recognizable proof code beneath which the subtle elements of all their sacks was put away and which they required to claim all their things once they reach the goal.

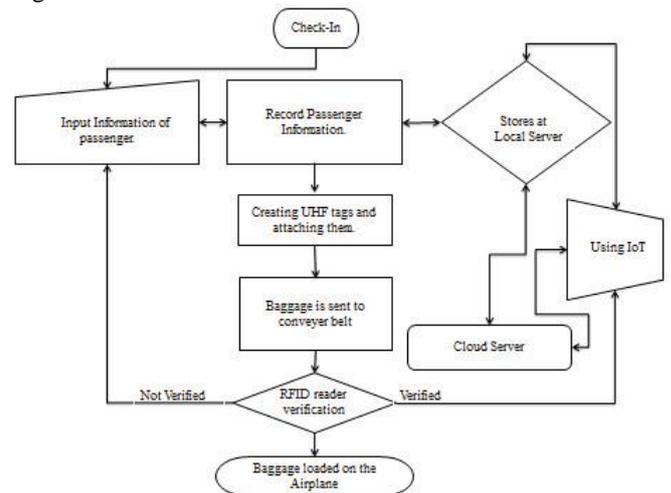


Figure. 3. Design flow for check-in process

The data almost travelers were put away on the nearby server and were transferred to a cloud in which the server’s of area 2 is associated with the offer assistance of IoT. When the stuff was prepared to be stacked on the plane it was passed through RFID and studied that specific serial number and sent it to the node MCU through Ethernet; and sends it to a nearby server which will note that the things were stacked. In the event that the serial number was not examined by the perusers at that point the things were sent back to the beginning point and checked for any issues.

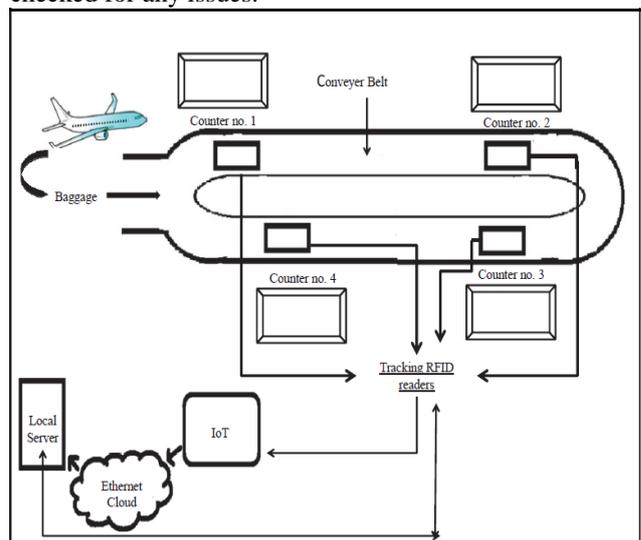


Figure.4. System implementation

B. Experimental Review:

We included 3 people in our Experiment and allowed them to check-in at location 1 with their baggage. When the RFID reader reads the tag and enters their information and location (longitude and latitude) of the area where the RFID tag was scanned were stored at the local server and allotted them the unique identification number, then the baggage was sent to location 2. When our passengers reached to the location 2 (which was their destination) and their baggage was ready to be offloaded, the baggage were passed through RFID reader which was connected to the cloud server and the destination Server through IoT. When the reader read the tags and it search information related to the tag in the cloud server that stored the information on the destination's local server. If the bag was misplaced we must consult the baggage counter and give the unique id which was given at the check-in with that we can see in which location the RFID tag was scanned and with this process we can find misplaced bags easily. In our experiment passenger could get better security, none of the baggage was misplaced and every baggage was delivered on time. And because of the counters created passengers got distributed into groups which also decreased the time consumed at check-out

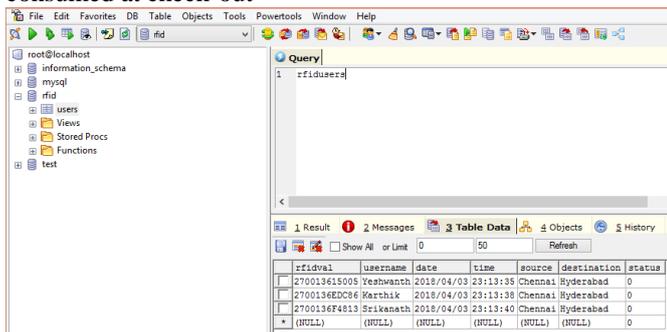


Figure.5 Data at cloud server

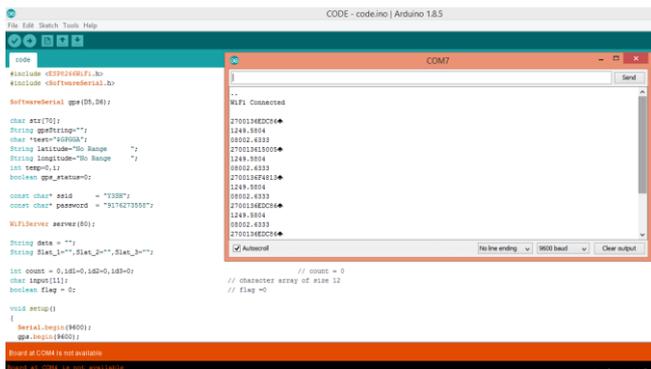


Figure.6 Gps location (longitude and latitude)

IV. DISCUSSION AND CONCLUSION

With the point of giving dependable and productive administrations with world lesson offices to travelers, the presentation of coordinates RFID labels at the side IoT within the flying industry will demonstrate to be a boon for things taking care of and following. The normal read-rate exactness of the airport's stuff dealing with the framework is expanded from a normal of 80% for standardized identification labels to 97% for the absorbed RFID labels. This pick up in productivity will empower the framework to prepare around 5% more packs. As the number of packs being prepared by computerization, the normal time required to prepare each piece of gear will diminish, which is fundamental in facilitating things loads amid surge hours. Nowadays 357 millions of packs are misplaced and an add up to 35.7 billion

US dollars misfortune is caused by the carrier industry. On a normal the individuals voyaging by discussing is 3.5 billion nowadays and is anticipated to extend by 5% per year i.e. it'll be 7 billion after 20 a long time [8,9] so to maintain a strategic distance from such tremendous misfortunes; RFID and IoT innovation application will demonstrate to be exceptionally productive.

A. Conclusion

In this 21st century, the tall security of gear is of huge concern in the flying industry due to rehashed loosing, delay and stolen stuff of travelers. The proposed investigate work centers on inquire about to create a working demonstrate of a things taking care of framework utilizing RFID tag and IoT which is able track sacks, help in finding sacks, caution staff in case stuff not stacked accurately, distinguish a sack for security work force to track, and change the flight schedule on the tag. The most advantage of the system is that it devours less time as the travelers don't have to be hold up for their things to turn up on the conveyer belt instep they are directed to diverse counters and guarantees tall security due to the one of a kind distinguishing proof number. It is taking after the current slant because it is environment neighborly, because it is paperless, no printing and paper are required which may be a exceptionally imperative issue right now within the flying industry. With this plan we tend to form the discuss travel more clients inviting, less time expending, bother free, with less lining and more prominent security of the traveler. The financial benefits and client fulfillment comes about accomplished by broad arrangement of RFID in stuff dealing with are furnished.

V. REFERENCES

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