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Airline Baggage Guidance and Tracking System Using RFID and Internet of Things

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ABSTRACT*:* The modern society is evolving to an IOT based hyper-connected society where it is possible to control and manage diverse resources in real time. In this environment, the luggage is effectively controlled by a system using RFID tag at airports. We propose an efficient way to automate the way baggage is handled in airports and avoid baggage getting lost. The bags are sent to their respective flights by an automatic conveyor belt with the help of RFID tags. In case a bag gets lost an alert is given and can be tracked easily using IOT and GPS. The information about the location of baggage is made available to everyone with the help of IOT.

KEYWORDS*:* RFID (Radio Frequency Identification), GPS ; GSM(Global System for Mobile); Conveyor Belt.

I. INTRODUCTION

The Internet of things (IoT) is the inter-networking and inter-connection of physical devices, vehicles (also referred to as " smart devices " and " connected devices"), buildings, and other items—embedded with electronics chip , software, sensors, actuators, and network connectivity that enable these objects to collect the system and exchange data.To have an efficient baggage handling system (BHS), the assignment of flights on unloading areas must incorporate uncertainties.

An airport baggage handling system (BHS) is one of the most complex airport operational systems. It is responsible for moving, controlling, screening, sorting and storing passenger baggage from the check-in area to the departure gates. Because the system is mainly composed of a series of conveyors that are connected as a whole system, a bottleneck in any part of the system could possibly affect the entire system. For this reason, an analysis of the system in the design phase has been emphasized to ensure system capacity under any circumstances by identifying the potential bottleneck area and assessing the deliverable capacity (de Neufville, 1994). If an effective design is not achieved, customer satisfaction rates decline due to delayed baggage or increased waiting times in passenger queues. In fact, these problems have become evident in numerous airports that are unable to handle baggage demands during peak operating hours.

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II. LITERATURE SURVEY

S.NO	TITLE	AUTHOR	CONCEPT	YEAR
1	IoT Based Airport Baggage Tracing System	RitwikaMallick ,KavyasreeKilari , Shreya , Anhad Saran , Tadepalli Sarada Kiranmayee	KEY STEPS: Existing techniques of baggage tracing in airports Improvement and problems in existing systems Bag Journey Applications RFID Based Tracking Detailed description of the architecture	Journal of Network Communications and Emerging Technologies (JNCET) Volume 8, Issue 4, April (2018)
2	Smart Bag Tracking and Alert System using RFID	Shubham Sarkar, Suvojit Manna, Subhadeep Datta	KEY STEPS: Nodal points are identified based on statistics. Nodal connections established. Weightage provided to each connection based on the mode of transport (e.g. Railway, Road or Air). Mathematical graph generated and cost optimized	2017 International Conference on Electrical, Electronics, Communication, Computer and Optimization Techniques (ICEECCOT)

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			path calculated.	
3	Smart Logistic System by IOT Technology	PattamaCharoenporn	KEY STEPS: Components of Logistics System The used of RFID technology RESEARCHMETHODOLOGY Design for prototype of logistics system Analysis Problems from old system and new Questionnaire	2016
4	Computer Animation in Studying of Magnetically Levitate Baggage System	Kuldip Acharya, Dr. Dibyendu Ghoshal	KEY STEPS: OPERATION AND LIMITATION OF CURRENT FRAMEWORK OF THE TRADITIONAL BAGGAGE SYSTEM PROPOSE DESIGN OF MAGNETICALLY LEVITATE BAGGAGE SYSTEM COMPARISON WITH EXISTING BAGGAGE SYSTEM	International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) - 2016
5	Proposal for Air-Baggage Tracking System Based on IoT	Lee Ye-Won, Choi Yong-Lak	KEY STEPS: Baggage Handling Process at the Airport Air-Baggage Tracking System Expected Effect Decreasing missing baggage	2015 9th International Conference on Future Generation Communication and Networking
6	Baggage Tracing and Handling System using RFID and IoT for Airports	Ashwini Singh, Sakshi Meshram, Tanvi Gujar	KEY STEPS: *Process on arrival at the Airport* *Control System of Baggege Handling (CSBH)* *The process at the Destination Airport* *Conforming Baggage and handing it over to Passenger using IoT*	*2016 International Conference on Computing, Analytics and Security Trends (CAST) College of Engineering Pune, India. Dec 19-21, 2016*

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7	The baggage system at Denver: prospects and lessons	Richard de Neufville	KEY STEPS: Design of the automated baggage system Causes of reliable delivery problem Deeper problem of reliable delivery Enormous increase in complexity	Journal of Atr Transport Management Vol 1. No 4. pp. 229-236. 1994
8	Fitting facilities to self-service technology usage: Evidence from kiosks in Taiwan airport	Edward C.S. Ku a,1 , Chun-Der Chen b,	KEY STEPS: Technology acceptance model Customer value perspective Behavioral intention and actual usage The moderating effect of perceived enjoyment,	Journal of Air Transport Management PP.0969-6997 e see front matter 2013
9	Balancing the baggage handling performance of a check-in area shared by multiple airlines	Gukhwa Kim, Junbeom Kim, JunjaeChae	KEY STEPS: Airport BHS in check-in area Window reservation Problem description Performance measures Simulation model and input data RE-ALLOCATION algorithm Throughput and baggage travel time	Journal of Air Transport Management PP.0969-6997 2016 Elsevie
10	On load balancing strategies for baggage screening at airports	Xuepei Wu, LihuaXie	Airport baggage screening system Performance indicators Queueing model Baggage arrival Baggage screening Methodology Simulation environment	Journal of Air Transport Management PP.0969-6997/© 2017

III. METHODOLOGY

When the customer check in his baggage a RFID tag is generated which contains all his details. The tag is then attached with his bag and sent along the conveyor belt. All the bags go through the same conveyor belt before changing to their respective flight's conveyor belt. When a checkpoint is reached the bags are scanned and rerouted to its respective belt. Sometimes the bag may reach a wrong destination when that happens a buzzer will be sounded and the location can be tracked using GPS. Using RFID is very efficient and makes sure that all the baggages reaches their destination on time.

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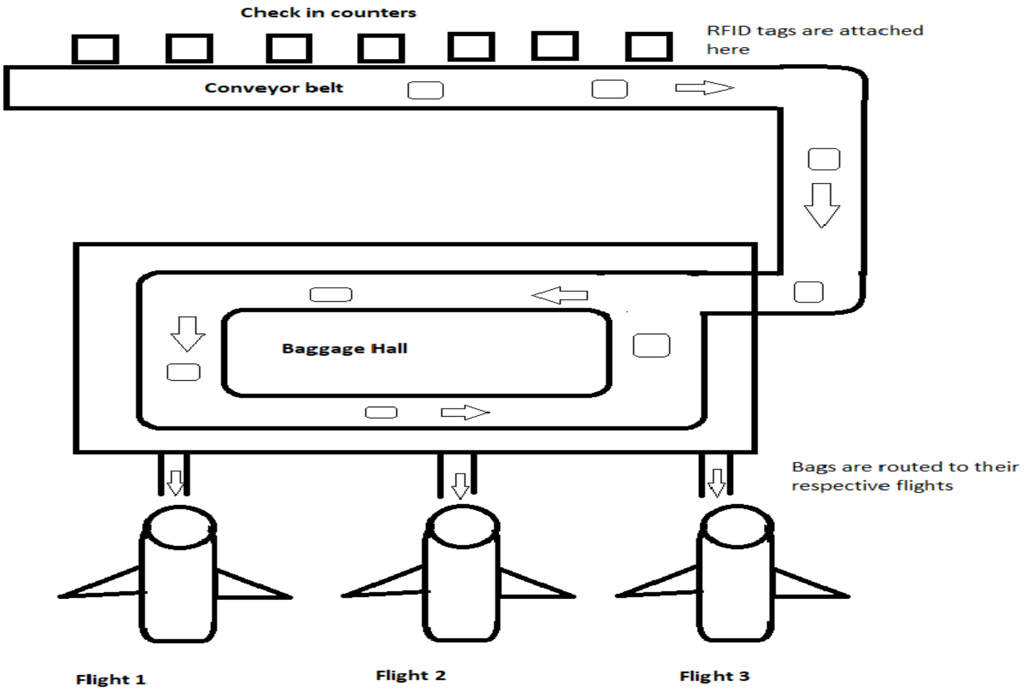

IV. PROPOSED SYSTEM

To use RFID tags on all bags for Guiding the bags and to send them at various terminals and intersections. To design an alert system using buzzer when a baggage enters into the wrong flight or conveyor belt. To use GPS to provide live tracking of the baggage when the user needs wants to see. The location of the baggage is updated on to the cloud to see the live tracking

4.1. Baggage arrival
We let ak represent the inter-arrival time between the k-th bag and its subsequent bag. The baggage arrival is partially predictable because it can be, to some extent, scheduled by the airport as each passenger is allocated with a limited period of time to check-in their bags (Abdelghany et al., 2006). Note that baggage separation is a common practice in the BHS to maintain the safety gap between bags (Black and Vyatkin, 2010; Hills, 2009).

4.2. Baggage screening
The EDS machines within a screening system are usually identical, i.e., with symmetric processing capacities. They operate in parallel. We define bk as the screening time for the k-th bag. The average service time m is given by the EDS machine manufacturer. The actual screening time each bag spends on an EDS machine can be obtained by the PLC via fieldbus interface (e.g., PROFIBUS)(Morpho, 2016).

4.3. Load balancing
The RoundRobin is widely adopted in the BHS industry due to its simplicity. Bags are dispatched in a cyclic manner to equalize the expected number of bags assigned to parallel EDS machines. The policy can be described as R ðkÞ ¼ ðk mod mÞ þ 1. That is, the k-th bag is routed to EDS line ðk mod mÞ þ 1. The RR performs open-loop routing, so the PLC does not need any state feedback from EDS lines.

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4.4. Procedure at check-out

After the passengers arrived at their destination (location 2) their baggage was loaded on the conveyer belt, which will keep on rotating the baggage until someone calls for it. The passengers will receive a unique identification code when they give their luggage during boarding which will be sent in the form of SMS.

V. CONCLUSION

By using our proposed system there will be a reduction in baggage loss, baggage mishandling and all the bags will reach the passengers in a timely manner. The main advantage is that it reduces the manual labour involved and moves towards a more automated approach. It also eliminates the need for us to generate and print barcodes onto tags and place them on the bags. RFID tags can be easily scanned automatically without needing for any manual intervention. Using our system will enable the airlines to save over billions of dollars every year. It will also lead to more satisfaction of the passengers. It also provides a platform for the passengers to check in their bags in a short amount of time and without a lot of hassle.

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