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Implementation of Baggage Security System Using RFID in Airports

K.Malathi Sai Varchaswi[1], S.Gnaneswari[2], P.Vineeth[3], P.Likhitha[4] , G.S.Annapurna[5]

U.G. Student, Dept. of ECE, Sri Vasavi Institute of Engineering &Technology, Nandamuru, Pedana Mandal, Andhra Pradesh, India[1,2,3,4]

Assistant Professor, Dept. of ECE, Sri Vasavi Institute of Engineering &Technology, Nandamuru, Pedana Mandal, Andhra Pradesh, India[5]

ABSTRACT: The improvement of worldwide institutions and dual switch flights will increase the passenger and baggage volumes developing massive challenges to airports and airways. One of the major requirements of airport is the rapid processing of bags sorting. Present baggage coping with device relies on an ageing barcode device with high errors percentage. On this device, shipping operation is performed at very low velocity and precision. For reading and manipulate of barcodes, barcode readers want to cautiously examine barcodes in direct sun light. There were many attempts to resolve these issues. Hence, the usage of RFID in this system is one of the quality ways to lower the problems. The main aim is to hint the luggage at specific security ranges on the airports and tell the passenger approximately the repute of their baggage. Each bags is tagged with an RFID tag with particular variety and passenger gets that wide variety in the course of check-in at the airport. The device gives higher solution for the airport luggage controlling system as its miles value effective and convenient. The RFID tags are used to enhance the ability for luggage monitoring, dispatching and conveyance with the intention to enhance the management efficiency for consumer pleasure.

KEYWORDS: RFID Reader, RFID Tag, Micro controller, Baggage detection, LCD.

I.INTRODUCTION

Radio Frequency Identification (RFID) is a rising innovation that is gigantically spreading in business and industry. Carrier industry is one of numerous enterprises that could be profited by RFID innovation. The carrier business every year handles in excess of 2 billion flyers. Following traveller stuff is a significant test to the aircraft business for both consumer loyalty and security. Takeoffs can be deferred essentially for meeting safety efforts for stuff coordinating, which effects cost efficiencies and consumer loyalty.

Radio-Frequency Identification technology (RFID) has revolutionized baggage handling technique to improve these processes. For increasing the ability for luggage tracking, dispatching and conveyance, usage of RFID is preferred for improving the management efficiency and the flyers satisfaction. An instant overview of the position of bags can be traced and tracked with real time by RFID-enabled system. Due to customer requests this system has been developed for providing a significant improvement in communication between the baggage handlers and flyers that will help to reduce the number of short-shipped or misrouted items. This will improve passenger security and satisfaction as well as reducing flight delays caused by mishandled baggage. The main objective of the project is to improve baggage tracking and delivery, to improve security, to ensure better services to track passenger progress through airports, reducing the number of flyers arriving late at the gate and thus ensuring that planes depart on time, to design alert system using GSM system by sending luggage whole information up to date.

II. EXISTING METHOD

The advancement of worldwide affiliations and double exchange flights expands the traveler and things volumes making huge difficulties to air terminals and carriers. Existing stuff dealing with framework depends on a maturing Barcode framework with high blunder rate. In this framework, transport activity is led at low speed and accuracy. For reading and control of barcodes, barcode readers need to carefully read barcodes in direct sun light. Current bag tags include a bar code. These bag tags are printed using thermal or barcode printers that print on an adhesive paper stock. This printed strip is then appended to the gear at check in. This takes into consideration robotized arranging of the sacks to diminish the quantity of misrouted, lost or deferred packs.

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III. PROPOSED METHOD

To overcome the drawbacks in the existing system, Baggage security system using RFID in Airports is implemented. The RFID reader reads the baggage information from the RFID tag in airports and sends the information to the control station. The baggage is moved from one stage to other stage and so on. This RFID tag makes in communication with the RFID reader at the each stage and informs the luggage details to the user through the message using GSM modem, and the same information was passed to the database.

III A.***Block Diagram:*** The Block diagram of the project is shown in Fig.1

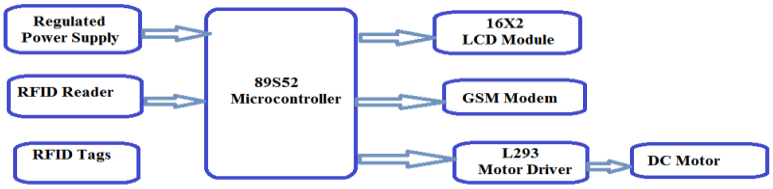

Fig.1: Block Diagram of the Project

III B: ***Flow chart of the Project:*** The flow chart of the project is shown in the Fig. 2

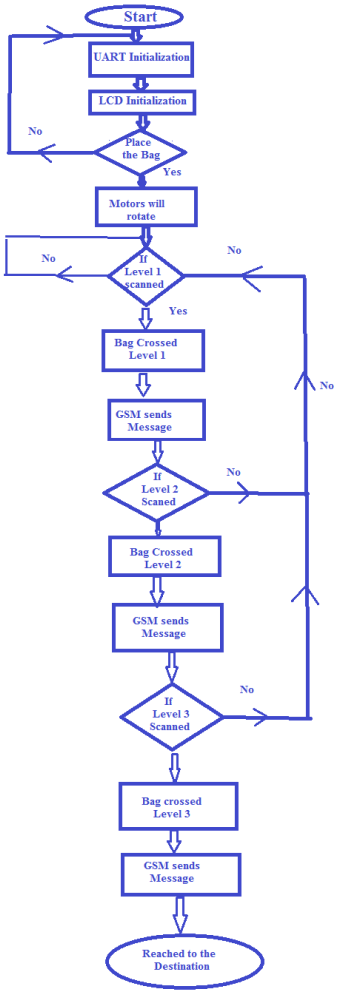

Fig.2: Flow chart of the Project

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III C: ***Overview of the Project***

The components used in the project are 89S52 Microcontroller, RFID Reader, RFID Tags, GSM and LCD. These RFID Reader, GSM and LCD are interfaced with 89S52 Microcontroller. At the point when the traveler puts the luggage on the conveyor, the reader gathers the label information and records from the earliest starting point of the excursion. As the bag travels through the conveyor, the RFID monitors the luggage to ensure that the baggage would be conveyed to the correct entryway and flight. Simultaneously, the database forms the information sent by the RFID framework and recovers from it the traveler's data to realize the remarkable ID number and send the best possible message. At the point when the traveler's luggage moves stage by stage, the traveler gets a message that "scanning completed at first level… and so on". This guarantees less utilization of time, security for luggage and is practical subsequently gives consumer loyalty.

IV. HARDWARE DESCRIPTION

IV A: ***RFID Reader***: RFID Reader is a scanning device that uses the antenna to realise the tags that are in its vicinity. It transmits signals at certain frequencies. RFID readers are usually ON, continuously transmitting radio energy and awaiting any tags that enter their field of operation. EM 18 RFID Reader is shown in Fig. 3. EM 18 RFID reader is the device capable of reading and retrieving information stored inside the RFID tags. There are two types of RFID readers, the active and the passive RFID readers. Active RFID reader can detect an active RFID tag at few meters to line of Sight while passive RFID reader can only detect passive RFID tag at a few centimetres away from the reader. It operates at frequency of 125 kHz and 12V power supply .The effective detection range of the reader is around 10 cm from the antenna. The RFID reader used in the system is a low cost reader for reading passive RFID tags.

IV B. ***RFID Tags***: RFID Tag is an IC chip that has unique hexadecimal or Electronic Product Code (EPC) contained in it. Here ―UNIQUE‖ refers to each and every code word of the tag and is independent of other code word. The tag acts as a Key that is capable of opening a particular lock. So, it is also named as RFID key. The sequence is a numeric serial, which is stored in the RFID memory. The microchip is available inside RFID tag which is shown in Fig. 4.

Fig.3: EM 18 RFID Reader

Fig.4: RFID Tags

The microchip includes minute circuitry and an embedded silicon chip. Each tag can store a maximum of 2KB of information in the microchips. The tag memory can be permanent or rewritable, which can be re-programmed electronically by the reader multiple times. Tags are designed specific to an application and the environment it is proposed in. There are three types of RFID tags which are active, semi passive and passive. Active tags are active in nature i.e. they do not require any external source, they have their own inbuilt battery. It can transmit high frequencies so it can be detected at a longer range. Passive tags are passive in nature i.e. they don‘t have any battery source built in them. They draw their power from the electromagnetic field generated by the RFID reader. They have no active transmitter and rely on altering the RF field from the transceiver in a way that the reader can detect. They transmit low frequencies so they can be detected up to few meters of distance. A Semi-Passive tag exists, which has the features of both Active and Passive tags. Semi-Passive Tags have their own power source that powers the microchip only. They have no transmitter and as with Passive tags they rely on altering the RF field from the Transceiver to transmit their data.

IV C. ***GSM Modem***: GSM stands for Global System for Mobile communications. It is used for transmitting mobile data and voice services. This GSM modem can accept any SIM card just like a mobile phone with its own unique phone number. These GSM modems are most often used to offer mobile internet connectivity, and used for sending and receiving SMS and MMS messages. SIM 900 GSM/GPRS MODULE - The SIM900 is a complete GSM/GPRS solution which we can embed in the customer applications. SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, and Data in a small form reason and with low power consumption. It operates at 12 V DC.

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Fig.5 GSM Module

IV D*: LCD*:The Liquid Crystal Display (LCD) is a low power device (microwatts). Now a days in most applications LCDs are using rather using of LED displays because of its specifications like low power consumption, ability to display numbers and special characters which are difficult to display with other displaying circuits and easy to program. An LCD requires an external or internal light source.

Fig. 6: 16X2 LCD Module

Liquid Crystal Displays are portable, reliable, lightweight, and cheap than the LED.LCD screen uses a thin layer of liquid crystal, a liquid that exhibits crystalline properties. It is sandwiched between two electrically conducting plates. The top plate has transparent electrodes deposited on it, and the illuminated back plate so that the viewer can view the images on the screen. An image is produced by passing light through selected segment of liquid crystal to the viewer. LCD screen works on the principle of blocking light rather than emitting light.

IV E: ***AT89S52 Microcontroller*:**

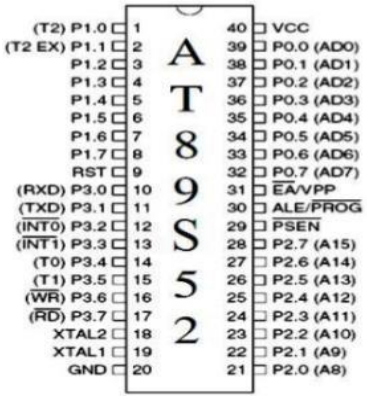

Fig.7: Pin Diagram of AT89S52 Microcontroller

The Microcontroller generic part number actually includes a whole family of Microcontrollers that have numbers ranging from 8031to 8751 and are available in N Channel Metal Oxide Silicon (NMOS) and Complementary Metal Oxide Silicon (CMOS) construction in a variety of package types. The AT89S52 Microcontroller is a 40 pin IC which has 4 ports i.e. port1, port2, port3, port4 each port consists of 8 pins and reaming pins are VCC (40^{tn} pin), GND (20^{th} pin), VPP(31^{th}pin), ALE (30^{th} pin), PSEN (29^{th} pin), XTAL1 (18^{th} pin), XTAL2(19^{th} pin),RST(9^{th} pin) as shown in Fig.7

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V. EXPERIMENTAL RESULTS

The experimental setup of implementation of baggage security system using RFID in airports is shown in Fig. 8.

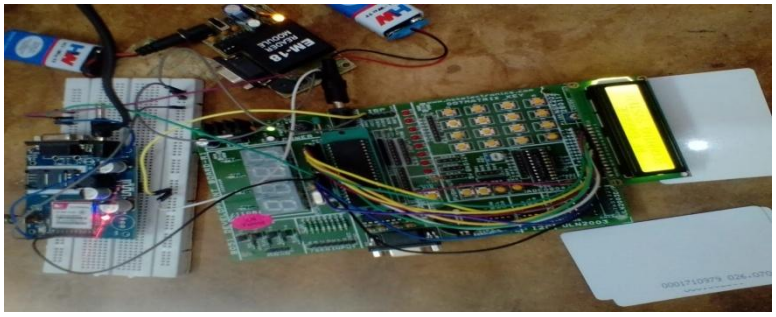

Fig.6: Final View of the Proposed Project

Baggage scanning system using RFID which is used to know about the status of the baggage in airports is as shown in Fig.7.

Fig. 7: Baggage Scanning System

The status of the baggage which is at level 1 is known when RFID tag is scanned by RFID reader at level 1 which is connected to the Microcontroller and displays the result in LCD .The status of the baggage which is at level 3 is known when RFID tag is scanned by RFID reader at level 3 which is connected to the Microcontroller and displays the result in LCD is shown in Fig.8

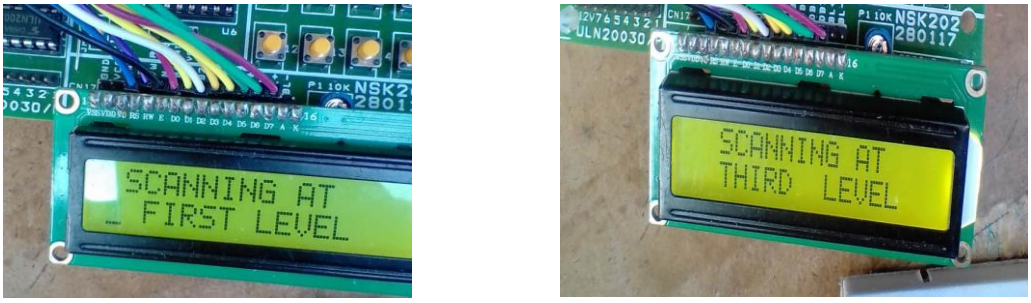

Fig. 8: LCD display showing that the baggage is at level 1and 3

When the baggage crosses security levels at level 1, level 2 and level 3 the messages are sent to the owner of that baggage by GSM module as shown in the Fig.9.

Fig.9: Received Messages through GSM

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VI.CONCLUSION

In present project, an automated baggage sorting system that has been designed using AT89S52 microcontroller so that it could be cheaply implemented on a small size airport terminal with a low cost. A prototype conveyor system is developed with the integration of Radio Frequency Identification (RFID) technology and sorting mechanism is used instead of a robot hand for baggage handling at airport environment. This is an automated system with RFID tags/detectors, intelligent control systems, sorting mechanisms and smart conveyor system. This demonstrates the significance and benefits of a smart conveyor system with the integration of RFID technology for product identification and handling, specifically in Airport industry. Main work is focused on RFID technology which is used for the purpose of identifying products which leads to a better identification than existing barcode systems. Furthermore, large data could be embedded in to the tag and could be placed inside the product to avoid damages. Each baggage is tagged with a passive RFID transponder which enables identifying of the objects and sorting. As the RFID reader identifies the objects on the main conveyor, the inventory database is automatically updated. The sorting movement of the mechanical pusher is assisted by a DC motor coupled to DVD writer used as pushing mechanism.

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BIOGRAPHY

K.Malathi Sai Varchaswi is pursuing B. Tech in the Department of Electronics and Communication Engineering from Sri Vasavi Institute of Engineering & Technology, Nandamuru, Pedana Mandal, Krishna District, Andhra Pradesh, India. Her area of research interest is Embedded Systems

S.Gnaneswari is pursuing B. Tech in the Department of Electronics and Communication Engineering from Sri Vasavi Institute of Engineering & Technology, Nandamuru, Pedana Mandal, Krishna District, Andhra Pradesh, India. Her area of research interest is Embedded Systems.

P.Vineeth is pursuing B. Tech in the Department of Electronics and Communication Engineering from Sri Vasavi Institute of Engineering & Technology, Nandamuru, Pedana Mandal, Krishna District, Andhra Pradesh, India. His area of research interest is Embedded Systems.

P.Likhitha is pursuing B. Tech in the Department of Electronics and Communication Engineering from Sri Vasavi Institute of Engineering & Technology, Nandamuru, Pedana Mandal, Krishna District, Andhra Pradesh, India. Her area of research interest is Embedded Systems.

G.S.Annapurna is currently working as an Assistant Professor in Sri Vasavi Institute of Engineering& Technology. She has 9 years of working experience in Teaching. She received her B. Tech degree from Jawaharlal Nehru Technological University,Hyderebad and M. Tech degree from Jawaharlal Nehru Technological University Kakinada, Kakinada. She is a member of ISTE and IAENG. Her research area interest is Embedded System and IoT.