



Research Article



## Analysis on RFID - GSM Enabled Intelligent Transfer System

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### ABSTRACT

As the time moves the life style of the persons has completely changed and there is no time for the people for micro management of every issue personally. So, this is the

right time to provide some space to the technology into our lives for monitoring the issues which requires our personal presence for the things to happen. One among those issues which require our personal interest to track the courier details which is sent by the merchant. This may require time and internet and in some scenarios it may also lead to tough situations to track the goods. So our work aims in providing a very reliable and very user friendly solution to overcome this kind of problem. As we know the advancements in the Radio Frequency and GSM technologies and making use of those existing technologies we can design a device which is capable of identifying the arrival of courier and forward the same to the receiver and also provide the details of the goods so that they do not require to tracking the item from online. The basic idea of the system is to employ an RFID tag to the courier and send the location and item details to the receivers mobile. The receiver of the courier will have information about the goods so that he can track the status with internet and he can collect based on his availability without fail.

**Keywords:** RFID, GSM, Transfer System, Tracking, RFID Reader, Tag.

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As the time moves the life style of the persons has completely changed and there is no time for the people for micro management of every issue personally. So, this is the right time to provide some space to the technology into our lives for monitoring the issues which requires our personal presence for the things to happen. One among those issues which require our personal interest to track the courier details which is sent by the merchant. This may require time and internet and in some scenarios it may also lead to tough situations to track the goods. So our work aims in providing a very reliable and very user friendly solution to overcome this kind of problem. As we know the advancements in the Radio Frequency and GSM technologies and making use of those existing technologies we can design a device which is capable of identifying the arrival of courier and forward the same to the receiver and also provide the details of the goods so that they do not require to tracking the item from online. The basic idea of the system is to employ an RFID tag to the courier and send the location and item details to the receivers mobile. The receiver of the courier will have information about the goods so that he can track the status with internet and he can collect based on his availability without fail.

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### 1. INTRODUCTION

Increased efficiency. Real-time delivery status. Less human errors. - RFID is the future technology for postal, courier and high volume light logistics. Though the percentage of mail delivery errors in postal services is relatively small, most of us have encountered them now and then. Mail arrives late, to the wrong address or does not show up at all. The Finnish national post office "Itella" reports that their delivery

error rate is about 1%. Customers make about 18,000 missing item inquires annually of which about half can be solved. What if the other half could be resolved with the help of RFID? As soon as the RFID Tag detected then RF reader reads the identity number of the tag, courier details and informs the same to GSM modem and it will transfer the courier arrival details to customer. To design the entire system we require a microcontroller which acts as a medium of communication between the RF

reader and the GSM modem. The major advantage of this system is the presence of the GSM modem enables the device to communicate with the receiver no matter where ever he was present on the globe.

## 2. PROPOSED SYSTEM

### POSTAL DELIVERY VALUE CHAIN

The postal systems vary a lot from country to country, but we can roughly say that private consumers bring their outgoing mail to local postal offices to traditional drop mail boxes. Companies usually get their mail collected by a carrier service truck once a day. After this the mail is transported to postal sorting and distribution centers from where they are sent to local postal offices and thereafter delivered to their final destination. RFID can be helpful in many different ways during the stages of this process.

#### High level Design of the proposed system

##### Basic Blocks:

1. RFID reader
2. Central Server
3. Database
4. GSM modem



##### Sequence of Actions:

1. Reading RFID Tag information by RFID reader.
2. RFID reader sends the Tag information to PC via Serial port (RS-232 cable).
3. Central server (Application Program) is mainly responsible to read from Ports,

process the Tag information and preparing the AT command and send to modem via available COM port.

4. GSM modem read the AT command and send the message to customer.
5. Customer will receive the message with order details.



### 3. GSM Modem

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. The MODEM is the soul of such modules.

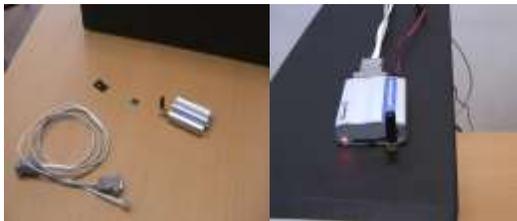


#### GSM Modem Specification:



#### Technical Specification

Product performance:	Dual-band GSM modem (EGSM900/1800MHz or EGSM900/1900MHz), applied to the data, fax, voice and messaging applications, has been certified by all of its design and development of the ETSI GSM Phase2 + standard (General Telephone)
Output Power:	Class4(2W@900MHz) Class1(1W@1800/1900MHz)
Input voltage:	5V-32V
Input current:	5mA standby, 140 mA @ 12V calls in the state GSM900MHz 5mA standby, 100 mA @ 12V calls in the state GSM1800/1900MHz
Temperature Range:	-20 °C - +55 °C working state -25 °C - +70 °C storing state
Product Size:	74×54×25mm
Product Weight:	130g



### 3.1 DELIVERY - TO THE RIGHT ADDRESS

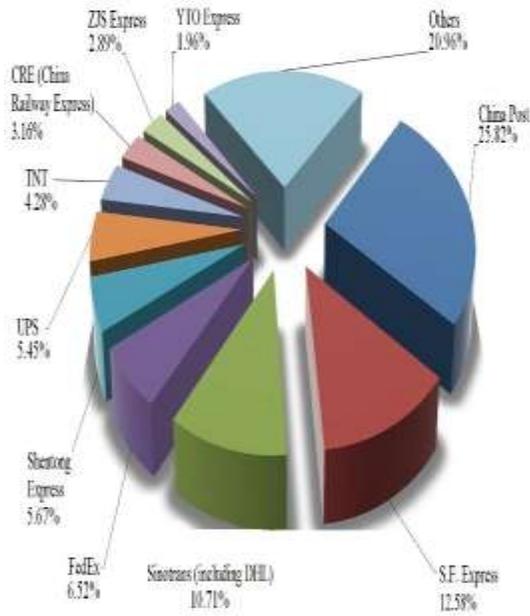
Once all letters and packages are tagged, sorted and loaded into delivery vehicles correctly, it's time to deliver them to their final destination. The tags contain all the information needed for sorting the mail in the exact right order according to the optimal route of delivery. When the postman starts his car, he is immediately informed where the first mail box is. If a letter or package is forgotten at a stop, the RFID reader in the vehicle will sense it and alert the postman before he leaves.

The delivery vehicle as well as the RFID readers in use are all equipped with GPS which makes it possible to follow a tag like a moving dot on a map. The post database constantly knows in which vehicle the mail item is travelling - even if it is not supposed to be in that particular vehicle - making it almost impossible to lose track of mail.

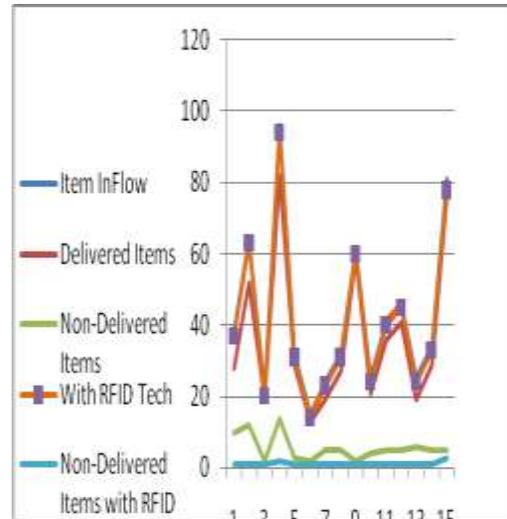
#### Tagged mailboxes

Once the delivery vehicle has dropped off the mail in the right box and driven away - mail can still get lost. This can be prevented by tagging mail boxes. Not only can the postman double check that it's the correct mailbox with an RFID reader that, of course, sends a notification to the database that the delivery is completed to a mailbox with the right tag.

A tagged box can also provide other services. A common cause for lost mail is vandalism and crimes targeted at mailboxes. There are ways that RFID could help prevent this as well. Tags equipped with sensors can be used to set off load alarms (like a car alarm for instance) and report to a cell phone if a mailbox is being or has been vandalized. Besides from discouraging vandals from choosing to attack "smart" (and scary) mailboxes, they make sure that the receiver knows HOW and WHEN the mail was lost. The more information, the easier it is to prevent similar situations in the future.



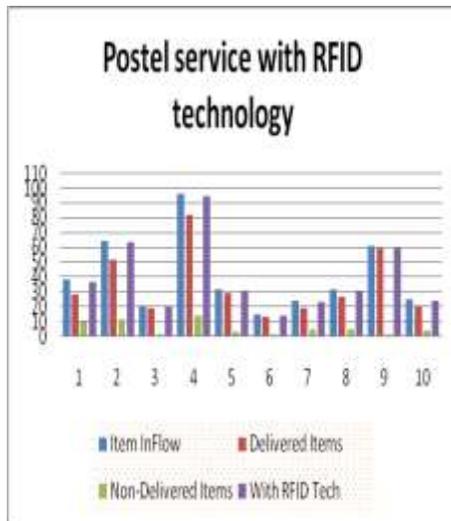
Source: Research Report on the Express Delivery Industry in China 2011.



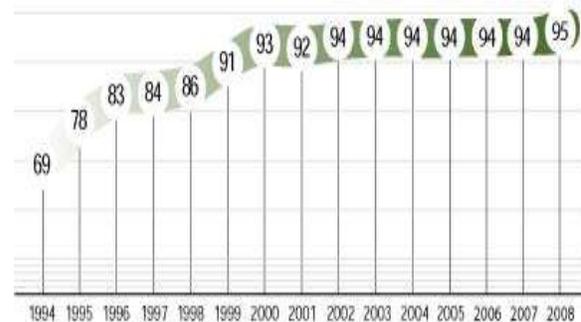
#### 5. RFID IMPLEMENTED IN POST SERVICES WORLD-WIDE

RFID has been active in the postal business area for a long time, though rather in truck, box and pallet tracking than item-level tracking. It all started with tests that were aimed to pointing out inefficiencies in the value chain. Letters and packages were randomly equipped with RFID and send off to different destinations in the world. The tracking results showed where the system needed improvements.

#### 4. RESULTS WITH PROPOSD SYSTEM:



#### DELIVERY PERFORMANCE J+3



Delivery performance year wise report

## 6. BENEFITS OF IMPLEMENTING RFID IN POSTAL SERVICE

As a conclusion we can state that tagging mail and mailboxes would result in:

- Overall reduced rate of mail delivery error
- Less human errors -> more efficient working hours in sorting and deliveries
- Satisfied customers who trust the system
- Less money spent on investigating lost mail
- Less money spent on insurances for lost mail
- Real-time up-to-date database
- 100% exact mail traceability service for customers
- Less vandalism of mailboxes
- Reduced handling costs for customers -> increased competitiveness
- More efficient and flexible operations -> shorter delivery times
- Enhanced security and safety
- Cheaper return package costs (for online shopping)

## 7. CONCLUSION

There is one huge flaw with the system though... when this is all reality you can no longer tell your aunt that "the post has probably lost your invitation" when she's wondering why she's not invited to your wedding... But let's look at the positive side of things! The pilots and implementations of RFID in postal services have great start and they considered a successful technology. RFID will make life easier! It will be exciting to see what applications and ways of benefitting from RFID will be added as the system develops.

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