

TRACKING THE LAST MILE

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Abstract: The main intent of building the system was to provide the user as well as the post-office with real-time surveillance with the help of GPS in smartphones (which is capable of calculation geographical position). This aids in empowering the customer to prefigure the estimated time to reach as well as encouraging the post-office to address any criticism in an ameliorated fashion. The postman has a tractability feature in which he may delegate his chores to another personnel via scanning of QR Code. The claimant is furnished with a name-card containing the delivery person details along with real-time correlation lineament. The postman can update the particulars in respect to delivery stature (such as delivery was productive or not, whether the customer was present or not, and elaboration in case package was acquired by any other personnel) and information regarding his on-dutifulness.

Index Terms - GPS, QR Code, Real-time tracking, Duty Mode, Push Notifications, Package marking (on maps)

I. INTRODUCTION

The present Postal system of the department works in an offline mode which lacks real time updation of the status of the consignment in turn overshadows the characteristics of data entry dynamicity. We have come up with a robust system which improves visibility of delivery system of INDIAN POST. The delivery updation of various accountable postal articles doesn't happen in real time. In current system the local servers connect with the Central server at regular intervals to update the courier status thus the delivery status doesn't get updated in Realtime. GPS in smartphones is capable of calculation geographical position. We can reflect that position on map to get the current location. Hence using this we can come up with a system to track real time location of the object such as courier, post etc

- a. **Background** Our system will consist of an android app installed on postman's phone on which the consignments would be registered and the app would send the phone's location to the server or database thus sending the current location of the consignment.

There are various shortcomings in the existing system:

1. Lack of Real time tracking.
2. Vulnerable to false claim by postman.
3. Unable to generate estimates Time of Arrival.
4. User can't notify the postman about his absence at the delivery location.
5. The delivery updating of the various accountable postal articles does not happen in real time

II. LITERATURE SURVEY CURRENT SCENARIO

- First when the stack of consignments is received, they are opened and through scanning of bar code they are uploaded into computer / server. The area of a particular city is divided into **beats**. Therefore, the individual posts are segregated according to different **beats**. This is done manually.
- Later these consignments are handed over to the post man of that particular area. They take sign of for delivering it and later when they return to the respective workplace, they manually make updates on the consignment. This work is done around 6 o'clock in the evening. Even if the delivery is done anytime during the day, the status is uploaded in the local server in the evening only.
- These local servers connect with the central server at regular intervals. Status of consignments in central server is not reflected in real time so there is need of a system that would allow us to get real-time updates like package's location, delivery status, etc.

III. TECHNOLOGY USED FOR IMPLEMENTATION

- Front end Android device (min. version 2.3 and above)
- GPS and Camera
- Minimum SDK:8
- IDE: Android Studio
- Development Platform
- Backend: Firebase

IV. PROPOSED SYSTEM

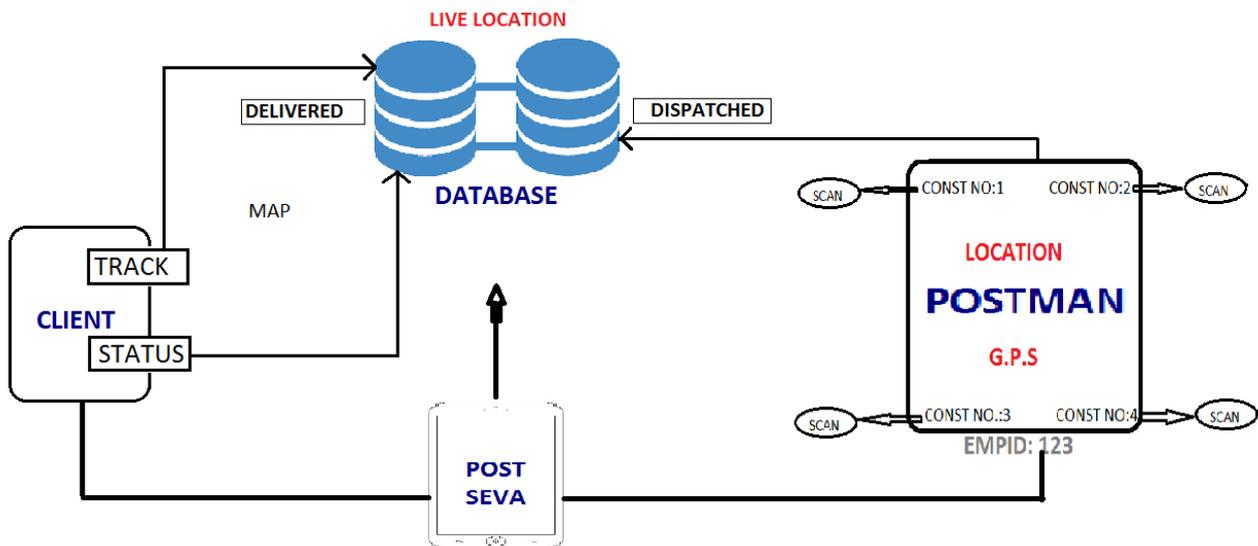


Figure 1: Architecture of the system

Following are the modules by which is divided and developed –

1) Postman

- a. The postman would register himself on the app using his UID (Unique Identity) Card. Postman would digitize (scan/register) the allocated consignment using provided media (Bar code, Unique Consignment Id [UCID], etc.) This scanning will trigger a mechanism which will send the location of the postman's phone to the server or the database which would be treated as the location of the pertinent consignments. This entry in the database signifies the start point of the entire delivery.
- b. After digitizing with a specific package, if he wishes to delegate his workload with another one. Then he can requisite the individual to screen the QR code present in his package elaboration snippet. After this formality, the handover process is accomplished and the database is accordingly revised which in turn reflects on the client side also.
- c. Once the postman (delegated personnel) reached the package's destination one of the 3 scenarios can take place –
 - i. The sought-out customer present, the postman makes necessary stimulus which is reflected in the database.
 - ii. No personnel present to receive package. Then the postman updates his status on the device and an automated message is generated by the server thereby delivering the same to the intended customer.
 - iii. Personnel other than intended person present. Then the postman chooses an appropriate action from the action screen. The system requests the postman to scan the Aadhaar of the personnel. Again, in which case an automated message is generated by the server thereby delivering the same to the intended customer along with the snapshot of the Aadhaar taken earlier.
- d. The postman can avail the feature of OFF Duty-mode if he's not working at that instant, this informs the customers try and not contact the postman and will also notify the user when postman is back online or ON Duty-Mode.

2) Tracking (Monitoring)

- a. The user is provided a unique code/number from the system when he registers his consignment with the Indian Post. This code facilitates the user with the location of his/her consignment along with the necessary specifics which to contact the postman. As soon as the user enters the Track module on the App. He would be asked for a consignment number which the user enters the number and submits the request, the system fetches the location of the postman's device showing it as the location of the consignment (by referring to the database).

3) Post-office

- a. During the delivery, the system at the head office keeps an eye on the location of the postman. It keeps tracking and feeding the postman's location at pre-determined intervals of time. This ensures consistency in tracking and feeding of locations traces a path covered by the postman. This trace generated is the entire Journey of the postman to avoid any false claim made by the postman. The entire procedure ensures reliability.
- b. The post-office can also access any particular consignment status if in case of any complaint has been registered to strengthen a harmonic communication between the concerned officials and the customers

V. TECHNOLOGY STACK

1) FRONTEND

- c. Smart phone running of Android 4.0 or higher.
- d. IDE: Android Studio, Minimum SDK 8.0

2) BACKEND:

- e. FireBase
- f. SQL

VI. RESULT ANALYSIS

- 1) An analysis was carried out among 15 postmen belonging to same post-office and customers. All the postmen logged in with their ids which was authenticated by the post-office.
- 2) Postmen didn't know about the inbuilt tracing feature.
- 3) So, the following observations were made during the trial.
 - a. Indirect contact between the customer and the postman through "ADDITION REMARK" column served more than status purpose for the customers.
 - b. Customer could directly track their consignment and the postman.
 - c. Aadhaar card scanning prevented the consignment from going into wrong hands because the post-office had the information of the alternate receiver.
 - d. Out of 15,3 of them committed fraud about their presence at delivery location. It was caught by the post office.
 - e. Post office could track the efficiency of the postman man and take necessary action if needed.
 - f. Overall it resulted in a very good & secure automated feature.
- 4) Post man delivery rate 71%(earlier) → 85%(now)
- 5) Past man fraud rate 18%(earlier) → 2%(now)
- 6) Overall post-office efficiency increased to 23%

VII. FUTURE ENHANCEMENT AND CONCLUSION

The Entire System can be provided in the form of Portable plugins for the Multinational E-Commerce Industries (Flipkart, Amazon etc). Security Features can be implemented by use of UID card. Hence, we have come up with a system which would overcome the Limitations of the current system and facilitate the Realtime updation of the courier status on the database

VIII. ACKNOWLEDGMENT

I would like to take this opportunity to thank my internal guide Prof. Manisha Bhende for giving me all the help and guidance I needed I am really grateful to them for their kind support. Their valuable suggestions were very helpful. I am also grateful to Prof. P. P. Shevatekar, Head of Computer Engineering Department, DYPIEMR for his indispensable support, suggestions.

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