

# *Railway Ticket Verification and Dynamic seat Allocation using Aadhar Card*

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**Abstract**—Indian Railway is spending more money on managing instead of development. Today Ticket checkers are checking the tickets manually. We can make the ticket checking with the help of technology instead of a manual process. In this paper, ticket checking is done without human intervention. For the same, we are going to use the AADHAR number and fingerprint recognition system. It also does the dynamic seat allocation for the waitlisted passengers so we can reduce the budget of management in terms of reducing the work of TC so that we can use them in other work.

**Keywords**—Aadhar Number, fingerprint Recognition system, Dynamic seat allocation, waitlisted passenger, Ticket checker.

## I. INTRODUCTION

Digitization is the need of today's world to bring new technology and advancement in the context of social service. India needs to work more to make our social service digitized to give fast service to citizens of India. Digitization impacts on the economy, society, and governance of any country. As per as economy concerned it helps to GDP growth, Job Creation and innovation in a country. As per as Society Concerned it helps to improve the quality of life and fast access to basic services of the country. As per as Governance is concerned it maintains the transparency, E-government, and education [1].

In 2016-17 more than 70 million passengers travel through train in India as per the report by economic times so the Indian railway is a necessity of citizens of India [2]. Indian Railway board is spending more money on management instead of development. Many workers are working for a smooth functioning of Train which limiting the development of Indian Railway. Indian citizens are able to book the Railway ticket in both offline and online mode but there is no provision of digitization for ticket checking inside the Train Coach. As per the current system, TC goes to each and every seat and checks the ticket which is time-consuming, extra overhead on Indian Railway Board and insecure. Many times TC is checking the only ticket of travel not the authenticity of traveler so it might happen that any intruder can travel through our train. There is one more drawback in the current system for the waitlisted passenger. After chart preparation, there is no transparent provision for assigning the seats to waitlisted passengers. In this paper, we are proposing the solution for the above problems using Aadhar card.

Unique Identification Authority of India (UIDAI) provided Aadhaar number to all citizens of India specified by some regulations which is unique across the country while giving the number of authority took citizens details along with the thumbs. Fig 1 shows the image of

Aadhar card [3]. Using a fingerprint recognition system we can verify the identity of the citizen.

We are proposing the solution using the Aadhar card. When the passenger is booking the train tickets either offline or online mode He/she is supposed to submit the Aadhar number of each and every passenger. As per the current system, Indian Railway Board needs to add one more field of Aadhar number in both offline and online mode. The passenger can travel in the train with SMS or printed copy as a ticket. fingerprint Recognition device will be fitted to each coach with security arrangements. When passenger comes in the coach of reservation He/she needs to put a fingerprint in the device then automatically passenger will get a message of confirmation through SMS that your ticket gets verified. There are some restrictions on passenger like fingerprint scanning should be done within 1 Hour after boarding train. If passenger missed scanning his fingerprint then it will be considered as a vacant seat so this seat will be allocated to waitlisted passenger according to a sequence as this maintains transparency in the system which is not present in the current system. We call it as dynamic seat allocation for a waitlisted passenger. Waitlisted passenger will get notified about their confirmation of the seat through the SMS. Such a solution reduces the number of TC as ticket checking is done using technology. After using this solution all the problems like budget management, security and waitlisted passenger will be solved. Indian railway boards now invest the money in development.



Fig 1. Aadhar card

## II. RELATED WORK

After going through the background of this study we have reported several related works as bellows,

Tanwara et al (2016) [4] stated verification of passenger at the entry for finding intruders but they have not highlighted the concept of verification at each compartment and no dynamic seat allocation. Ghosal et al (2015) [5] stated to use the smartphone for ticket booking and ticket checking but there was no Concept of ticket checking through online. study talked about the QR Code generation and also used the Cloud database to store the entry. Sunil & Pranav (2018) [6] talked about the ticket verification and Dynamic seat allocation using QR Code. In his study author ensures maximum fairness for Waitlisted passenger.

Nasution SM et al (2012) [7] stated E-Ticketing system using Near Field Communication Technology. Train Ticket application is integrated with NFC device that is deployed in Android. Gaurav Kumar & Pradeep Kumar (2014) et al [8] Bhatia explained about what are the stages of feature extraction also features of image listed in the paper. Mark S Nixon, Alberto S Aguado (2002) [9] given all the details about types of feature extraction, different ways of extraction and also given some examples by considering some images.

Karim et al (2012) [1] talked about defining and measuring digitization, digitization score and impact of digitization. In defining and measuring digitization author stated six key attributes ubiquity, affordability, reliability, speed, usability, and skill. In digitization score mentioned metrics to each key attributes of measuring digitization also plotted the graph for the stages of digitization with levels of digitization. In the impact of digitization mentioned three components where it is effective those are economy, society, and Governance. Graphs also plotted based on a survey done by OECD Better Life index. Karthick SI, Velmurugan (2013) [10] stated Local Railway Ticket checking is done with the help of GPS System in which initially ticket is booked through the smartphone. The study used the GPS facility to check and delete the ticket from the smartphone. The study also focused on giving the account to the ticket so that he can verify the details of a passenger. The author also mentioned about cloud database where all information will be stored [11].

In all study mentioned above researchers talked about the ticket checking process but dynamic seat allocation feature is missing in the studies so in our study we will incorporate this feature.

## III. FINGERPRINT RECOGNITION ALGORITHM

### A. Feature Extraction

Features are a very important component of fingerprint recognition system which characterizes images. The first step in the algorithm is feature extraction for this we are using optical fingerprint sensor device which extracts the feature like crossover, core, bifurcation, ridge ending, island, delta, and pore. There are two types of feature extraction one is a low-level feature and High-level feature. The low-level feature is those features which can be extracted automatically from an image without any shape information for example edge detection and line drawing.

High-level feature extraction finds the shapes in the images. Based on these feature judgment is done. Fig 2 Shows the Fingerprint Optical sensor.



Fig 2. Fingerprint Optical sensor

### B. Feature Enhancement

The second step in algorithm is Feature enhancement. It might happen that some passengers fingerprint is not clear so that time one more concept came into picture feature enhancement which is done after feature extraction. Feature enhancement process the image w.r.t contrast improvement, and image sharpening. The main Aim of Feature enhancement is image should be better suited for further processing. There are three types Feature enhancement.

#### 1. Point Processing.

In this enhancement technique histogram modeling, image averaging and contrast improvements are done.

#### 2. Spatial Filtering.

In this enhancement technique linear and nonlinear filters are applied on the image also edge improvement and zooming are done.

#### 3. Image coloring.

In this enhancement technique pseudo and false coloring is done as enhancement to image.

Mathematical formula for brightness and contrast are given below.

Let us consider P and Q variables for brightness and contrast respectively.

$$P = \frac{1}{AB} \sum_{i=1}^A \sum_{j=1}^B f(i, j) \quad 1.$$

$$Q = \sqrt{\frac{1}{AB} \sum_{i=1}^A \sum_{j=1}^B [f(i, j) - P]^2} \quad 2$$

In above Equation 1 & 2 A and B are image dimensions while  $f(i, j)$  gray level value at  $(i, j)$  [8,9]. Above equation is used to increase the brightness and contrast so that identification image should be done very efficiently.

### C. Template Selection

There could multiple templates available so one can choose the best which represent the variability associated with a user's biometric data should be stored in a database.

### D. Matching Algorithm

There are many matching algorithm available we selected Minutiae detection algorithm. The idea is very simple two images minutiae are compared with each other. Minutiae were marked in the database and similarly input image also gets minutiae point latter on minutiae are compared and gives output as matched or not matched.

### E. UIDAI Database.

Unique Identification Authority of India (UIDAI) has database which consist of all the information about citizens of India also it contains fingerprint of Citizens. Our system will fetch the stored fingerprint image from UIDAI database.

Whenever there is match between fingerprints obtained from input and UIDAI database then there is update in the travel information of passenger and same thing will conveyed to him/her by sending message that verification completed.

Fig 3 shows the all the parts of fingerprint recognition algorithm.

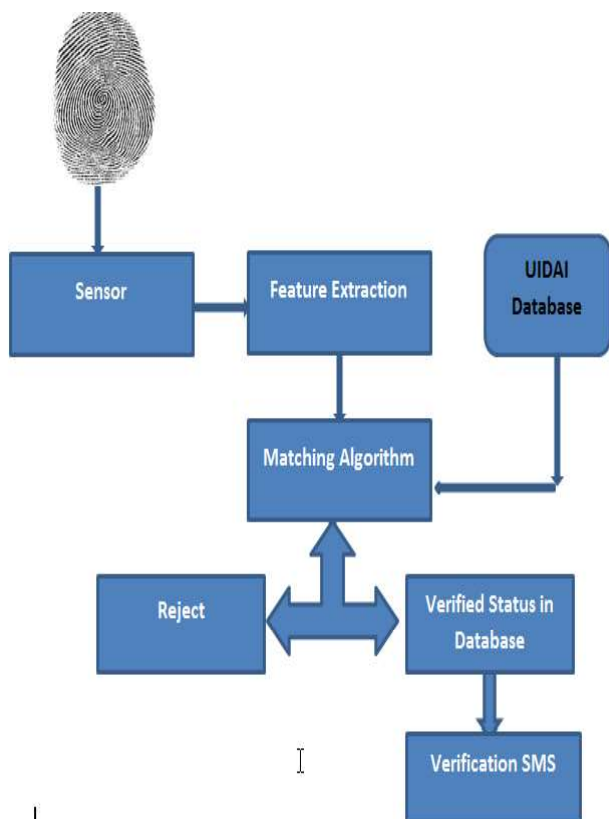


Fig 3. Fingerprint algorithm structure

## IV. WORK FLOW

### A. Train ticket booking

Fig 4 is the workflow of Train ticket booking. Passenger can book the ticket online and offline. For each passenger needs

enter Aadhar Number while booking. As Aadhar is having details like Name, Year of birth, Sex so no need to give these details while booking. Automatically these details will be fetched after entering the Aadhar number from UIDAI Database then Passenger needs to mention the mobile number so that server can sent the message of details of booking.

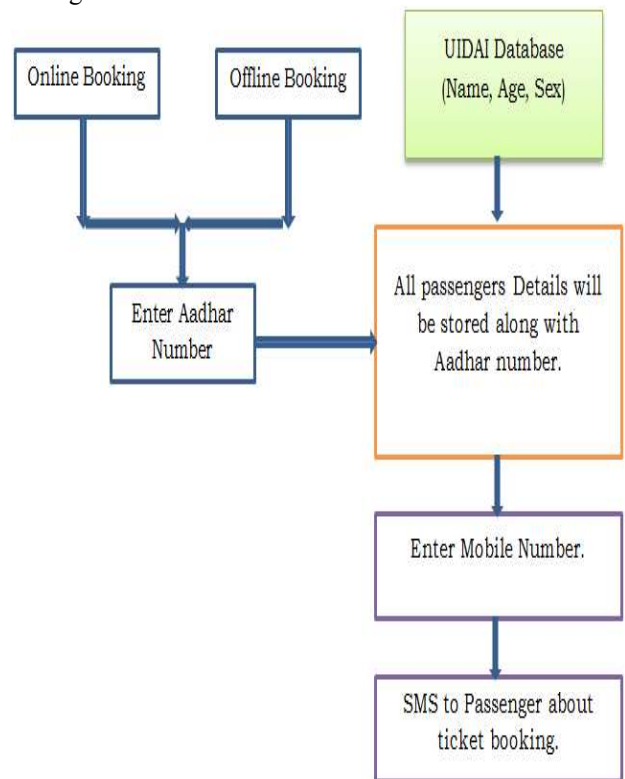


Fig 4. Train Ticket Booking

### B. Dynamic seat Allocation

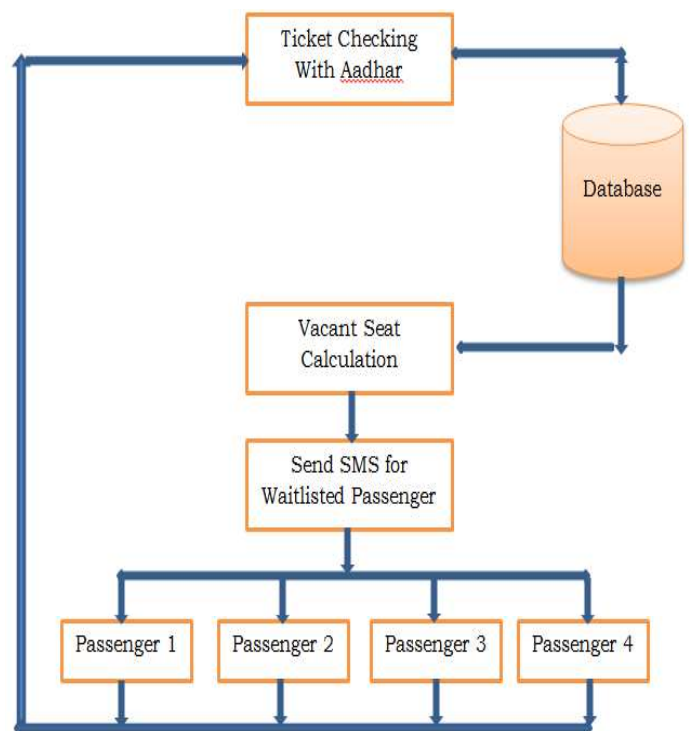


Fig 5. Dynamic Seat Allocation

There should be 100% Ticket checking for effective implementation of Dynamic seat allocation. Each passenger needs to verify his or her ticket through system within 1 Hour of boarding the train so first component in dynamic seat allocation is Ticket checking with Aadhar. Every activity is recorded in the database so this will become the input for vacant seat calculation module. It can happen that some passengers miss the train or cancels at last moment. This module identifies the vacant seat available in a train after 1 Hour of departure of train. In current system ticket checker is assigning the seats to waitlisted passenger according to seat available but this is not fair way to treat passenger. Our system removes this drawback. According to waitlisted sequence seats are assigned to passenger and the same is informed to passenger through SMS. Again passenger needs to verify his/her ticket with our system within half an hour. Vacant seats calculation will be done at interval of half an hour so this process will be repeated. This algorithm will run for the entire junction where train is going to board. Dynamic seat allocation

## V. CONCLUSION

In this paper we focused on Railway ticket verification and dynamic seat allocation using Available Aadhar card. While booking the tickets passenger doesn't need to enter his details as our system will fetch all the details of that passenger. Proposed system will improve our Railway system by removing or reducing the drawbacks. Dynamic seat allocation concept will give the maximum fairness in the current system. We are using the UIDAI Database for matching the fingerprints of passengers. Proposed system will work for both online and offline booking of ticket. There is need to fit the Fingerprint optical sensor on each compartment of train.

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