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ALLOCATION AND VERIFICATION USING QR CODE AND THERMAL SCANNER

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Abstract—Indian railway is the third-largest human transport system in India with over 30 million passengers travelling every day all over the country. One of the most prevalent problems in Indian Railway stations is that the platforms are overcrowded. A system to tackle this issue has been recommended. The system that is proposed is to issue a smart seat allotment to passengers. Every ticket will have its QR code which will have to be scanned to enter into the platform. The scanning of the ticket will automatically confirm the presence of the passengers and these seats will be locked till the passengers' destination. Passengers should scan the QR code on their ticket against the scanner and go through a turnstile to gain access to the platform. The turnstile will also keep track of how many passengers pass through, in cases where the ticket that has been generated is booked for more than one passenger. The turnstile will also screen and record the temperature of the passenger. The temperature of the passenger at the time of boarding will be recorded. Should the passenger have a temperature beyond the threshold limit, their ticket would be cancelled automatically, for the safety of the rest of the passengers, especially during the pandemic. Scanning of the ticket will confirm the presence of the passenger/passengers on the platform and thereby, locks their seat/seats. Passengers have a small window of 45 minutes to board the train at the next station in case they have missed their boarding station. On missing their window, the reservation

would be cancelled and will be allotted to passengers travelling in RAC. The seat will be allotted to the RAC passenger, prioritizing their age and gender

Keywords: QR code, UTS mobile apps, prioritizing, RAC.

I. INTRODUCTION

Rail transport (also known as train transport) is a means of transferring passengers and goods on wheeled vehicles running on rails, which are located on tracks. In contrast to road transport, where the vehicles run on a prepared flat surface, rail vehicles (rolling stock) are directionally guided by the tracks on which they run. Tracks usually consist of steel rails, installed on sleepers (ties) set in ballast, on which the rolling stock, usually fitted with metal wheels, moves. Other variations are also possible, such as "slab track", in which the rails are fastened to a concrete foundation resting on a prepared subsurface. Until the late 1980s, Indian Railways ticket reservations were made manually. In late 1987, IR began using a computerized ticketing system. The system went online in 1995 to provide current information on status and availability. The ticketing network at stations is computerized except for remote areas. IR now provides multiple channels for passengers to book tickets between any two train stations in the country.

Reserved tickets may be booked up to 120 days in advance on the Indian Railway Catering and Tourism Corporation website, smartphone apps, SMS, rail reservation counters at train stations, or through private

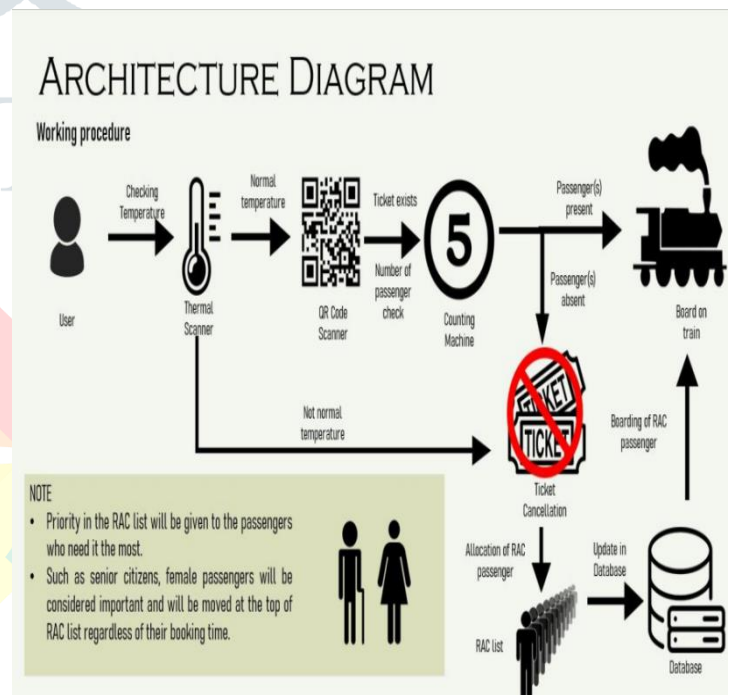
ticket booking counters. A Tatkal train ticket can be booked by passengers who want to travel at short notice with a reserved seat or berth, but such tickets are sold at higher fares than regular reservation tickets. Confirmed reservation tickets will show the passenger and fare details along with berth or seat number(s) allocated to them on the ticket. If the reservation is not available on a particular train, the ticket has a wait-list number. A person with a wait-listed ticket must wait for enough cancellations to obtain a confirmed ticket. If their ticket is not confirmed on the day of departure, they cannot board the train. Reservation against cancellation tickets, between the waiting and confirmed lists, allows a ticket holder to board the train and obtain a seat chosen by a ticket collector after the collector has found a vacant seat.

Unreserved tickets for short-distance or unplanned travels may be purchased at stations at any time before departure. Holders of such tickets may only board the general compartments. Suburban networks issue unreserved tickets valid for a limited time or season passes with unlimited travel between two stops for some time. Commuters can purchase tickets and season passes at stations or through UTS mobile apps. A valid proof for the purchase of a ticket along with photo identification is required to board the train.

India has some of the lowest train fares in the world, and passenger traffic is subsidized by higher-class fares. Discounted tickets are available for senior citizens (over age 60), the differently-abled, students, athletes, and those taking competitive examinations. One compartment of the lowest class of accommodation is earmarked for women on every passenger train. Some berths or seats are also reserved for women or senior citizens. To serve this purpose, we have formulated a system that would generate a QR code-based ticket. Each ticket will have its QR code. On arrival at the station, the passenger should scan the ticket against the scanner. This would confirm the passenger's presence on the platform. If the ticket is deemed valid, a turnstile would be used to let the passenger through. The turnstile-like machine will keep track of the number of people passing through and also screen the passenger's body temperature as they pass through. Should the passenger be recorded having a temperature beyond 100.4 F, their ticket is to be immediately cancelled owing to the pandemic and safety of the rest of the passengers. A person can book the tickets for up to 6 people. The turnstile will count the number of passengers passing through and

only let as many people through as the ticket is booked for. Another minor issue that the railway system is dealing with is the seat allotment for the passengers who are reserved under RAC (Reservation Against Cancellation). When a ticket that is confirmed is cancelled, the seat of the cancelled ticket would be allocated automatically to a passenger travelling under RAC. The seat will be allotted based on the age of the passenger. Therefore, the oldest passenger under RAC will be prioritized. In cases where the passengers have the same age, the seat will be allotted based on gender. A 60-year-old woman will be prioritized over a 60-year-old man. The system is one of the many steps to achieve "Digital India".

II. SYSTEM ARCHITECTURE



The implemented system consists of a website where people are to log in and fill in details into to book the ticket. Details like their phone number, Aadhar card number, name, age, gender, physically challenged or not, boarding station, destination station, etc. Each booking will generate a ticket with a QR code. At a time, a person can book seats for 6 people.

The QR code on the ticket should be scanned against the scanner at the platform. The details of the ticket that is scanned will be pronounced on the system that a person sitting by the entry point will be using. If it is a valid QR code, the plunger bar/gate of the turnstile-like machine allows entry. The machine also has a thermal scanner in it that screens the body temperature of the person entering. Passengers recorded having a high temperature will have their ticket automatically

cancelled. The machine also keeps count of the people passing through. If a ticket is booked for 5 people, the machine will have its gate open for 5 people. Should a person not enter the train at the boarding station as per their ticket, said person has their ticket still confirmed for another 3 stations failing which will call for the cancellation of their ticket and cause of an empty seat in the reserved list. The database will now scan for a passenger travelling in RAC and allot the vacant seat to them. The seat will be allotted to the passenger by prioritizing their age and gender.

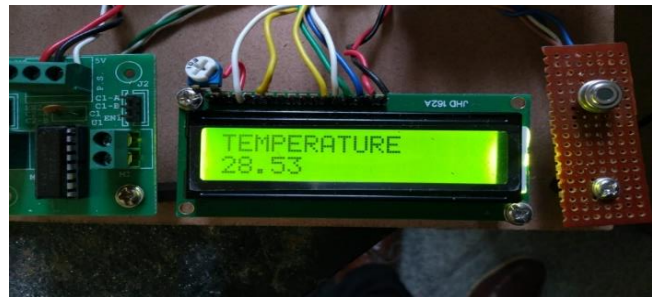
III. IMPLEMENTATION.

ALGORITHM

- Step 1: Start
- Step 2: Check the Temperature of the passenger
- Step 3: Cancel booking if the temperature is high
- Step 4: Check the status of the Ticket
- Step 5: Check if the passenger is present or absent
- Step 6: Cancel ticket if Passenger is not available
- Step 7: Allot the cancelled seat for the person reserved under RAC
- Step 8: Update the database
- Step 9: End

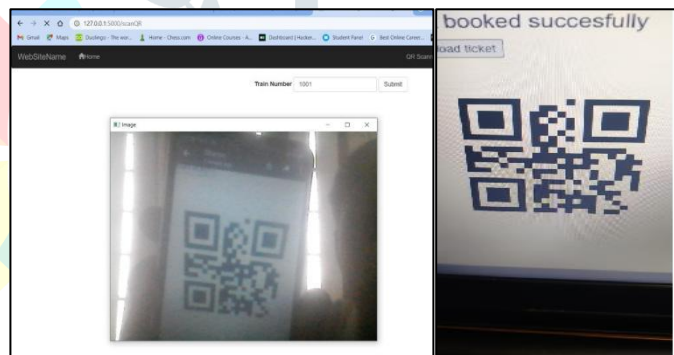
3.1 TEMPERATURE SCANNER USING DHT11 SENSOR

The temperature range of DHT11 is from 0 to 50 degrees Celsius with a 2-degree accuracy. DHT11 is small in size with operating voltage from 3 to 5 volts. The maximum current used while measuring is 2.5mA. The person is to place their finger near the sensor. The temperature gets detected. If the temperature is normal, the passenger can enter. If the temperature is abnormal, the ticket gets cancelled and a message is sent.



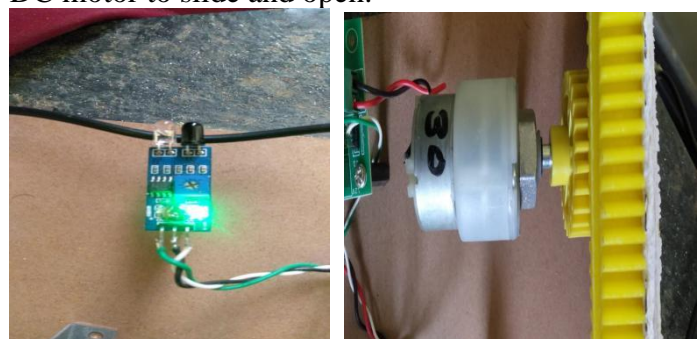
3.2 QR SCANNER

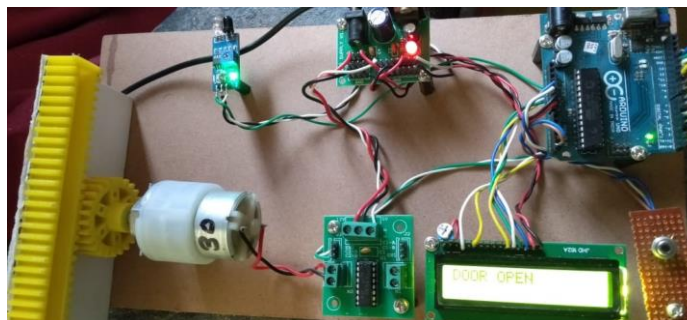
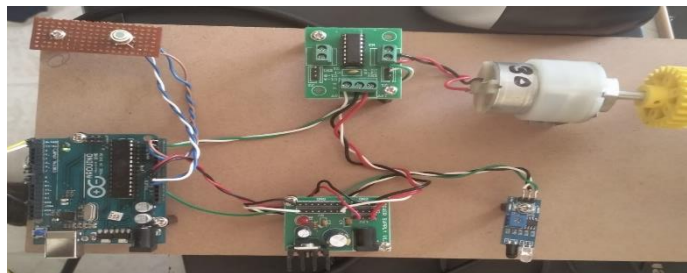
A QR code works similarly to barcodes at the supermarket. Each QR code consists of black squares and dots representing different information pieces. When scanned, the unique pattern on the barcode translates into human-readable data. This transaction happens in seconds. Users must scan the code with a QR reader or scanner, although nowadays most people scan QR codes with smartphones. On the off chance your phone doesn't have the capability, there are plenty of free apps for QR scanning like NeoReader and QuickMark Barcode Scanner.



3.3 COUNTER

IR sensor is an electronic device, that emits light in order to sense some object in the surroundings. An IR sensor can measure the heat of an object as well as detects motion. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes, but infrared sensors can detect these radiations. The IR sensor will detect an obstacle(person) and triggers the DC motor to slide and open.





System Model

The Website

From	To	Date	Train_No	Train_Name	Time	Remove Train
Bangalore	Belgum	mm/dd/yyyy	1000.0	sangoli rayana expre	-- --	Remove
Bangalore	Belgum	04/22/2022		nan	11:35 AM	Remove
Bangalore	Belgum	mm/dd/yyyy	1003.0	TrainName1	11:10 AM	Remove
Bangalore	Belgum	04/22/2022	1004.0	TrainName4	11:20 AM	Remove

CONCLUSION

This model proposes a radical change in train operation and passenger experience. One of the many steps towards a more digitized society as a part of the “Digital India” movement proposed in 2015 by the Prime Minister. The system aims to achieve discipline and organization on the railway platforms. Only passengers with a valid ticket will be allowed to enter the platform, reducing the unnecessary crowding of people and thereby, easy maintenance of social distancing norms that are to be practised due to the pandemic. In addition, the system screens the temperature of the passenger and keeps a track of the number of passengers passing through for further security, discipline, and organization. The system also aims to provide dynamic seat allocation to passengers travelling in RAC whenever a reserved ticket cancellation occurs. As soon as a seat that is reserved is deemed vacant, the seat will be dynamically allocated to a person travelling in RAC but based on the passenger’s physical fitness (physically challenged), age, and gender. The system is not foolproof and requires a dramatic change in the existing system in terms of the people allowed on platforms, etc. but baby steps matter.

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