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Biometric Based Metro Ticketing System Using Image Processing

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ABSTRACT: This paper based on automated system for ticketing in the Metro Train System which is based on unique passenger identification. This is a user friendly system, which will automatically identify the passenger and deduct the passenger's fare according to the distance travelled.Transportation plays a vital role in ones life. The main goal of this paper is to eradicate the day to day and one of the major problems with regard to carrying a ticket during transportation from ones life and make traveling a lot more peaceful. For this purpose, we are proposing a biometric-based ticketing system in the metro railway scenario but not limited to the same. In order to get a unique identifier for each person, we are considering their fingerprint right away from registration, booking tickets and validating the fingerprint on the day of the journey so he/she can travel on a particular day and on the desired train to his/her preferred destination. The fingerprint sensor will be interfaced with Arduino which in turn will store the fingerprint data to the cloud. We are proposing a two-way encryption standard for storing the sensitive fingerprint data in the cloud. This two-way encryption standard involves encrypting the data during data generation at the hardware end and encrypting it again before storing it in the cloud database.

KEYWORDS: metro train, biometric, railway, fingerprint

I. INTRODUCTION

In the past, for any formal job of government, we required various different cards for user authentication, but with time all those cards were replaced by a single point of authentication Aadhar card in India. This card uniquely identifies an individual living in India. The main problem with the physical existence of a card is that we may sometimes forget to carry the card and due to carelessness, we may lose it and that can be further used by others for some different works. In such scenarios, the entire process of the ticketing system may become more complex to use. For travel, we need to carry our ticket as well as a UID card which is always a hectic task for

day to day travel. So hence we propose a solution for a system that may take into account the biometrics of a person for authentication, which may be more useful than carrying a physical card around. So once a user registers himself/herself into the system using their fingerprint, they can travel from anywhere and any station across India, as they will not have to register again in this new station.

Today, everything in the world is smart and digitalized. Many advances have been made in the transportation sector too. However, public transport metro in India have always been an area where such new advances have turned their faces out. In Past Years, human travels from one location to another takes months and years, with less support of technology and communication tools. Currently, with the effective and efficient mode of transportation, we could travel thousands of a long way with hours and days and communicate across the globe within split of seconds. As the denomination suggests, these are typically designed with the specific purpose of automating the ticketing system, easing public transport use for passengers and adding efficiency to revenue collection operations for this purpose we are developing one app. Whenever we will open this application in our mobile system, we have to just scan the fingerprint of passengers, in which we have to collect the ticket of passengers. Our primary objective is to design ticket-collecting process of the state or local transport vehicles, which will do improvement in comfort, and convenience of passengers' travelling using Fingerprint scanning.arti

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II. LITERATURE REVIEW

Title: BUS FARE COLLECTION
Author:
Sunitha Nandhini.A , Sangeetha.G , VidhyaJanani.J
Review:

In general way, every bus is controlled by a conductor. The conductor will collect money from each passenger and issue ticket. Initially, printed papers or tokens are used as tickets. Nowadays, handheld machines are used to print tickets. This system has many disadvantages. The passenger have to carry the ticket till the reaching their stopping, the conductor should ensure that everyone has got the ticket, the time taken for ticketing is comparatively more and more amount of paper is needed to print the Ticket. For example, if a passenger wish to travel in bus. He has to carry money with them. Then conductor will collect the money and he will give ticket. This has to repeat for all passengers. This will take more time and waste of human resource as well as energy. The data relate to an AFC system integrated with an automatic vehicle location system that records a transaction for each passenger boarding a bus, containing attributes regarding the route, the vehicle, and the travel card used, along with the time and the location where the journey began. **Title**: Manual Bus Fare Collection
Author:
Chanda Rajurkar, S R S Prabaharan, S.Muthulakshmi(2017)
Review:
Every bus is controlled by a conductor. The conductor will collect money from each passenger and issue ticket. Initially, printed papers or tokens are used as tickets. Nowadays, handheld machines are used to print tickets. This system has many disadvantages. The passenger have to carry the ticket till the end of travel, the conductor should ensure that everyone has got the ticket, [3]the time taken for ticketing is comparatively more and more amount of paper is needed to print the Ticket. Nowadays conductors are trained to operate the handheld ticketing machine. For example, if a passenger wish to travel in bus. He has to carry money with him. Then conductor will collect the money and he will give ticket. This has to repeat for all passengers. This will take more time and waste of human resource as well as energy. Even handheld ticketing machine is comparatively slow and need trained person to operate it.

Title: PTS System
Author:
Carlos Kamienski1, João Henrique Kleinschmidt1, Juha-Pekka Soininen2, Kari.Kolehmainen2,Luca Roffia3, Marcos Visoli4, Rodrigo Filev Maia5, Stenio Fernandes6 (2018)
Review:
Portrays about the public transport ticketing system, prevailing in the megacity Dhaka (Bangladesh) which introduces severe mal-function in the system, malicious argument among public, corruption and most of all traffic jam. PTS remains the major source of income in most of the developing countries like India. ButPTS now faces severe malfunction and various security problems. First, there is a lot of confusion between the passengers regarding fares which lead to quarrels and corruption. In addition to this, nowadays there is a severe security crisis in PTS due antisocial elements.
[1] Author : Atul Jain, Ankita Gurbaxani ,Sagar Oza ,Purvi Sankhe
Paper Title: Train Ticket Using Smart Card
This is a revolutionized idea that propagates easier ticket generation. With the help of an android application, a user will be able to login with ID and password. The user then enters important details. This information gets stored in the database, which can also be accessed even via the website. Wi-Fi hotspots will be made available for travelers at each station which will provide connection to use the application and experience hassle free ticketing. The account will be debited from the main database when the user books the ticket from the application. The ticket will then be available on the mobile device, preventing paper wastage, enabling easy ticket generation and safe generation of ticket.
[2] **Author :** Amit Kumar Gupta and Priyanka Ahlawat Mann
Paper Title: Railway Train Ticket Generation A Business Application for Indian Railways
The reservation of railway tickets in India is done through by either of the two alternatives. The first one is that the individual himself goes to the counter opened by the Indian Railways and book the advance ticket i.e. reservation of ticket and other one methods is through online reservation. This methods are valid in time dependent, timing is response 8 AM to 10 PM. Implementation of this proposed work we can provide general ticket and reservation ticket is available twenty four hours. Now here we are talking about an application which can be very useful for common people. We can use ATM for booking railway tickets besides withdrawing money.

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[3] Author : Athukorala A.U.B. ,Dissanayake C.P. ,Kumara M.G.C.P.
Paper Name: Automated Train Ticket System
MobiTiki uses the train commuter's cellular phones to store the authentication data. The users will then authenticate themselves at the train station via an automated system. As the tickets are issued using a prepaid system we expect the process to be much faster than the current manual system. This report gives a detailed description about the project including literature survey, research, design and development stages and final outcome of the project. It also suggests further improvements that can be carried out for achieving a better system. Several technologies and designs are done by many authors based on the fingerprint technology and it has many drawbacks which I have overcome using biometric technology using fingerprint. More or less it is also the same design with little different system designs.

[4] . **Train Ticketing System using Smart Card:**
The goal of our project is to attain improved travel information and electronic ticketing using smart cards. The smart cards are similar to that of an ATM, so that they can be recharged and can be reused often. Smart cards are secure portable storage devices used for several applications especially security related ones involving access to the system's database. This looks into current trends in smart card technology and highlights what is likely to happen in the future. The smart card has a microprocessor or memory chip embedded in it that, when coupled with a reader, has the processing power to Highly Secured Railway Reservation using Biometric Technology serve many different applications. The smart cards are userfriendly and so it can be used for Public Transport Networks (PTNs).It can also be noted as a service-oriented architecture. Railways are the important key aspect for the development of the Indian revenue. Many people are in need of train transportation than any other means of transportation because a number of people may travel at the same time. So people may prefer smart cards for the traveling purpose instead of booking the tickets. The existing fare booking system can be replaced by smart cards.
[5]. Ticketing System of Indian Railways through SMS and Swapping Machine: UTS ticketing through the computer and computerized reservation ticketing system came in existence in Indian railways in mid of 1985 with a solution of computerization in the ticketing system and tracking of the status of the reserved ticketing, but it creates a number of problems related to this newly implemented system, this paper is regarding the solutions of the problems related in consumption of time during the Ticketing Process in Indian Railways and the mode of payment other than the specified by the Indian Railways while taking ticket from their Ticketing Counters.

[6] **Author: SmitaPatil**
Paper Title: An Intelligent Ticket Checker Application for Train using QR Code
has proposed that the biggest challenge faced today in the ticketing system is having to wait in queue for purchasing tickets. Their work is primarily intended toward booking suburban train tickets which is more of a challenge, in comparison to booking tickets for long journey, using the existing system. In their system, tickets are booked through a smartphone application and the ticket information is stored within a QR code. A timebased technique is used to automatically delete the ticket after a specific period of time, once the user reaches the respective destination. They employed a Cloud-based database to store all the information of every user, for security purpose which is not available in the current suburban railway system database for ticket checking. Also, the ticket checkers are given a QR code scanner, using which they were able to retrieve all the details of the passenger's ticket. For generating the QR code, transition id was used. When this transition id gets scanned by the ticket checker, using the reader, a request is sent to the server, to retrieve the user's data into the checker's phone. In this way the checker can easily check the user's ticket.
[7] Author Name : Ravi Subbanet
Paper Title: "A Study of Biometric Approach Using Fingerprint Recognition"
has further done research in their paper, about the viability of fingerprint as a biometric security technique. Fingerprint of any individual does very well serve as a unique way to identify the person's identity, in order to authenticate who they are. Fingerprint identification is also a very popular biometric security technique, as it is relatively much easier to acquire, and also the sheer availability of plentiful resources in comparison to other biometric security techniques. The plentiful resources mentioned earlier is nothing but a reference to ten fingers for an average human being, and to their established usage. Their paper further summarizes all the research that was done in the fingerprint matching techniques, their recognition methods and also the detailed performance analysis.
[8] Author Name: Xiong Wei
Title : QR Code Based Smart Attendance System
has described in their paper about a system that handled the problem of recording the attendance of a given set of audience, using smartphones. The system they proposed is a combination of two applications, one of it is for generating a QR Code by entering the student details and the second application is for taking the attendance for the QR Code and generating the attendance sheet in CSV or XLS format. The teacher had to scan the student's QR code in order to confirm their attendance. Their paper details about how the system verifies each student identity in order to eliminate

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false attendance registrations. Their system deals with managing and evaluating the attendance of all students. A student's QR Code was presented to the professor for marking their attendance. The respective professor, handling the subject was in charge of marking the attendance for all students of their group or class. The attendance that was marked, were in the form of binary 0 or 1, where 0 is for absent, and 1 is for present. This attendance value gets stored in a database of the particular student row in the respective table. The final attendance sheet was generated in CSV and XLS sheet for any further reference.

III. METHODOLOGY

Nowadays, transportation has become very hectic for people travelling via metro train.
This project is a complete metro train simulator that will be installed in a metro train. The Biometric technology is used that is it has a unique id for every tag. Every person is registered along with fingerprint scan with the fixed balance in it. The metro train will keep on passing between the stations and as it stops at the station the person has to scan its fingerprint to make an exit.

- In order to get a unique identifier for each person:
- we are considering their fingerprint right away from registration, booking tickets and validating the fingerprint on the day of the journey so he/she can travel on a particular day and on the desired train to his/her preferred destination.
- The fingerprint sensor will be interfaced with server which in turn will store the fingerprint data.
- We are proposing a encryption standard for storing the sensitive fingerprint data in the server.

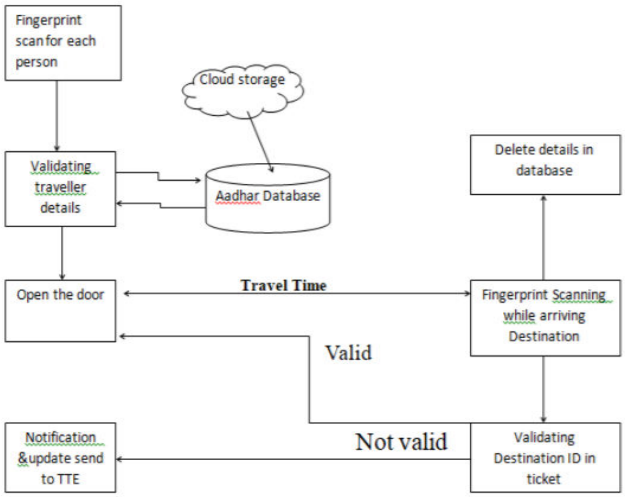

Fig3.1. System Flowchart

IV. PROPOSED WORK

The first ACO algorithm was called the ant systemand it was aimed to solve the travelling salesman problem, in which the goal is to find the shortest round-trip to link a series of cities. The general algorithm is relatively simple and based on a set of ants, each making one of the possible round-trips along the cities. At each stage, the ant chooses to move from one city to another according to some rules:

1. It must visit each city exactly once;
2. A distant city has less chance of being chosen (the visibility);
3. The more intense the pheromone trail laid out on an edge between two cities, the greater the probability that that edge will be chosen;
4. Having completed its journey, the ant deposits more pheromones on all edges it traversed, if the journey is short;
5. After each iteration, trails of pheromones evaporate.

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A) Working of the system:

Admin Login:
When admin will install the software, in case he wants to register user admin need to login.
User Registration: user will register with adhar details and fingerprint.
User Verification: This software will install in metro station user should have put the fingerprint if he has already register.
Open Door: If verification is success than open the door or deduct money.

V. CONCLUSION

Using this system we eradicated the hassles of day to day traveling. There is now no need to carry physical tickets/tokens or any other UID card/documents for the sake of traveling. With this proposed methodology, the user will be ensured a more comfortable and convenient travel experience.

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