



Biometric Authentication and Key Pattern for Authentication in Smart Buses

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Abstract: In response to the worldwide propagation of communicable diseases such as Coronavirus, we want to help by improving the quality of life in our tech-heavy society. To increase the notion of social distancing, some transportations have improved their services by taking cards and requiring pre-paid fees. In other words, the card serves as a timer for how long the individual can be on a bus before they are asked to show their card again. The bus will have a camera that recognizes each passenger's face, which then gets them on the bus and directs them to their proper seat. The bus has automated driving that uses Google navigation system, helping it avoid traffic and make decisions. The bus operates on pressure-sensitive seating, so the seating arrangements are based on social distancing. If someone tries to sit in an incorrect seat, the alarm sounds in the bus and it won't move any farther. To reduce the chance of contracting COVID-19, we can use public transportation.

Index Terms – Smart Transportation, Bio Authentication, Pressure Seats.

I. INTRODUCTION

With sensors, advanced communication technology, and automation capabilities, these smart technologies revolutionize how cities interact with drivers and pedestrians. Researchers found that humans have always been on the move, not just today. Whether it was Horse-drawn carriages, steam trams, or rocket ships, we've successfully made our way into space. [1]

From walking or riding to vehicles and now the "intelligent transportation systems" of today, civilization has come a long way in moving from one place to another. [1]

"Intelligent Transportation Systems (ITS) apply technologies to make transportation systems more efficient, safe, and cost-effective." Intelligent transportation uses new and emerging technologies to make moving around a city more convenient and safer. [2]

IoT and 5G have helped make these new opportunities possible. Sensors and controllers have enabled IoT, which also benefits from high speed wireless communication. This minimizes disruption when managing transportation. [2]

There has been successful smart transportation in several cities, which is being mapped and documented to improve new locations. Smart technology is no longer just a myth in the future, it's being utilized today. Some of the places implementing new transportation technologies may surprise you at first. Still, major hubs like New York City have embraced smart transportation for their ever increasingly intelligent city. However, the rural state of Wyoming is also a leading testbed for connected vehicles. This is because the cowboy state is a major freight corridor — autonomous transportation of goods across the country can drastically improve supply chain efficiency and reduce the need for long-haul drivers forced to balance tight timelines with their human need for rest. [3]

Combining machine learning with IoT and 5G, autonomous transportation systems are safer. Computers can't be distracted or get fatigued or emotional, making them a more reliable bet for driving conditions. [4] Smart transportation data is properly managed. Public managers can increase their efficiency by using detailed data points to monitor traffic, identify maintenance needs and address key sources of issues. [4]

Good data management can help identify areas for improvement in efficiency. You may find that it would be better for trains to have different schedules, or bus routes should have different stops. Smart transportation saves money on resources. It can cut down costs with preventative maintenance, lower energy consumption, and fewer accidents from crashing. Smart transportation can also save riders money by being more efficient than owning a car for your commute. [5]

Smart Transportation uses dashboards for city traffic and other systems to keep the city running smoothly and be aware of potential problems so they can take action or notify other agencies. [5].

II. BIO-METRIC AUTHENTICATION

If a person wants to enter a building, they might need to verify that they are who they say they are with a retina scan. Biometric authentication is used for access expediency and security in cases such as these. Biometric data is always related to human features which make each individual different from others. This personalizes and authenticates devices, especially with the introduction of smartphones. When the two sets of data are nearly identical, the device knows that they match and gives access accordingly. [6]

Biometric Authentication Methods

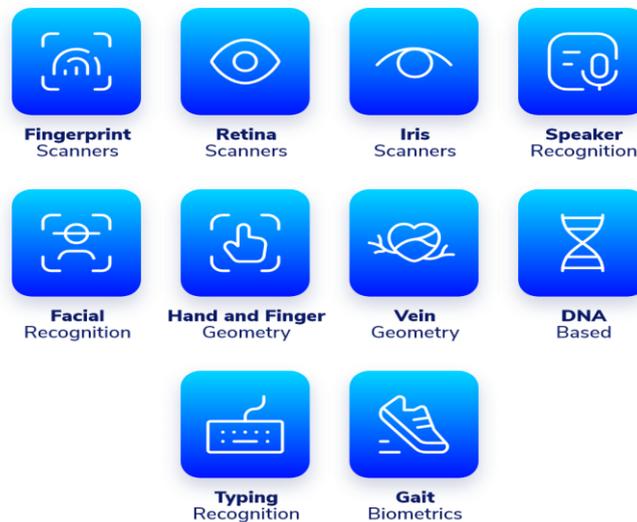


Fig 1. Bio-metric Authentication

The important thing to note is that the match between the two data sets has to be nearly identical, but not exactly identical. This is because it's close to impossible for 2 biometric data sets to match 100%. For instance, you might have a slightly sweaty finger or a tiny, tiny scar that changes the print pattern. False negatives are less likely to happen (fingers not recognized by device) without a general model of what the fingerprint is supposed to look like. [6].

III. LITERATURE SURVEY

A. Liu et al [7] Facial landmark recognition is only half the battle when working with faces; this paper proposes a quick and efficient technique for facial landmark discovery using Haar course classifiers and basic 3D modeling software.

E. N. Sandıkcı, Ç. E. Erdem and S. Ulukaya [8] Facial landmark identification is one of the pre-handling steps in face research. Numerous algorithms and complete studies have been created for facial landmark identification. Reviewers saw that deep learning (TCDCN, DCR), relapse-based (CFSS) techniques, and open source frameworks show predominant performance in facial landmark identification technologies.

V. M. Álvarez, C. N. Sánchez, S. Gutiérrez, J. Domínguez-Soberanes and R. Velázquez [9] There have been many efforts to automate this process. In this paper, after applying algorithm from the Cohn-Kanade dataset, a multi-layer perceptron classifier was found to show the best accuracy of 89%.

M. I. N. P. Munasinghe [10] Human feelings are the all around regular method of connection. Robotized human outward appearance recognizable proof has its very own focal points. In this paper, the creator has proposed and built up a procedure to distinguish facial feelings utilizing facial landmarks and arbitrary woodland classifier.

F. Z. Glory, A. Ul Aftab, O. Tremblay-Savard and N. Mohammed [11] The author of the system generated a pattern which contains words and random numbers by using the information provided by the user.

IV. PROPOSED WORK

3.1 New Registration for Bus

This section will discuss the new registrations for the bus passengers, the registration is based on the identification of user using Face Recognition, Finger Print and smart pattern.

Step 1: Read Passenger Name, Phone or Email Id and Address

Step 2: If Phone/Email ID already in Use Then:

- i. Write "Passengers Details Exists in Database"
- ii. Goto End

[End of If Structure]

Step 3: In the Password generation section the user has to specify the first phase password, by swapping of the images and then generate the password on the basis of the positioning of the images.

Step 4: After the step 3, the process of the swapping of the images is repeated on the second image and after that user once generate the password, second phase password is generated.

Step 5: Stores the details in BusRegis table.

Step 6: END.

3.2 Bus Entry Process

This section is concerned about the entry in the bus by the passenger using Face or Fingerprint validation

Step 1: Read Passenger Name, Phone or Email Id

Step 2: If Validation using Face then

- a. Input Face Image, generate the SHA-512 Code and store in FACESHA.
- b. Then the screen presented for entering the first phase password, swap the images and generate the first phase password.
- c. If the first phase password is validated in the database, then the second phase password is prompted from the user, and again the swapping of the images is done and new password is generated with the pattern.
- d. After the validation is done the further processing is done.

Else

- a. Input BIO-Metric Finger Print Image, generate the SHA-512 Code and store in BIOSHA.
- b. Then the screen presented for entering the first phase password, swap the images and generate the first phase password.
- c. If the first phase password is validated in the database, then the second phase password is prompted from the user, and again the swapping of the images is done and new password is generated with the pattern.
- d. After the validation is done the further processing is done.

[End of If Structure]

Step 3: If valid Phone or Email Id and KEY then

Allow in Bus

Else

Denied from Bus Entry

[End of If structure]

Step 4: END.

V. IMPLEMENTATION AND RESULTS

The entry modules will facilitate the process of boarding the bus and are able to recognize people based on their fingerprints or faces. Input the details of the passenger (e.g. their Name , Phone Number, Email Address). Take a photo of their face and encode it with SHA-512. This output is stored in FACESHA. Once you have taken your BIO-metric fingerprint impression, it generates the SHA-512 code and stores it in the BIOSHA.



Fig 2. User Registration

The next step is to create the password. In this process, in order to generate the password, first user has to input a random password and then swap the images. Then after the algorithm generates 2 new passwords with different positions, the second phase password can be also generated. To create a password, set up all the details in the first step. You can choose your desired character, font and color to generate a password. Under the Password Generator section, the user has to input the first part of the password by flipping through images. The app will then generate a part of the password based on where the other image is in relation to it. Settings such as an image swap can be edited until you're happy with the result. After the image settings are complete, another set of passwords is generated.

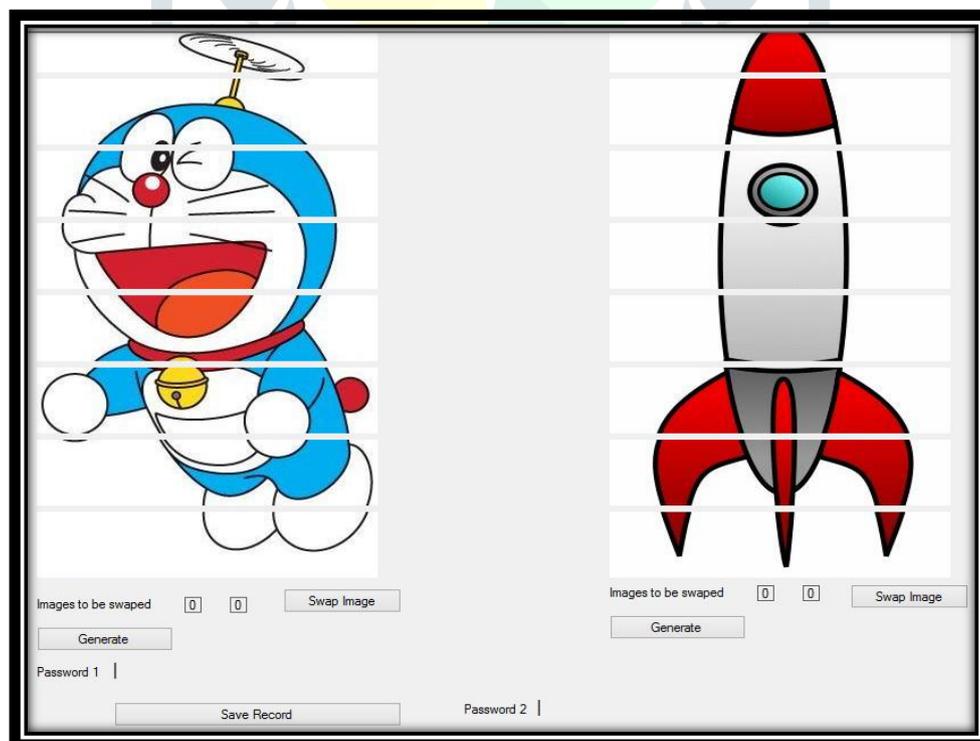


Fig 3 Passenger Registration Pattern

TABLE 1 Result Comparison Table

Proposed Work OTP	Website/Tool	Result
Pic_Partition_6_Pic_Partition_2_Pic_Partition_3_Pic_Partition_4_Pic_Partition_5_Pic_Partition_1_Pic_Partition_7_Pic_Partition_8_	Rumkin	Length: 128 Entropy: 636 bits Charset Size: 84 characters
Pic_Partition_6_Pic_Partition_2_Pic_Partition_3_Pic_Partition_4_Pic_Partition_5_Pic_Partition_1_Pic_Partition_7_Pic_Partition_8_	Entropy Test	Entropy 3407 Bits Length :128 characters
Pic_Partition_6_Pic_Partition_2_Pic_Partition_3_Pic_Partition_4_Pic_Partition_5_Pic_Partition_1_Pic_Partition_7_Pic_Partition_8_092c1a894	Cryptool2	Entropy 3.343 Very Strong

TABLE 2. Base Result (Glory Paper) Comparison Table

Proposed Work OTP	Website/Tool	Result
@niK29tUr@n?	Rumkin	Length: 12 ,Entropy: 59.7 bits Charset Size: 94 characters
@niK29tUr@n?	Entropy Test	Entropy 39Bits, Length :12 characters
@niK29tUr@n?	Cryptool2	Entropy 3.343 Very Strong

VI. CONCLUSION

In response to the worldwide propagation of communicable diseases such as Coronavirus, we want to help by improving the quality of life in our tech-heavy society. To increase the notion of social distancing, some transportations have improved their services by taking cards and requiring pre-paid fees. In other words, the card serves as a timer for how long the individual can be on a bus before they are asked to show their card again. The bus will have a camera that recognizes each passenger's face, which then gets them on the bus and directs them to their proper seat. The bus has automated driving that uses Google navigation system, helping it avoid traffic and make decisions. The bus operates on pressure-sensitive seating, so the seating arrangements are based on social distancing. If someone tries to sit in an incorrect seat, the alarm sounds in the bus and it won't move any farther. To reduce the chance of contracting COVID-19, we can use public transportation. The better security authentication concept is suggested in the paper.

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