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UID based Payment Interface

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Abstract: ***The 3 modes of payment that people use to carry out any transaction are: cash, cards, e wallets. But there might be some circumstances when the buyer cannot use any of the above mentioned modes of payment. To deal with such case a payment interface can be developed which won't require the customer to have a phone or a card or cash. Only the shopkeeper needs to have a smartphone having a camera. The customer needs to verify through iris scan to proceed with the transaction process. Aadhar cards are linked with bank accounts, which already contains the bio-metrics i.e. iris and the fingerprint, the input bio-metrics will be matched and verified. There is no need to collect information from the user, since Aadhar cards which contains the bio-metrics are already linked with the bank accounts can be used.***
Keywords**: *Transaction Processing, Iris Recognition, Database Handling, Security, E-Commerce, Payment Gateway***

I. INTRODUCTION

Every now and then in our day to day lives, we are always visiting a shop to buy some things according to our needs. In order to buy a product from a shop we need to pay the of that product in from money. This payment can be done either by cash, or card or an e-wallet. Nowadays e-wallets has become a trend, since mobile phones are widely used by the people. E-wallets are intended to replace the existing physical wallet, with its notes, coins, plastic cards etc. E-wallets makes it easier for the customers as well as the shopkeepers it requires no cash physically to carry out any transaction. Also e-wallets provide not only secure transactions but also they keep the records of each and every transactions that has been carried out successfully.

There might be some circumstances where the customer can neither pay through cash, card or any e-wallet. This is where our proposed system can be used. The proposed payment interface makes use of the Aadhar Card that is linked with the user's bank account for verification purpose. The main advantage of our system is that there is no need to collect any data from the customer and make use of what is existing already. Iris recognition is the most crucial part of this project. People often get confused with iris and retinal scans. The retina is the portion made up of neural-cells that is located at the back portion of the eye. Whereas the iris is the circular structure in the eye that holds the responsibility of controlling the size and diameter of pupil. Iris Recognition is carried out by using the John Dougman Algorithm. By using this algorithm the camera of the mobile can be used, and there is no need of an external iris scanner.

II. RELATED WORK

Research has proposed systems that use iris patterns to identify individuals by relying on near infrared images. A few use visible light images. In this section, some of the previous studies are reviewed based on the algorithms used in the iris recognition system phases for iris and pupil segmentation, normalization, feature extraction, and iris template matching.

TABLE I. LITERATURE SURVEY

Sr. No	Name of the Reference Paper	Publish Year	Author	Description
[1]	Developing Iris Recognition System for Smartphone Security	2017	Lamiaa A Elrefaei, H. Hamid.	Mobile devices can be used for high performance iris recognition. Main issues related to iris recognition in mobile device consist of uncontrollable capturing conditions and limitations in computation power. This approach consists of following key components- multi-stage algorithm structure, novel iris image quality estimation approach for mobile applications.

[2]	Methodology for Iris Scanning through Smartphones	2018	Rosales-Bandares Jose de Jesus.	The iris scan is an automatic biometric identification method that uses image processing techniques and pattern recognition. This paper describes an application for scanning the iris through mobile devices without the need to use special cameras.
[3]	Security Risk Analysis and Management in mobile wallet transaction: A Case study of Pagatech Nigeria Limited	2018	Musbau D. Abdulrahaman, John K. Alhassan	This research work focuses on the assessment of the vulnerabilities associated with mobile wallet transactions and performs an empirical risk management in order to derive the security priority level needed to ensure the security and privacy of the users of mobile wallet platforms.
[4]	Comparison of Iris Biometric Algorithms	2016	Priyanka Hende, Vinaya Pranab, Gauri Kakade, Nikita Kamble	This paper, shows various biometric authentication technique based on human iris and compared Iris biometric algorithms that includes Avila, Li ma, Tisse and Daughman based on their accuracy rate. We concluded that Daughman has the highest accuracy rate.
[5]	Iris Authentication through Gabor Filter using DSP Processor	2013	V. Saravanan, R.Sindhuja.	This method analyses the Iris Biometric Authentication as it as low error rates compared to other Biometric Authentication methods and its robustness of the algorithm is provided. Gabor Filter algorithm is used for feature extraction.
[6]	Comparison of iris recognition Algorithms	2004	Mayank Vatsa, Richa Singh, P.Gupta	This paper shows various known algorithms for iris recognition. Four algorithms due to Avila, Li Ma, Tisse and Daugman are implemented and compared on the CASIA iris image database. The results show that the Daugman's algorithm gave the highest accuracy of 99.9%.
[7]	Iris Recognition with a Database of Iris Images Obtained in Visible Light using Smartphone Camera	2017	Mateusz Trokielewicz	This paper introduces a completely new database of high quality iris images obtained with a smartphone camera and provides answers to several questions regarding iris recognition accuracy with such data. Experiments involving four different, commercial and open-source iris recognition algorithms.

[8]	Iris Recognition System in Smartphones Using Light Version (LV) Recognition Algorithm	2017	Syed Arslan Ali, Munam Ali Shah, Taimoor Ahmed Javed, Syed Muhammad Abdullah, Maham Zafar	This paper introduces a light version (LV) algorithm that can recognize iris images in smartphones. Light version(LV) algorithm is used for iris recognition using smartphone cameras by modifying and extending iris recognition algorithm in such a way that the best optimized solution can be found for authentication using smartphone cameras.
[9]	Iris Recognition using Machine Learning from Smartphone Captured Images in Visible Light	2017	Md. Fahim Faysal Khan, Ahnaf Akif, M. A. Haque	This paper shows the applicability and feasibility of different machine learning techniques on iris recognition from smartphone captured eye images. First, the iris is localized using the popular Daugman's method and the eyelids are suppressed with canny edge detection technique.
[10]	High Performance Iris Recognition for Mobile Platforms	2018	G.A. Odinokikh, A.M. Fartukov, V.M. Eremeev.	Mobile devices can be used for high performance iris recognition. Main issues related to iris recognition in mobile device consist of uncontrollable capturing conditions and limitations in computation power. This approach consists of following key components- multi-stage algorithm structure, novel iris image quality estimation approach for mobile applications.

III. DIFFERENT IRIS RECOGNITION ALGORITHMS

Any iris algorithm is basically divided into four steps, Localization, Normalization, Feature Extraction, Matching.

A. Daugman Algorithm

Daugman was the first to give an algorithm for iris recognition. Both inner and outer boundaries of iris are found preprocessing step. A rectangular representation of required area is created for the conversion from Cartesian to Polar coordinates. For feature extraction algorithm makes use of 2-D wavelets. For matching, the hamming distance is calculated.

B. Avila

In Avila, iris feature are extracted in fine or course approximations. The result obtained is in the form of model which uses different distances.

C. Tisse

Tisse algorithm is done in two steps-

1) It implements gradient decomposition technique for iris localization.

2) It then analyses the image to verify iris from iris structure.

This algorithm is another alternative for Daugmann algorithm but has very less accuracy.

D. Li Ma Algorithm

The local texture information of the iris is captured using circular symmetry filters, they also construct a fixed length feature vector. Nearest feature line method is used for iris matching.

TABLE II
COMPARISON OF DIFFERENT IRIS RECOGNITION ALGORTIHMS

Iris Algorithms	Avila	Tisse	Li Ma	Daugmann
Process	Iris representation is in the form of fine or coarse approximations.	Implements half transformed technique for iris localization. It then analyses the image to get the structure of iris.	Li Ma decomposes into four layers using 2-D Haar wavelet transform technique.	Divides the iris into inner and outer regions. Segmentation is done for iris verification.
Advantages	Works for more than one distance measuring techniques.	Provides high confidence iris verification.	Provides high accuracy.	Provides high accuracy and resistance to noisy images.
Disadvantages	Tedious work.	Less accuracy compared to others.	Does not work on noisy images.	
FAR/FRR	0.03/2.08	0.02/1.98	1.84/8.79	0.01/0.09
Accuracy	97.89	98.00	89.37	99.90

IV. EXISTING SYSTEM

Currently there are many e-wallets that are being used by customers and the shopkeepers. Some remarkable examples are PayTM, Google Pay, PhonePe. Each of these application needs to be installed on both the shopkeeper's and the customer's smartphone in order to work. If customer's phone is dead due to some reason, there is no way he/she can proceed with the transaction.

TABLE IIII
EXISTING SYSTEMS

Sr No.	Parameters	PayTm	Google Pay	PhonePe	Proposed System
1.	Secure	Yes	Yes	Yes	Yes
2.	Additional Collection of Data	Yes	Yes	Yes	No
3.	Need of a Smartphone at Customer's Side	Yes	Yes	Yes	No
4.	Linking Application to Bank Account after Installation	Yes	Yes	Yes	No (Shopkeepers Only)

V. PROPOSED SYSTEM

The payment interface is supposed to be an application that must be installed and run on shopkeeper's smartphone. After installing the application, the shopkeeper needs to register, and enter the details of his bank account and the aadhar card number linked with that account.

Whenever the customer has to pay an amount in order to buy a product, the shopkeeper will have to enter the amount in the interface and give the smartphone to the customer for verification. The customer will feed his iris as an input and it will be matched with the iris that is stored in the Aadhar Card of the customer that is linked with his bank account.

If verification is done successfully, the transaction is carried out, and the amount is transferred from customer's bank account to shopkeeper's bank account. The customer will also get an SMS of the completed transaction on his phone number which is linked to the same bank account.

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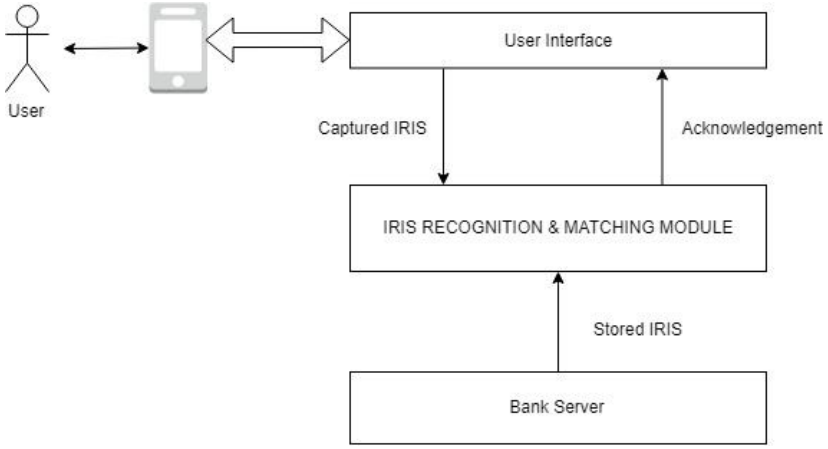

Fig. 1 Architecture of Payment Interface

As compared to the existing systems, the customer does not need to install the application on his smartphone. Also there is no need for the customer to link any bank account to the application.

VI. IRIS RECOGNITION ALGORITHM USED IN THE PROPOSED SYSTEM

There are four main phases:

1) *Segmentation:* The inner and outer boundaries of Iris are calculated.
2) *Normalization:* Irises captured may be different in different cases, considering the size of image, variations in light, etc.
3) *Feature Extraction:* A lot of information is provided by a single Iris. An ordered sequence of features extracted from iris is used to form a feature vector.
4) *Matching:* Feature vectors are matched using formulas like Hamming Distance, Dissimilarity function, etc.

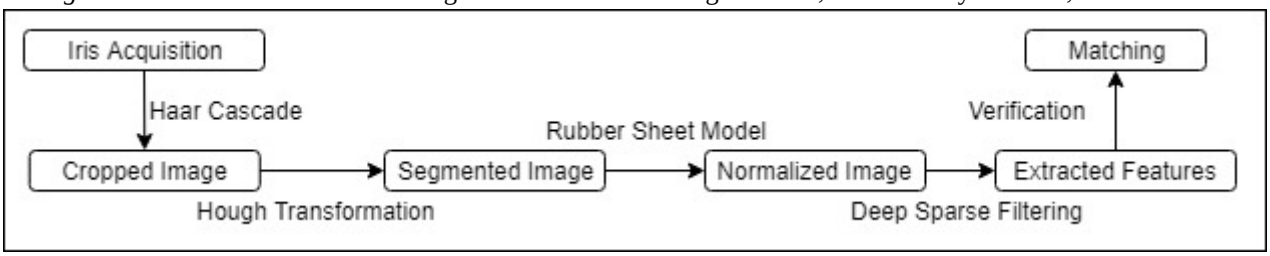

Fig. 2 Iris Recognition Module

John Daugman Algorithm is preferred for Iris Recognition in our proposed system. The proposed system captures an image by using the mobile built-in camera

5) *Segmentation:* This step is further divided into three steps: detection of iris, localization of pupil, localization of iris.

a) Detection of Iris: Iris must be detected from the eye region in the image captured. Here the Haar Cascade Classifier is used.

b) Localization of Pupil: It is used for locating the annular region surrounded by two circles: i.e. Sclera and boundary of Pupil. To identify the lines and circles, Hough Transformation is used. It determines the radius and the centre of the pupil.

c) Localization of Iris: This is the most important step, here both the inner and outer boundaries of the iris are to be located.

6) *Normalization:* This step is performed to obtain the fixed dimensions in variable conditions for iris comparisons. Mapping of iris done from Cartesian coordinates to the polar coordinates that represent a fixed pattern. The Rubber Sheet Model is used for this step.

7) *Iris Feature Extraction:* The Deep Sparse Filter algorithm is implemented and used for feature extraction. The only parameter required is the number of features present in Iris. A Deep Sparse Filter is used to collect a bank of filters, which will be used for extracting the features from the iris image.

8) *Matching:* Simple distance formulas can be used to compare to textures. Formulas like CityBlock, Euclidean, Chebyshev, Hamming, Canbera, Bhattacharyya and Coorelation.

VII. CONCLUSIONS

In future people will tend to go hands free, and this proposed system has the such potential. The UID based Payment Interface is very secure as it makes use of the Iris of the customer for verification, which can never be the same. Since data is already collected, the system is easy to implement as it has no need to collect the data again. This would revolutionize the whole payment system.

VIII. ACKNOWLEDGMENT

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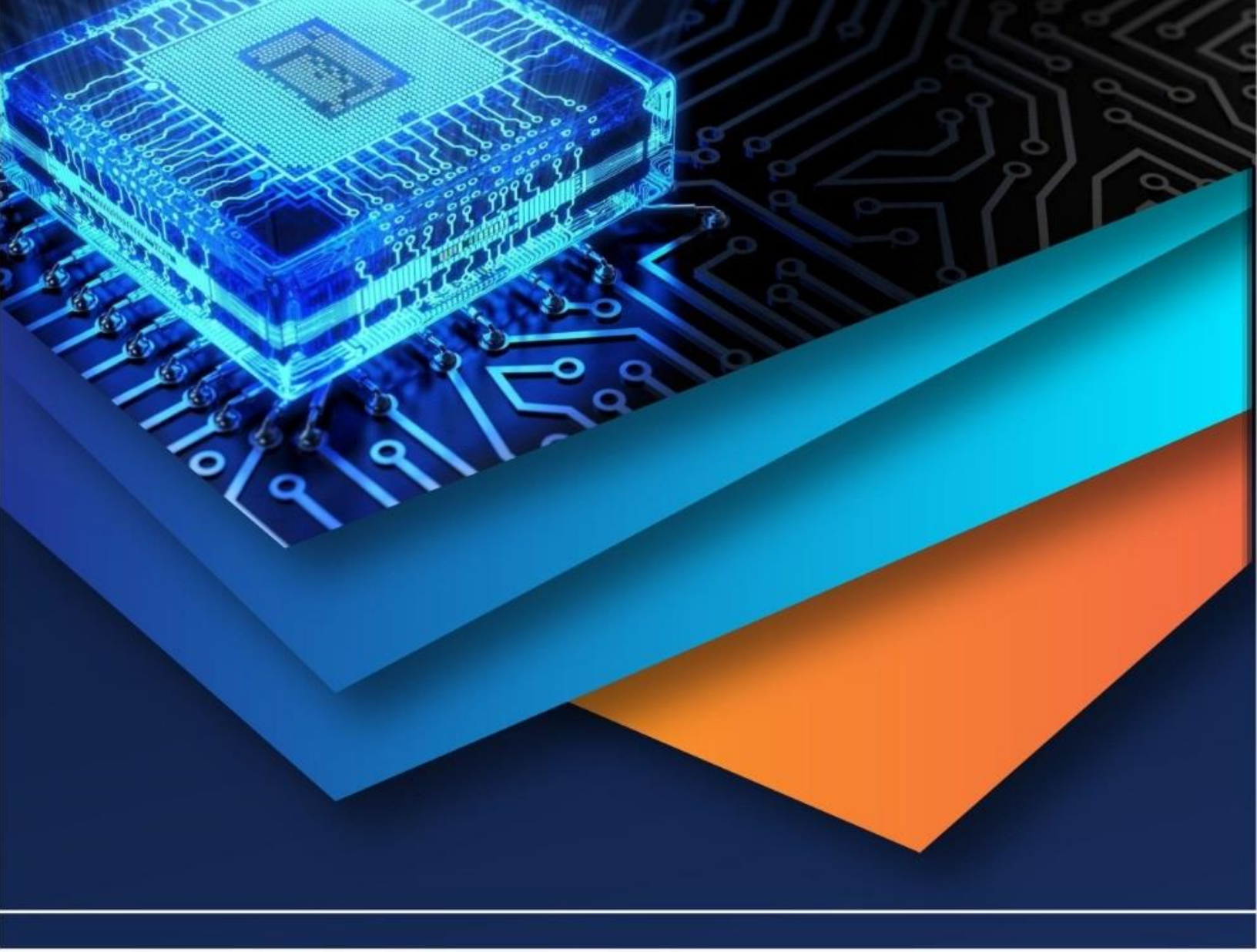

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