International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-12 Issue-11, October 2023

Iris Scan with 3 Blinks Plus Emotion Recognition for Secure Payment Method for POS using Cloud Computing

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Abstract: ***Financial transactions are becoming unsecured day by day by means of phishing, stolen identity or stolencredentials. It is the need of the hour to innovate convenient payment methods that are secure. Bearing this in mind we through this paper propose a system that is complex to developbut does achieve the targets of providing convenient and secured payment financial services. To make financial transactions we now suggest Face Recognition as the first parameter, 2nd parameter be emotions recognition and 3rdbeing 3 blinks IRIS scan. Once all 3 are positive then thetransaction will be successful.***

Keywords: POS based on three IRIS eye scans, 3 blink and emotion recognition, secured payment method, AI based, Cloud based POS, consumer deviceless payment method.

I. INTRODUCTION

Financial transactions are majorly a combination of hardware and software solutions with human actions required to make payment at the counter of a shop. Today, POS can accept payments through credit/debit, e-wallets, cash, UPI etc. Some countries have advanced Artificial Intelligence based information systems. However, concerns over security remain with those solutions. Major security problems with current AI based POS systems is that a biometric identity compromised is a big threat. However, these systems are advanced in terms of convenience offering but a step ahead is required to make these systems robust and secure.We have recommended multiple measures of Artificial intelligence (AI) combined with biometrics to accomplish this task of secure and convenient payment systems. The solution combines two research in the field of AI. That is, Face identification with two measures of emotions and actions. Once Emotion of a safe presence is identified then a combination of 3 blinks of an eye is required to make the transaction. To make it highly secure 3 major rules are to be enforced. One being face identification. Second is that out of 5 emotions (Happy, Angry, Sad, Disguise, Surprise) two be considered valid for transaction success that being of Happiness and sadness, and third being 3 blinks of eyes within optimum time frame of 15 seconds.

Manuscript received on 04 September 2023 | Revised Manuscript received on 09 September 2023 | Manuscript Accepted on 15 October 2023 | Manuscript published on 30 October 2023.

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Furthermore, we can make it more robust in terms of security by adding a single eye blink as a sign or notificationfrom the payer that something unsecure is observed during the transaction that should lead to blocking of transactions until activation is processed through mobile authentication on banking apps.

II. LITERATURE SURVEY

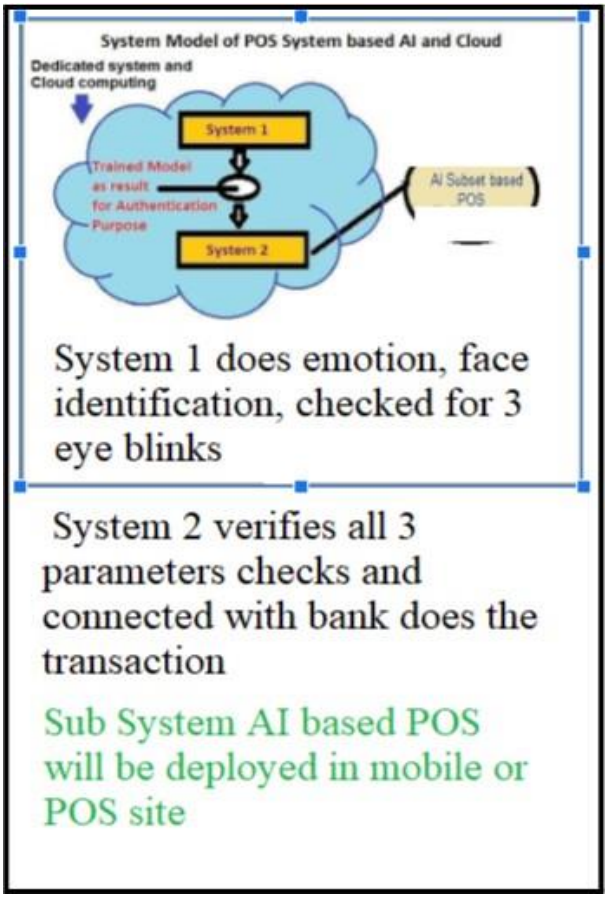
There are many papers and work accomplished on Artificial intelligence using cloud computing. Some famous works are of the attendance system using Face recognition. Then there are systems of payments using Artificial intelligence etc.
We have gone step ahead and learnt about emotion recognition systems through the work of [1][4] [5] research paper 'Emotion Detection Algorithm Using Frontal Face Image'. The work is already in light that identifies 5 emotions of a person with accuracy level. However, the accuracy here maybe not perfect but is not overlapping with 2 emotions at same time. Recognition accuracy of five emotions: Happy 79.7%, Sad 69.9%, Angry 72.3%, Disgust 69.9%, Surprise 78.5%.
There is another work well accomplished in the field of POS through AI that recommends payments through Face Recognition using Artificial Intelligence and password [2][6][7][8]. This system recommends input of a password that the user will have to remember and enter. The password can be seen by camera focus or by a person standing next by. Again, a problem of security arises.
The Facial Recognition Cash Register (FRCR) viz. Telpo System 650 has a face matching in the self- payment service. This uses pay with your face methodology and this technique is also high precision. The system recommended in this another paper cited at [3] is secured such that it can enclose three dimensional masks that can lead to theft of information and pass security as verification. This device is powerful and uses an efficient method for Face authentication. It also has a touch screen numeric keyboard interface to input values [3]. During thorough studying of previous work, we also came across a system known as PayEye implemented in POLAND country. This system also proposes eye scans as a means of payment. But it lacks the parameters of security that we recommend and propose in this paper. That is emotions recognition, Face detection, and 3 blinks of an eye combined with a secure alert method of single eye blink that immediately blocks the access or account transactions until unlocked through banking application on mobile device or by going to a bank.

Payeye in comparison to our solution has just a single IRIS scan as a way of financial transaction.

III. SYSTEM MODEL OF PROPOSED SOLUTION

Based on the solution we have a 3-tier architecture System Model that comprises System 1 and System 2 at back end server while System 3 namely AI Subset based Point of Sale (POS) is used at front end at the customer location.

Fig.1 Three tier architecture of system proposed.



In Fig. 1, The following systems and POS terminal with cloud implementation is as mentioned.

System 1 is where all the cloud computing work is to be done. Artificial intelligence based trained model is to be placed on System 1 cloud. It will comprise 3 major tasks.

1. Face identification - Identity first that a face is present in front of it to make the transaction.
2. Then it will automatically process the face inputsto do emotion recognition. Positive recognition of parameters will make it ask for 3 steps. Positive recognitions include happy, or sad faces. Negative signs will be of disgust, anger, surprise.
3. During the third step: the customer or payer isrequested to make 3 blinks to make the transaction successful.

System 2 will have business logic defined comprehensively to check fraud. Should at any time the customer feels to notify fraud or unjustified transaction then at any point of transaction when 3 blinks are requested, customer can do single eye blink.

Doing so will immediately block the transaction and account.

To enable or unlock the account, the customer or payer can immediately ask the bank or unlock it through the bank's mobile application. It is system 3 that will interact with the Banking System to push money debit from customer accounts to make the transaction successful.

System 3 will be the point-of-sale terminal that needs to be first activated manually through human input to start face identification after entering the amount or auto populating the transaction amount in the software system. Once successful clearing of 3 pointers of authentication then a success message will be shown on the screen. Thus, closing of the payment.

IV. PROBLEM STATEMENT

Impersonation, credential identification, and no immediate method of reporting fraud or unauthorized transactions are some of the problems with current payment systems that we have studied for making financial transactions. Through this paper we propose to solve these problems with increased convenience through an Artificial Intelligence based system that does 3 IRIS scans with blinks, Face recognition and positive emotions recognitions.All this on cloud computing that can be Google, Microsoft or Amazon.

Solution proposed is not only solving the problem of fraud but also provides convenience over other methods such as carrying a device, card or cash.

A. Problem analysis and comparison to existing system:

Some of the research proposed and implemented systems do provide convenience similar to making payment through a single IRIS scan or Face Recognition with password but are unsecure comparatively.

1. Problem with Face Recognition and Password solutions to make payment is that Passwords can be noted by someone and then from another device a miscreant or fraudster may scan the face and enter the seen or stolen password of the customer even when facing the actual customer.
2. The problem with single Iris scan is that it is too convenient for miscreants or fraudsters to process transactions while facing a person to be victimized.

Other existing systems like cards, cash in hand, also have known security issues and are well known for being lost, stolen with the burden of carrying them every time.

The system we recommend shows that it is more secureand also has an inbuilt alert functionality to notify banks or police of fraud or unwanted or forced transactions by means of emotions recognition measures.

We are showcasing a comparison table with reference to AI based systems like IRIS scan and Face Recognition with password method to proposed system in this paper of

3 blinks IRIS scan including emotion recognition and face recognition on cloud computing.

Table 1. Showing comparison between existing AI systems and a recommended solution in this paper.

Particular	Existing System	Proposed System
Instant Fraud Alert System	no	yes
Number of eye blinks	0-1	3 or 3+ within 15 seconds
System Complexity	Less	More
Convenience	More	Less
Secure	Less	More

V. PROCEDURE

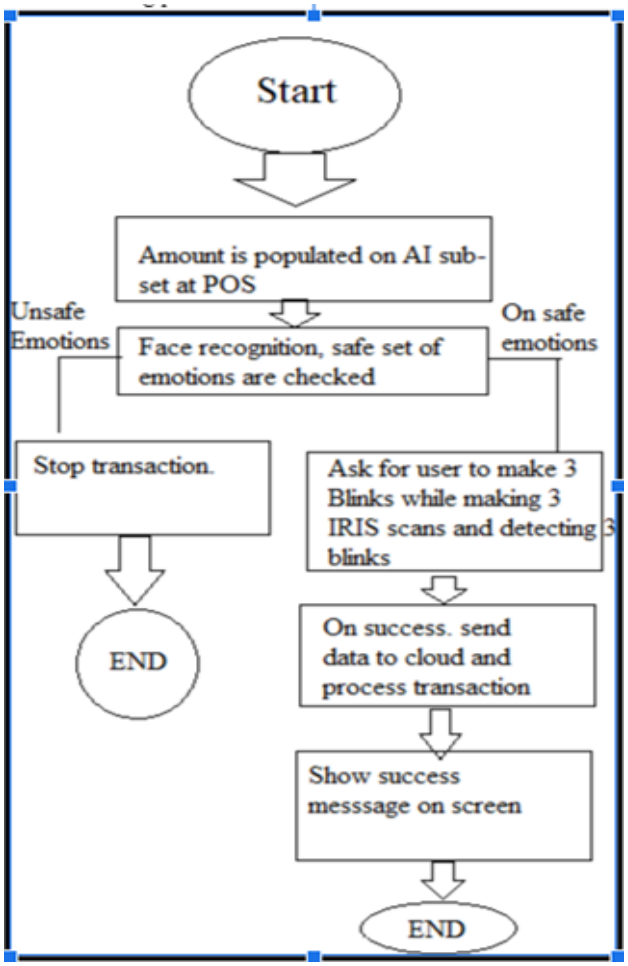


Fig 2. Step by Step procedure for successful transaction based on the proposed system in this paper.

Initially, the system will have to be trained with images of a person to be able to recognize customer faces. The second step will be emotional recognition. If it is Sad or Happy then we can proceed with the transaction or else deny the transaction. Repeat attempts are allowed in this scenario. The third step is to have 3 IRIS scans with blinks to ensure that the user is present and wants the transaction done.

There is also going to be an alert or notification system to the bank or police when a customer makes a single eye blink that an unwanted transaction is taking place. That leads to blocking the account until unlocked again.

A. Actions to be done by the shopkeeper or through the automated software application are as follow:

1. Automatic software application or Shopkeeper willenter the amount of purchase by the customer.
2. System will become active to recognize faces.Emotional recognition happens at the same time in the background.
3. Three blinks with IRIS scan are required within 15 seconds of the activation. With three successful blink and IRIS scan by AI system on Cloud the transaction will proceed.
4. Successful message is published on the Subsystemsat the POS center or on the mobile device wherever the transaction was taking place.

Artificial intelligence implemented Subset based POS will have a camera that will send data to cloud computing to process the transaction. The purpose of face recognition during customers at POS is to match with the bank account of the person in concern and have the transaction done corresponding to the same person. It will be through FACENET that a pretrained model at Cloud computing exists. Once face recognition is done then the emotion of the face will be verified. If the emotion is under the SAFE category that is SAD or HAPPINESS, then customers will beasked to do 3 blinks to make the transaction within 15 seconds. With each blink the count of success will be shown as 1, 2, 3. At the point when 3 is showing it will also show “Success Message” and close the transactions. If at any time UNSAFE emotions that are ANGRY, DISGUST, or SURPRISE are present during the transaction on the same person's face then another attempt is allowed. The Major put forward for the security is if during 3 blinks asingle IRIS eye scan happens that means an unwanted transaction is taking place and the system will be halted of the person whose face recognition was successful at STEP1.

VI. RESULT AND DISCUSSION

Iris scan plus emotion recognition for secure payment method over the counter on Cloud Computing makes the systems face, reliable, secure. The result is that it may be less convenient when compared with a single IRIS scan method but is more secure and robust as the need and focus of the hour is to have a safe and secure system that does not threaten the customers in any way. Four major advantages:

1. No passwords to be remembered.
2. Customer devices independent.
3. Robust and secure along with convenience.
4. Alert or notification system in the scenario of unwanted transaction or forced transaction taking place.

practical implementation to better the advancement of technology for humanity.

FUTURE WORK

Presently we have put in effort to make the system secure by adding emotions and 3 blinks with IRIS scan in place. We look to make systems faster in times to come and see whether we can bring more convenience to the customers. Fraud notification or alert systems can be further enhanced.

Published By:
Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP)

ACKNOWLEDGEMENT

I would like to acknowledge time, resources and previous work shared by the research department at Nandyavart Consultancy Services at Chandigarh, India. We look forward to seeing the implementation of the proposed system in this paper and suggest further improvements in times to come. Optimizing Face Recognition may be skipped during implementation and IRIS scans be used to identify people with their bank accounts to make the transaction successful in a more efficient manner.

DECLARATION STATEMENT

Funding/ Grants/ Financial Support	No, I did not receive.
Conflicts of Interest/ Competing Interests	No conflicts of interest to the best of our knowledge.
Ethical Approval and Consent to Participate	No, the article does not require ethical approval and consent to participate with evidence.
Availability of Data and Material/ Data Access Statement	Not relevant.
Authors Contributions	I am only the sole author of the article

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AUTHOR PROFILE

Sudhanshu Jain is a postgraduate researcher. He qualified as Master of Computer Applications from engineering college Chitkara Institute of Engineering and Technology (CIET) during the year 2010. After working at Companies such as Infosys and IBM he started business in the field of Information Technology at Chandigarh. With more than 13 years of experience after postgraduate he also qualified to be Senior Member at IEEE. Sudhanshu Jain has three research works published in the field of User Experience/User Interface. Expanding his Scope of Work, artificial intelligence-based innovations are his current interest of work. He also looks to implement these solutions through