Multilevel Biometrics for Exam Hall Authentication

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Abstract: **During examinations, Authentication has always been the major challenge. Verifying candidate's eligibility for the exam is not an easy task as its time consuming following traditional candidate checking. In order to overcome this, the project is designed to eliminate impersonation, by using multiple biometrics features of the candidate. This authentication Technology uses different biometric features, fingerprint, facial features and vein pattern of the candidate. The system consists of a camera for detection, fingerprint scanner connected to the circuit and also vein authentication technology. The fingerprint is scanned and is checked with already saved/stored data base of the system and confirm the eligibility of the candidate, and the ace recognition is done using a camera integrated to the circuit which is matched with the database entries of the eligible candidate, also the vein authentication technology used here captures an infrared rays image of the candidate's vein and is matched with the already recorded pattern. If the fingerprint, face and the vein is authorized; the system now sends the signal that person can be allowed to the examination hall, and in this way non-authenticated students can be avoided.**

Keywords: **Biometric, Fingerprint, Palm vein, Face recognition, Raspberry Pi, Exam hall Authentication.**

1. Introduction

Using Biometrics features of the person to recognition/verification is becoming a common occurrence. Even though there are numbers of ways to prove authentication and authorization, biometric authentication beats all the techniques. In traditional method, a person desired to be identified submits an identify claim to the system via a magnetic strips cards, identity cards etc. All of these techniques suffer from common problems of inability to differentiate between an authorized person and an imposter who fraudulently acquires the access privilege of the authorized person. But Biometrics system is genuine and the identity the person dependent upon his/her physiological or behaviour attributes belonging to only themselves. Based on the usage of the number of traits, they divided as unimodal biometrics and multi-biometrics. Multi-biometrics system provides accuracy and can be established in much large scale biometrics application. This paper is about multimodal fusion of facial and vein images along with fingerprint sensor. Fingerprint is one of the easily accessible parts of the user and requires minimum efforts on the part of the user. Face detection is also included as it is, yet another option for human identification and authentication technology is also included, due to its high precision, as they are unique to each individual.
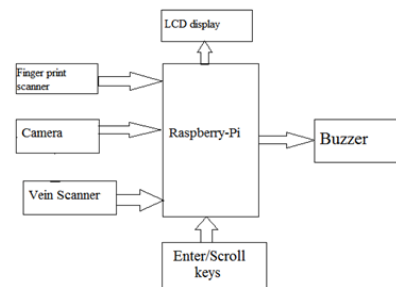
2. Block Diagram

Fig. 1. Block diagram

This biometric based exam hall authentication is to assist in the elimination of examination impersonation. This system consists of a Fingerprint scanner along with a Camera and a Vein scanner integrated to the Raspberry-pi Microcontroller. In registration mode, the system allows to register up to 20 users and save their identity with different id numbers.

While the testing process, the person first needs to scan his fingerprint on the scanner. The Microcontroller now checks for that person's fingerprint validity. If the fingerprint is valid only then it checks for the face recognition, and only if the face is recognized it moves on for the vein pattern detection.

If in case any one of the biometric device fails to identify a person's identity i.e. fingerprint or face or vein pattern the Microcontroller send a signal to the buzzer to indicate that an unauthenticated person tried to enter the exam hall. In this manner only the Authenticated candidates are allowed inside the exam hall.

3. Literature Review

[1] Impersonation in exams is expanding day by day. This is because of indiscreet and tedious conventional competitor checking and verification framework in test lobbies. This venture is intended to lessen impersonation in test corridor by

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confirming biometric highlights of the applicant. Our framework comprises of unique mark scanner associated with arduino and iris what's more, palm vein information put away in tangle lab information base. The framework is intended to pass just clients by confirming their unique mark, iris also, palm vein and square non confirmed clients. The unique mark framework was intended to check the unique mark and ID number which were appropriately spared into the information base of the system and affirm the qualification of possibility for assessment. Robotized iris acknowledgment is accommodated the check and recognizable proof of individuals as iris is exceptionally unmistakable to a person. The main picture securing is prepared and worried about restricting the iris from a caught picture. At that point it is coordinated with competitor information base passages. Likewise, the contactless palm vein validation innovation utilized here catches an infrared beam picture of the client's palm and the sensor can catch the palm picture paying little mind to the position also, development of the palm. The mat lab program then matches the deciphered vein design with the recorded example, while taking an example coordinating strategy to decide the position also, direction of the palm. In the event that the subtleties are approved, the microcontroller now imparts a sign to an engine driver. The engine driver currently works an engine to open an entryway. It guarantees just approved clients are permitted to enter the assessment area and unapproved clients are not permitted to enter with no human intercession.

[2] Palm vein biometrics has gotten a ton of consideration as of late. This innovation offers exactness, strength furthermore, is contactless, which makes it a promising alternative for clinical applications. It utilizes palm vascular examples of people as recognizable proof measurement to coordinate the personality. As per perceptions, the vein structure underneath the palm surface has a more muddled example when contrasted with the rear of the palm, the fingers or some other effectively available vein organizations in the body. Subsequently, the palm vein can give more highlights to be utilized for verification. This paper features the execution assessment of different methodologies embracing this verification procedure. The exhibition assessment is based on standard measurements, for example, equivalent blunder rate and bogus acknowledgment rate. We think about various strategies dependent on existing distributed research and sum up their preferences also, impediments. We at long last recommend the utilization of profound learning calculations in the dynamic cycle which vows to be generally solid for not so distant future applications.

[3] This paper presents advancement of face acknowledgment for understudy participation utilizing Raspberry Pi. Face acknowledgment is a exceptionally proficient and an exact device in improving security. With Nano gadgets, for example, Raspberry Pi and Raspberry Pi night vision cameras, instructors record understudy participation to class with up close and personal recognizable proof frameworks. Little night-vision raspberry cameras are introduced on the homeroom entryway outline in the study hall room to catch video, endorsed to Raspberry Pi for face

recognition and acknowledgment. The proposed technique is actualized on Raspberry Pi and Raspberry Pi night vision which is tried on different standard datasets. Test results approve the productivity of the proposed acknowledgment technique.

[4] In biometric verification based vehicle entryway locking framework, the biometric verification plays a significant function to give high security. Presently a day's security is significant to keep our information secretly from unapproved people. The primary point of this paper is to shield the vehicle from unapproved individuals by utilizing the special id that is unique mark verification. At the spot of vehicle entryway locking framework, the unique mark scanner is set to bolt and open the entryways instead of the traditional entryway locking framework. Which gives more insurance to the vehicle proprietor? The other sign framework is likewise evolved by utilizing GSM module to send the message to the vehicle proprietor versatile. The whole framework is constrained by the Raspberry pi 3 processor.

[5] An expanded interest of biometric validation combined with Automation of frameworks is seen in the ongoing times. By and large biometric acknowledgment frameworks presently utilized consider just a solitary biometric trademark for check or validation. Scientists have demonstrated the shortcomings in unimodal biometric frameworks and proliferated the appropriation of multimodal biometric frameworks for confirmation. This paper presents Bi-modular Biometric Verification Mechanism utilizing Unique mark and Face (BBVMFF). The BBVMFF considers the frontal face and unique mark biometric attributes of clients for confirmation. The BBVMFF Considers both the Gabor stage and size includes as biometric attribute definitions and basic lightweight component level combination calculation. The combination calculation proposed empowers the materialness of the proposed BBVMFF in unimodal and Bi-modular modes demonstrated by the test results introduced.

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[7] This paper is introduced about an arrangement of recording understudy participation utilizing unique mark distinguishing proof that permits understudies to screen understudy participation to class is a genuine electronically. It can decrease the presence of false understudies who are

presently generally done by the understudies and the framework can likewise lessen issues, for example, the presence of the missing paper and effectively harmed. With this framework can supplant the current manual framework to a more efficient and gadgets. This participation framework will be shown on a PC teacher with more alluring and designs and have understudies total detail utilizing Microsoft Visual Fundamental Studio and incorporated utilizing the unique mark per user.

[8] Face Recognition starts with separating the directions of highlights, for example, width of mouth, width of eyes, understudy, and contrast the outcome and the estimations put away in the information base and return the nearest record (facial measurements). These days, there are a great deal of face acknowledgment methods and calculations found and created the world over. Facial acknowledgment turns into a fascinating exploration point. It is demonstrated by various number of distributed papers related with facial acknowledgment including facial element extraction, facial calculation enhancements, and facial acknowledgment usage. Primary reasons for this exploration are to get the best facial acknowledgment calculation (Eigen face and Fisher face) gave by the Open CV 2.4.8 by contrasting the ROC (Receiver Operating Qualities) bend and actualize it in the participation framework as the principle contextual investigation. In view of the tests, the ROC bend demonstrates that utilizing the current preparing set, Eigen face accomplishes preferred outcome over Fisher face. Eigen face actualized inside the Participation System returns between 70% to 90% closeness for certified face pictures.

[9] Palm vein design acknowledgment is one of the freshest biometric strategies explored today. This paper presents a palm vein acknowledgment framework that utilizations vein designs as an individual recognizing factor. The vein data is difficult to copy since veins are interior to the human body. The configuration subtleties of the palm vein catch gadget are explored, also, pre-processing and highlight extraction of palm vein picture are additionally examined. A little palm vein picture information base is worked by the proposed catch gadget. Trial results on the little palm vein information base show that the planned framework accomplishes an adequate degree of execution.

[10] A wide assortment of frameworks requires solid individual acknowledgment plans to either affirm or decide the personality of an individual mentioning their administrations. The reason for such plans is to guarantee that the delivered administrations are gotten to as it were by a real client and nobody else. Instances of such applications incorporate secure admittance to structures, PC frameworks, workstations, phones, and ATMs. Without powerful close to home acknowledgment conspires, these frameworks are powerless against the wiles of an impostor. Biometric acknowledgment or, essentially, biometrics alludes to the programmed acknowledgment of people dependent on their physiological or potentially conduct qualities. By utilizing biometrics, it is conceivable to affirm or build up a person's character based on "what her identity is," instead of by "what she has" (e.g., an ID card) or "what she recalls" (e.g., a secret word). In this paper, we give a short

diagram of the field of biometrics and sum up a portion of its points of interest, burdens, qualities, impediments, and related security concerns.

4. Future Scope

The following elucidation can be made:
- General influence: Biometric technologies scan many different biological patterns which are unique to every individual to identify them. They are so precise and independent that law enforcement agencies and judicial systems around the world have used them for over a century.
- Emerging drift: In the near future, we can anticipate seeing a higher adoption rate and better technology for facial recognition, palm vein scanner and finger print not just for access to personal devices but also for authentication and personalization in many different fields.
- Insurance with solace: There are multiple methodology used for biometric identification, so they can be used in diverse applications like access control and authentication, identity management and forensic identification. Apart from being extremely difficult, if not impossible, to replicate or forge as of now, they are extremely accurate and convenient for both the individual and from a technology implementation standpoint.
- This device can be used to form a network where the databases of the students of the entire University are stored.

5. Conclusion

Multibiometric system has a huge potential of growth. Biometric authentication can perform high degree of security. In this paper, the block diagram, recognition algorithm and experimental analysis of a palm vein recognition system are proposed. Fingerprint authentication is a form of mature biometric technology; it is one of the easiest and gives a fine recognition performance. Facial detection is influenced by clarity of image, the brief analysis of the face detection techniques using effective statistical learning methods seems to be easy as practical and perfect solutions. Palm vein design acknowledgment is one of the freshest biometric strategies explored today. Palm vein picture information base is worked by the proposed catch gadget. Trial results on the little palm vein information base show that the planned framework accomplishes an adequate degree of execution.

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