Identity Verification Using Geometry Of Hands

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Abstract: *In This Paper today's society, In low- to medium-security applications, hand geometry-based biometrics systems are becoming more and more common. The geometrical features of the hand, such as the length and width of the fingers, the diameter of the palm, and the perimeter, are used in identification methods based on geomerty. The proposed system, a verification system, uses these hand geometry properties to authenticate persons. This study suggests a low-cost, reliable, and user-friendly hand geometry-based biometric person authentication system. The novelty of this work include the introduction of hand geometry-related, location independent, feature extraction and identification, which may be useful in problems involving image processing and pattern recognition. Today, all organisations and institutions place a greater emphasis on student attendance. The system is designed to create a palm-print-based attendance management system, requiring students to successfully complete the attendance by using their palms, ensuring that only actual students' attendance during class may be logged. This technology use a webcam to capture attendance data that is then electronically saved in a database. The roll call percentages and individual student information are easy to observe thanks to the graphical user interface.*

Keywords*: Logistic Regression, Pre-processing, Feature Extraction*

1. INTRODUCTION

For many organisations and institutions today, student attendance has become increasingly important. The time-consuming and risky old method of taking attendance, which calls names or requires signing on paper, is inefficient. This study switches from a manual approach of managing student attendance to a computerised one in an effort to increase convenience or the accuracy of the data. The system was developed by incorporating ubiquitous computing technologies into classrooms in order to control student attendance using a palm-print scanner. The system is designed to create an attendance management system based on palm prints, requiring students to correctly complete the attendance using their palms so that only actual students can have their attendance during class logged. It is also something that cannot be stolen or broken, in addition to being far simpler to use than carrying about a card or remembering numerous passwords. The human characteristics that are used in biometric authentication systems are both distinctive and uncopyable. Biometric authentication is unquestionably the way of the future for personal identification.

It is also something that cannot be stolen or cracked, making it much simpler to use than remembering numerous passwords or carrying around a card. The biometric authentication methods rely on human

characteristics that are both unique and impossible to replicate. Unquestionably, biometric authentication is the way of the future for personal identification.

People are subject to the constraint of maintaining distinct passwords for various programmes and changing them frequently. It would be required to memorise several different passwords in today's environment. Even identity and access cards can easily stolen, and there is a potential of fraud. Every day, new incidents involving card and password theft are reported. The best answer to all of these needs is a biometric authentication system.

2. LITERATURE SURVEY

1. Utilizing direct shape optimisation, Zhizhong Han, Baorui Ma, Yu-Shen Liu, Member, IEEE, and Matthias Zwicker created "Reconstructing 3D Shapes From Several Sketches".

Rebuilding 3D shapes using numerous hand-drawn sketches is a novel method of 3D shape modelling. Neural networks are used in contemporary methods to learn a mapping from a large number of sketches made from various view points to a 3D voxel grid. Nevertheless, because 3D voxel grids are cubic in complexity and lack geometric information, neural networks can only be employed for low resolution reconstructions. To tackle this problem, we suggest employing direct shape optimisation (DSO), which does not use deep learning models for direct voxel-based 3D form creation, to rebuild 3D shapes from various sketches.

2. Johnson I. Agbinya, "Human Palm Geometry Modeling for Biometric Security Systems"

Systems for modelling and recognising palm prints have received a lot of research. Research on palm geometry or shape has gotten less attention because of the difficulties in describing and modelling shape. The focus of this work is the experimental determination of human palm geometry equations. The calculations are based on measurements of different hand parts taken from a wide range of male and female members of different ethnic groups. It is stated how the perimeters at the tips and bases of the fingers relate to the lengths of the hands. The linkages produce the hand geometry equation, a unique expression.

3. "Haptic Rendering of 3D Geometry on 2D Touch Surface Based on Mechanical Rotation," by Seung-Chan Kim and Byung-Kil Han, IEEE members.

In this article, we show how a robotic surface display can physically show the orientation of virtual 3D geometry touched on a flat 2D screen. Users can genuinely gain relative geometric information, which is essential for the perception of haptic items in the real world, thanks to the suggested method's rendering of the surface orientation of 3D geometry. The method builds a rotation matrix to control the pose of a surface with minimal mechanical movements using partial geometric information, taking use of the planar nature of touch surfaces. to assess the suggested rendering plan.

4. Yue Liu1 Rui Cao1 An augmented reality tool for learning 3D geometry is called Hand ControlAR.

The traditional approach of teaching geometry cannot adequately support beginning students because the geometric forms are presented in 2D on the whiteboard or in books. In light of the fact that augmented reality (AR) offers a naturally intuitive method of learning geometry, this paper suggests an interactive AR system that enables students to naturally and directly manipulate 3D objects through hand gesture-based interactions and intuitively explore the spatial relationship between spheres and polyhedrons. The recommended gesture-based interface allows the user to control AR objects. We develop multiple levels of training to assist students in comprehending geometric concepts as well as a

test to evaluate how well the AR system functions. The analysis's conclusions showed that the recommended strategy is user-friendly, enticing, and advantageous to students.

3. PROPOSED SYSTEM

Data Flow Diagram:

In a data flow diagram, we demonstrate how data flows through our system using a base data flow diagram (DFD0), in which a rectangle represents input and output and a circle represents our system. In DFD1 we show actual input and actual output of system input of our system is text or image and output is rumour detected like wise in DFD 2 we present operation of user as well as admin.

Fig 2. Data Flow(0) diagram

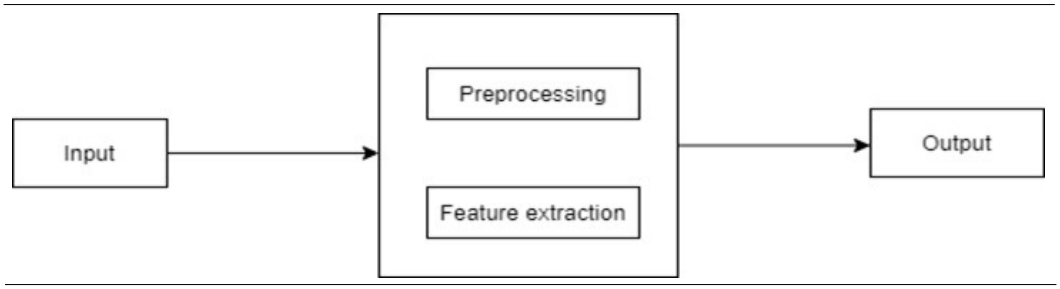

Fig 3. Data Flow(1) diagram

In the modern information society, accurate biometric authentication is the main topic of discussion because it is necessary for access control systems, criminal or forensic applications, and automated identification. Many physiological traits, such as fingerprints, palm veins, face characteristics, palmprints, hand geometry, etc., are suitable for verification. Many characteristics, including primary lines, wrinkles, and epidermal ridges, can be utilised to verify a palmprint. With great confidence, a person can be identified just by looking at their palm. The lengths, widths, and areas of the fingers, the palm's height and width, the finger's area, and other hand geometry metrics can all be employed for this purpose. The dimensions of the hand and the characteristics of the palm are located in a single image with excellent quality.

In order to achieve the best results, a method for extracting characteristics from both the palm and the hand is presented in this study. While the hardware for capturing the hand picture may be made up of cheap, high-resolution cameras, the suggested method provides a solution for a low-cost biometric authentication system:

- Substantial data storage is necessary for both the information system and decentralised data storage.
- The various security problems with centralised database structures.
- In central data architectures, there is no automatic attack recovery.

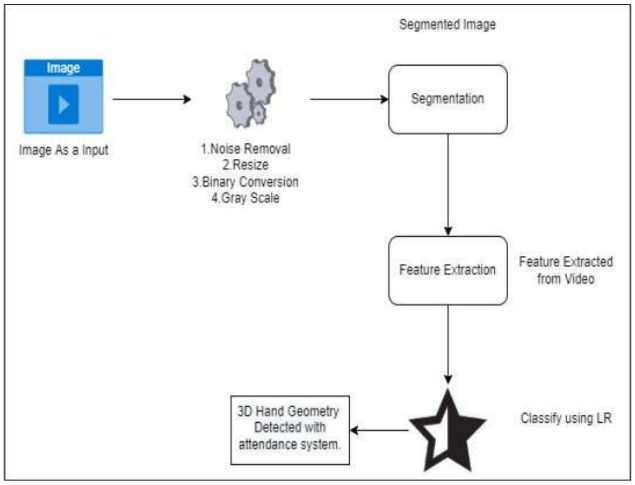

Fig 1. system Architecturel

4. METHODOLOGIES

Accurate biometric authentication is a hot topic in today's information society since it is required for automated identification, criminal or forensic applications, and access control systems. Many physiological traits, such as fingerprints, palm veins, face characteristics, palmprints, hand geometry, etc., are suitable for verification. Many characteristics, including primary lines, wrinkles, and epidermal ridges, can be utilised to verify a palmprint. With great confidence, a person can be identified just by looking at their palm. The lengths, widths, and areas of the fingers, the palm's height and width, the finger's area, and other hand geometry metrics can all be employed for this purpose. The dimensions of the hand and the characteristics of the palm are located in a single image with excellent quality.

4.1 Software Testing:

Software testing can be implemented at any stage of the development process, depending on the testing methodology used. The majority of testing, however, happens after the requirements are defined and the software is complete. As a result, the test technique is determined by the software development methodology that is adopted. The focus of the testing effort will vary depending on the software development model used. With more recent development methods, such as Agile, test-driven development is a prevalent practise that places more testing in the hands of the developer before it is sent to a formal team of testers. In a more traditional model, the majority of testing is carried out following the definition of the requirements and the completion of the code.

TYPE OF TESTING USED:

1. Unit Testing:

the individual software components of the application being tested. It happens after a unit is put together but before integration. The development of test cases for unit testing ensures that the program's fundamental logic is working properly and that inputs result in legitimate outputs. Verifying the internal code flow and every decision branch is crucial. An understanding of how it was constructed is necessary for this intrusive structural test. Unit tests conduct core tests at the component level and focus on a

specific application, system configuration, or business process. Unit tests ensure that every individual path of a business process strictly complies with the stated specifications and has well-defined inputs and outputs.

2. Integration Testing:

Integration tests are performed on integrated software components to determine whether they truly function as a single programme. Event-driven testing emphasises the basic outcome of screens or fields. Integration tests show that the combination of the components is correct and consistent even when the individual components passed unit testing successfully. Integration testing is specifically made to draw attention to problems that arise while merging components.

3. System Test:

We are using the right testing methodology, including unit, integration, validation, GUI, low-level and high-level test cases, and significant scenarios, to test this application. Prior to moving on to integration testing, we will test the GUI. Following integration testing, high level test cases and significant situations that could impact how the application functions are run. Using a variety of inputs and outputs, we will test the communicated data and validate the results.

4. White-box testing:

In white-box testing, test cases are created using programming knowledge and an internal viewpoint of the system.

5. Black-box testing:

Black-box testing examines functionality without knowing how the software is implemented internally. It approaches the programme as a "black box." The software is supposed to do certain things, but the testers are only aware of what those things are.

5. CONCLUSION

In This Project With the simultaneous extraction and fusion of 3D and 2D hand geometry data, a novel method for achieving more trustworthy personal authentication has been demonstrated in this project. In order to guarantee high usability and to address hygiene issues, the suggested system captures hand images without any physical touch. The processing of simultaneously acquired range and 2D images of the hand allows for feature extraction and matching. We introduced two new representations for 3D hand geometry-based biometric assessment, namely finger surface curvature and unit normal vector. It is suggested to use simple and efficient criteria for the matching of two 3D hand photos. A very reliable authentication system is created by combining the match scores from 3D and 2D hand geometry matchers.

We talked about how to assess student attendance. A pilot study shows that a teacher can categorise every student's attendance based on their use. Every teacher can utilise the records to create graphs for their own purposes.

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