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Hand Geometry Based Attendance System

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ABSTRACT: Biometrics which can be used for identification of individuals based on their physical or behavioral characteristics has gained importance in today's society where information security is essential. Hand geometry based biometrics systems are gaining acceptance in low to medium
security applications. Hand geometry based identification systems utilize the geometric features of the hand like length and width of the fingers, diameter of the palm and the perimeter. The proposed system is a verification system which utilizes these hand geometry features for user authentication. This project introduces an inexpensive, powerful and easy to use hand geometry based biometric person authentication system. One of the novelties of this work comprises on the introduction of hand geometry's related, position independent, feature extraction and identification which can be useful in problems related to image processing and pattern recognition.
Today students' (class) attendance became more important part for any organizations/institutions. The conventional method of taking attendance by calling names or signing on paper is very time consuming and insecure, hence inefficient. This paper presents the manual students' attendance management into computerized system for convenience or data reliability. So, the system is developed by the integration of ubiquitous computing systems into classroom for managing the students' attendance using palm print scanner. The system is designed to implement an attendance management system based on palm print scanner which students need to use their palm to success the attendance where only authentic student can be recorded the attendance during the class. This system takes attendance electronically with the help of the webcam, and the records the attendance in a database. Students' roll call percentages and their details are easily seen via (GUI).

KEYWORDS: Machine Learning, Women Security Graphical User Interface (GUI)

I. INTRODUCTION

The renewed interest in digital identity of people has opened up several areas of biometric analysis which in the past received less attention. These areas include hand geometry,3D geometry and analysis of finger structures. Many characteristics of human beings are used for identification of which fingerprints, voice and face have been the most prominent. Electronic methods also use voice, face, iris and hand features to provide unique keys for people identification. Machines are very limited in terms of their capability to recognise human beings from their hands alone. This limitation is human limitation in the representation and selection of appropriate features. Fingerprint features have been used for decades and biometrics systems based on fingerprints and face features have been in the market the last few years and are gradually gaining acceptance. Despite acceptance of fingerprint access systems, the management of digital identity across distributed networks require more than one metric to provide high identification reliability and

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low failure rate authentication. In real life, many of the bio metric systems can be defeated. Therefore, the more the number of biometrics applied for identification of a subject, the better the reliability of the system and certainty of recognition. As for system development and implementation, it should be able to help the lecturers to managing their student attendance systematically. The system must have database that contains student information and it must be able to help lecturer to manipulate data, update database.

3D shape reconstruction from multiple hand-drawn sketches is an intriguing way to 3D shape modeling. Currently, state-of-the-art methods employ neural networks to learn a mapping from multiple sketches from arbitrary view angles to a 3D voxel grid. Because of the cubic complexity of 3D voxel grids,however, neural networks are hard to train and limited to low resolution reconstructions, which leads to a lack of geometric detail and low accuracy. To resolve this issue, we propose to reconstruct 3D shapes from multiple sketches using direct shape optimization (DSO), which does not involve deep learning models for direct voxel-based 3D shape generation. Specifically, we first leverage a conditional generative adversarial network (CGAN) to translate each sketch into an attenuance image that captures the predicted geometry from a given viewpoint. Then, DSO minimizes a projectand-compare loss to reconstruct the 3D shape such that it matches the predicted attenuance images from the view angles of all input sketches. Based on this, we further propose a progressive update approach to handle inconsistencies among a few hand-drawn sketches for the same 3D shape. Our experimental results show that our method significantly outperforms the state-of-the-art methods under widely used benchmarks and produces intuitive results in an interactive application.

palm print modelling and recognition systems have been extensively studied. Palm shape or palm geometry has had lesser attention paid to its study because of the difficulties associated with shape definitions and modelling. This paper reports on experimental determination of

human palm geometry equations. Experimental determination of human palm geometry was undertaken using measurements of hands of 14 subjects drawn from a mixture of racial and gender backgrounds. By also analysing scanned images of their hands, characteristic measurements of their palms were determined. Characteristic expressions describing the geometry of human hands are proposed. The equations are based on measurements of various parts of the hand cross a broad spectrum of female and male representative of various parts of the hand cross a broad spectrum of female and male representatives of various ethnic groups. They describe the relationships between the lengths of the hands and their perimeters at the finger tips and the base of the fingers. The relationships lead to a unique expression called the hand geometry equation.

II. PROBLEM STATEMENT

The aim is to develop a hand geometry recognition program in MATLAB thathe information of the hand geometry to find a feature vector from a set of hand images. also this system used for taking attendance by using hand palm.

• To detect the valley and tip point of the image of a hand

• To extract the features from the hand image

• To extract depth information from the 3D image

• To compare the features of the test image from the data existing on the database

• To show the decision of the system whether the owner of the test image is a valid user of the system or not.

III. PROJECT SCOPE

The renewed interest in digital identity of people has opened up several areas of biometric analysis which in the past received less attention. These areas include hand geometry,3D geometry and analysis of finger structures. Many characteristics of human beings are used for identification of which fingerprints, voice and face have been the most prominent. Electronic methods also use voice, face, iris and hand features to provide unique keys for people identification.

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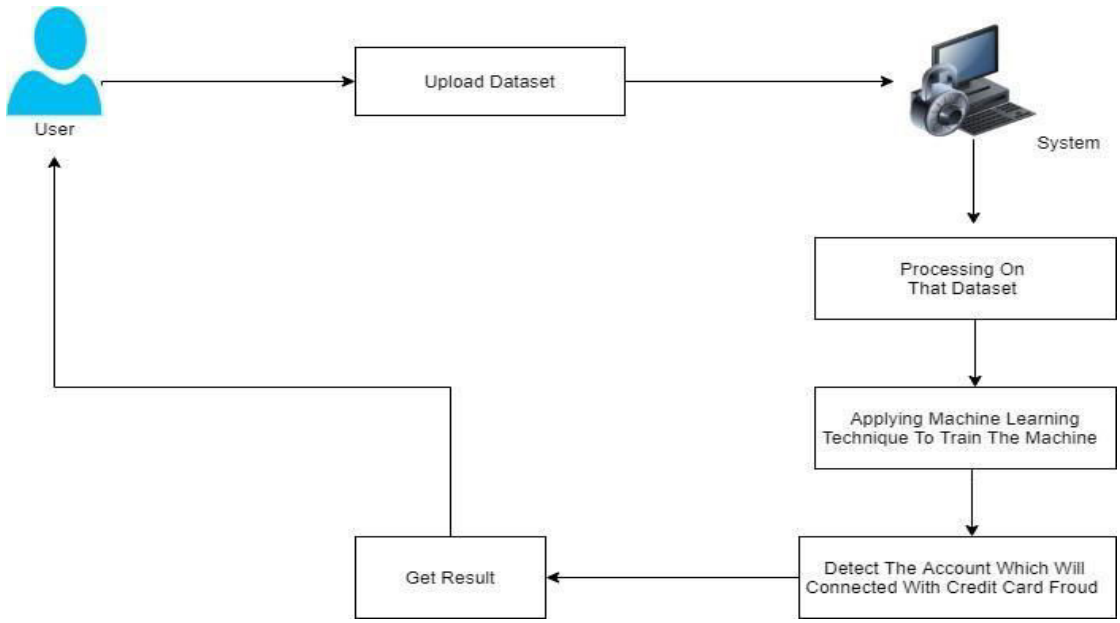
IV. METHODOLOGY OF PROBLEM SOLVING

We are using waterfall model for our project.

1. Requirement Gathering and Analysis:
   In this step of waterfall we identify what are various requirements are need for our project such are software and hardware required, database, and interfaces.
2. System Design:
   In this system design phase we design the system which is easily understood for end user i.e. user friendly. We design some UML diagrams and data flow diagram to understand the system flow and system module and sequence of execution.
3. Implementation:
   In implementation phase of our project we have implemented various module required of successfully getting expected outcome at the different module levels. With inputs from system design, the system is first developed in small programs called units, which are integrated in the next 10 phase. Each unit is developed and tested for its functionality which is referred to as Unit Testing.
4. Testing:
   The different test cases are performed to test whether the project module are giving expected outcome in assumed time. All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.
5. Deployment of System:
   Once the functional and non-functional testing is done, the product is deployed in the customer environment or released into the market.
6. Maintenance:
   There are some issues which come up in the client environment. To fix those issues patches are released. Also to enhance the product some better versions are released. Maintenance is done to deliver these changes in the customer environment. All these phases are cascaded to each other in which progress is seen as flowing steadily downwards like a waterfall through the phases. The next phase is started only after the defined set of goals are achieved for previous phase and it is signed off, so the name Waterfall Model. In this model phases do not overlap.

System Architecture



System Architecture

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V. ALGORITHM

Convolutional neural network is one of the main categories to do image recognition, image classification, object detection widely used

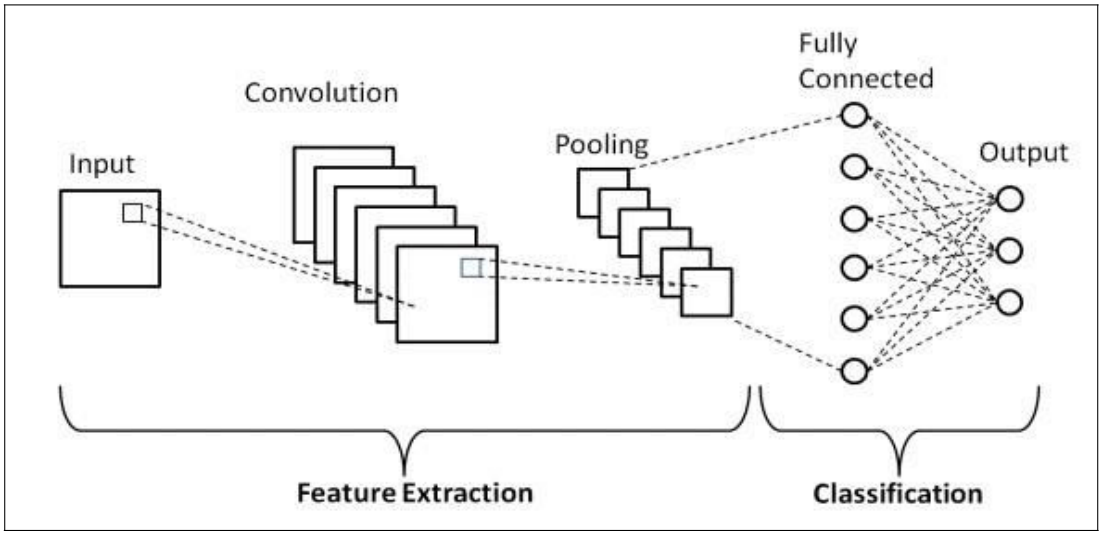
. • CNN image classification takes the input image,process it and classify it . Computer sees an input image as array of pixels depends on the image resolution.(h*w*h)

• Convolutional layer

• Non Linearity(ReLU)Layer

• Pooling Layer

• Fully connected Laye



TOOLS AND TECHNOLOGIES USED

Python is an interpreted, high-level and general-purpose programming language.

Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasizes code readability with its notable use of significant white space. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

Python is dynamically typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly, procedural), object-oriented, and functional programming. Python is often described as a "batteries included" language due to its comprehensive standard library. Python was created in the late 1980s as a successor to the ABC language.

Python 2.0, released in 2000, introduced features like list comprehensions and a garbage collection system with reference counting.

Python 3.0, released in 2008, was a major revision of the language that is not completely backward-compatible, and much Python 2 code does not run unmodified on Python 3.

The Python 2 language was officially discontinued in 2020 (first planned for 2015), and "Python 2.7.18 is the last Python 2.7 release and therefore the last Python 2 release."[30] No more security patches or other improvements will be released for it. With Python 2's end-of-life, only Python 3.6.x and later are supported.

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Python interpreters are available for many operating systems. A global community of programmers develops and maintains CPython, a free and open-source reference implementation. A non-profit organization, the Python Software Foundation, manages and directs resources for Python and CPython development.

VI. SYSTEM TESTING

Testing is an investigation conducted to provide stakeholders with information about the quality of the product or service under test. Software testing also provides an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation. Test techniques include, but are not limited to, the process of executing a program or application with the intent of finding software bugs. Software testing can also be stated as the process of validating and verifying that a software program or application or product: 1. Meets the business and technical requirements that guided 2. Works as expected; 3. Can be implemented with the same characteristics

TYPES OF TESTING

1 Unit Testing

It focuses on smallest unit of software design. In this we test an individual unit or group of inter related units.

2 Regression Testing

The objective is to take unit tested components and build a program structure that has been dictated by design.Integration testing is testing in which a group of components are combined to produce output.

3 Smoke Testing

Very time new module is added leads to changes in program. This type of testing make sure that whole component works properly even after adding components to the complete program.

4 System Testing

In this software is tested such that it works fine for different operating system.It is covered under the black box testing technique.

VII. CONCLUSION

This project has presented a new approach to achieve more reliable personal authentication using simultaneous extraction and combination of 3D and 2D hand geometry features. The proposed system acquires hand images in a contact –free manner to ensure high user friendliness and also to address the hygienic concerns. Simultaneously acquired range and 2D images of the hand are processed for the feature extraction and matching. We introduced two new representations, namely finger surface curvature and unit normal vector, for 3D hand geometry based biometric measurement. Simple and efficient metrics are proposed for the matching of pair of 3D hand images. Match scores from 3D and 2D hand geometry matchers are combined to obtain a highly reliable authentication system. Our research also suggests that significant performance improvement can be achieved by combining hand geometry information extracted from user's 2D and 3D hand images.

we discussed the way to measure the attendance of students. A preliminary experiment demonstrates a teacher can classify any student's attendance according to their use. Any teacher can take the records and generate graph according to their use.

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