



# Biometric Palm Recognition and Classification using Machine Learning

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## Article Info

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## ABSTRACT

*In recent times there may be a threat that others can get admission to the personal records anywhere and every time. Presently passwords and personal identification cards are used for personal identification. Nowadays, Biometric based total recognition is the maximum popular human recognition sample. It offers extra dependable and green means of identity verification. The physical dimension of the hand, called palm geometry, carries information that can authenticate an individual's identity. The intention of the biometrics verification system is composed of deciding whether or not two characteristics belong to equal men or women. In this case, the photograph may be used for verification purposes. The period worldwide states that complete pictures of the palm are taken into consideration for verification. Original paintings in this example are the pre-processing of a photograph. Extracting the functions, creating the facts set, clustering set of rules and typeset of management is used, and performance is as compared in each the instances. In our mission, we have proposed a Convolution Neural Network (CNN) set of rules to be compared with different algorithms. In recent times there may be a hazard that others can get entry to the same records everywhere.*

*Presently passwords and non-public identification cards are used for personal identification. Biometrics, primarily based on reputation, is the most famous human popularity pattern. It provides a more excellent reliable, and efficient method of identification verification. The physical size of the hand, known as palm geometry, includes facts that are capable of authenticating the identity of a man or woman. The purpose of a biometrics verification gadget is to find out whether or not two characteristics belong to the same person. In this situation, the image can be used for verification purposes. The term international states that an entire photo of the palm is considered for verification. Original work in this example is the pre-processing of an image, then extracting the functions, growing the statistics set, clustering algorithm and classification algorithm is used, and performance is in comparison in both the cases. In our project, we've got proposed a Convolution Neural Network (CNN) set of rules to be compared with different algorithms.*

**KEYWORDS:** *Biometrics Verification System , Convolution Neural Network , Clustering algorithm , Identity Verification, Reliable , Authentication*

## 1. INTRODUCTION

There has been a terrific hobby of many researchers on the Palm recognition hassle in recent years. Among these researchers are the engineers, neuroscientists, and psychophysicists studying this problem in unique fields

and from exclusive points of view. There are numerous utility regions of Palm recognition in our actual lifestyles, including the identity of employees, the usage of credit cards, passport checks, entrance manipulation, criminal investigations, and so on.

Various automatic structures for identifying humans based on biometrics have been used lately. With well-known techniques and fingerprint or DNA recognition, Palm's popularity opens new possibilities. Many prerequisites for placing Palm popularity into exercise, e.g., Palm localization in digital cameras, have already been adopted through groups and are commercially available.[6] Palm recognition is already being applied to photo organizing software programs, web applications, mobile devices, and passports containing palm biometric facts. The benefits of Palm recognition are extraordinarily modest requirements on hardware and simple actual-time procedure from the perspective of the identified topics.

In recent years Palm recognition has received considerable interest from researchers in biometrics, pattern reputation, and computer imaginative and prescient communities. The machine is getting to know, and laptop pics groups are increasingly more involved in Palm's reputation [7]. This not unusual interest amongst researchers working in numerous fields is encouraged via our remarkable capacity to apprehend human beings and the reality that human activity is a primary difficulty both in regular lifestyles and in our online world. These packages encompass computerized crowd surveillance and access manipulation, mugshot identification (e.g., for issuing driving force licenses), Palm reconstruction, the layout of human laptop internal (HCI), multimedia, and content-based photo database control. Some business Palm reputation structures were deployed, including Cognitec, Eyematic, Viisage, and Identix.

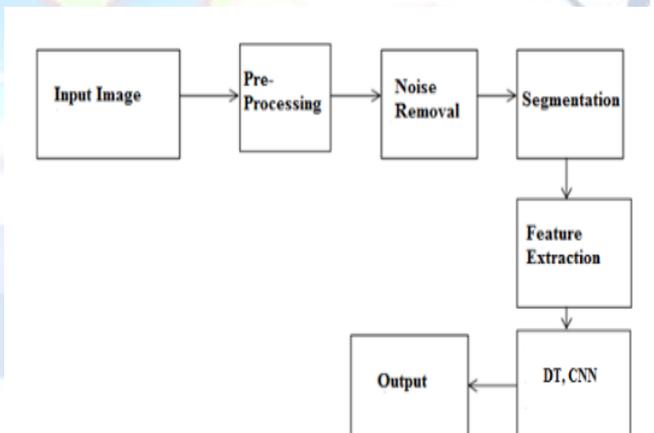
## 2. EXISTING SYSTEM

- **Naïve bayes method:**
- Multispectral imaging makes it viable to expand effective palm print reputation methods to utilize functions acquired with unique spectral wavelengths, such as visible, near-infrared, infrared, or even unmarried crimson, inexperienced, and blue channels.
- With infrared spectral imaging, palm vein statistics could be captured to enhance the capability of spoof detection and the accuracy of palm print reputation.

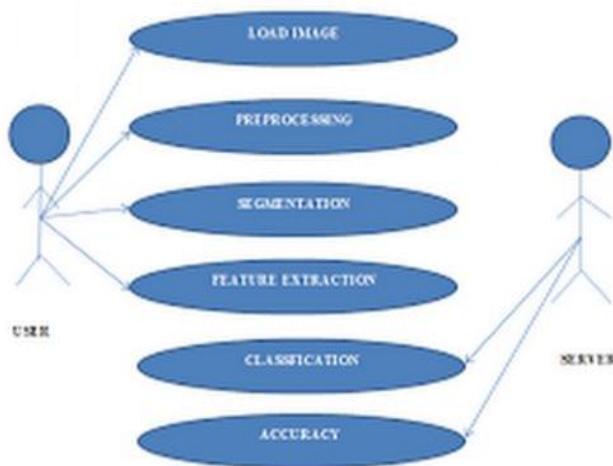
## 3. PROPOSED SYSTEM

- A **Convolution Neural Network** is a category of deep neural networks, most generally applied to analyzing visible imagery. They are also called **Shift Invariant or Space Invariant Artificial Neural Networks (SIANN)**, based on their shared-weights architecture and translation invariance traits. Convolutional networks were inspired by means of organic procedures in that the connectivity pattern between neurons resembles the organization of the visible animal cortex. Individual cortical neurons reply to stimuli most effectively in a restrained region of the visual field known as the receptive field.
- A PALM image is taken, or the acquisition can be performed through impression or direct scanning.
- Once you have the impression converted into a greyscale picture to increase the properties of the impression and as soon as it converts, have a few noise or pixel losses that can be removed by using filters like a bilateral filter.
- After the processing of noise removal, each and every property can be segmented by the usage of fuzzy c manner clustering.

### SYSTEM ARCHITECTURE:



## UML Diagram



There are 5 components in the system. They are:-

- (i) Image Acquisition
- (ii) Image Preprocessing
- (iii) Image Segmentation
- (iv) Feature Extraction
- (v) Classification.

In image Acquisition, real-time images are captured from distinct people. The captured photos are cropped to a particular size. The cropped RGB images are transformed to grayscale in image Preprocessing. Image Segmentation is the third component. It consists of segmenting the converted grayscale photos. The usage of k means filtering. This allows to remove issues like backgrounds, illumination of mild, etc. function Extraction is extracting or displaying the part of the segmented photos in order that classification will become smooth. The last module consists of the classification wherein Tensor flow and support vector machine is used.

- **Image Acquisition Image**

The acquisition is the method of collection of images. These images are downloaded from the online dataset issuer referred to as Kaggle.com.

- **Image Preprocessing**

Image preprocessing includes changing RGB images into Grayscale images. The images are present in an RGB image approach with their unique colors. Grayscale pictures have a mixture of black and white. Conversion of RGB to grayscale is carried out to enhance the dataset

available. Changing the images to grayscale allows for improving the accuracy of the result. Grayscale images assist in lessening noise and additionally make the background impartial. It additionally helps to enhance the brightness of the picture. Information augmentation is a way of making new information that has advantages like generating more significant information from restrained details, and it prevents overfitting.

- **Image Segmentation**

Image segmentation breaks the picture down into enormous areas. It divides a virtual image into more than one segment. The purpose is to simplify or exchange the instance into an amazing additional picture. It differentiates among the objects we need to research in addition and the alternative entities or their background. It includes segmenting the converted grayscale pics. The use of k means segmentation.

- **Feature Extraction**

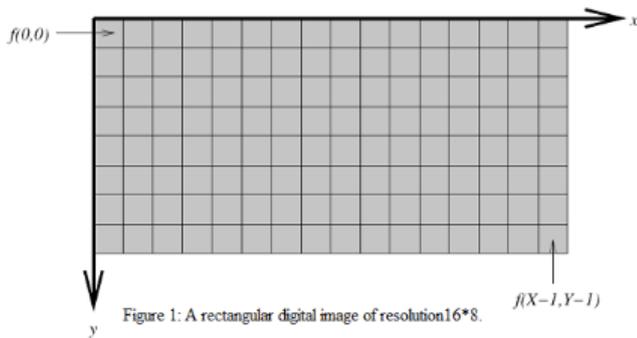
Feature extraction extracts or shows the segmented part of the picture so that the class will become smooth. Features are extracted to distinguish among the images. Features extraction is utilized in nearly all machine vision algorithms. The not unusual motive of feature extraction and illustration strategies is to transform the segmented items into representations that better describe their principal functions and attributes.

- **Classification**

Here we use the concept of classification method. The final module consists of the classification wherein Tensor flow, and machine learning algorithm will be used. Tensor flow is a Matlab-friendly open-source library for numerical computation that makes machine learning quicker and less complicated. Tensor flow allows developers to create dataflow with graphs - systems that describe how facts act via a graph or a sequence of processing nodes. Every node in the graph represents a mathematical operation, and every connection or aspect among nodes is a multidimensional facts array or tensor.

## 4. RESULTS

### A.INPUT IMAGE



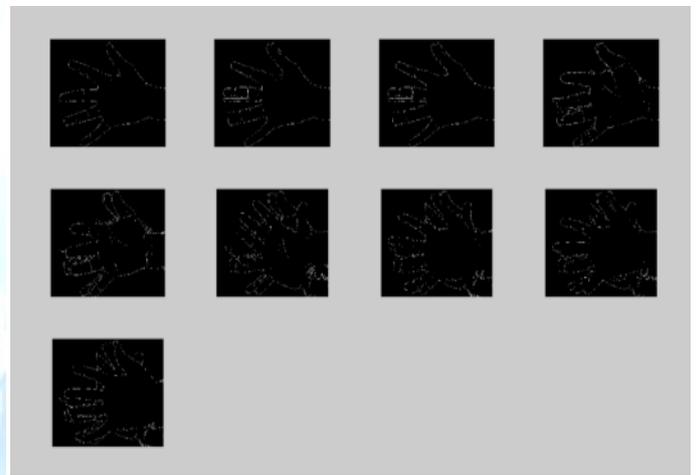
### B.PREPROCESSING



### C.SEGMENTATION



### D.EDGE DETECTION



### E. FEATURE EXTRACTION

```

Command Window
-3.701318428676225e-02  -1.295428324462028e-01  7.604788902760324e-02
-4.034890088975554e-02  -0.845889473743410e-02  8.324894981879559e-02
-4.577399897641832e-02  -1.293796888637119e-01  8.380137428200364e-02
-3.881813960817222e-02  -1.393571750458312e-01  7.729533366821378e-02
-3.239256971148379e-02  -1.564667415292359e-01  7.216997024836599e-02

Column 40 through 42
1.395501912331420e-01  9.944320436507936e-01  9.961445609483659e-01
1.595667804226424e-01  9.935899170274171e-01  9.9575946744449609e-01
1.595667804226424e-01  9.935899170274171e-01  9.9575946744449609e-01
1.449607903215670e-01  9.928052849927850e-01  9.945906748819948e-01
1.417289340376142e-01  9.912922478540773e-01  9.928707945949326e-01
1.229573328618397e-01  9.903449703626220e-01  9.913368599791013e-01
1.403779994267957e-01  9.914669354951186e-01  9.930218129571578e-01
1.458270918976357e-01  9.915043148535564e-01  9.931393678160919e-01
1.5786008461839818e-01  9.909093880753139e-01  9.930305207244863e-01

Column 43 through 44
9.966592241904762e-01  9.976867365690195e-01
9.961539502144503e-01  9.974556804669765e-01
9.961539502144503e-01  9.974556804669765e-01
9.956831709956711e-01  9.967544048291969e-01
9.947753487124463e-01  9.957224767569596e-01
9.942069822175732e-01  9.948021159874607e-01
9.950018612970712e-01  9.955130877742546e-01
9.949025889121338e-01  9.955836206896552e-01
9.945456328451883e-01  9.958183124346918e-01

Feature Extraction Ended
    
```

## F. CLASSIFICATION:

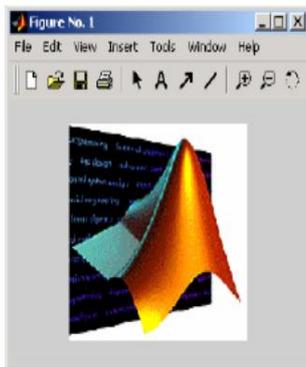


Figure 4.2: Bitmap Image

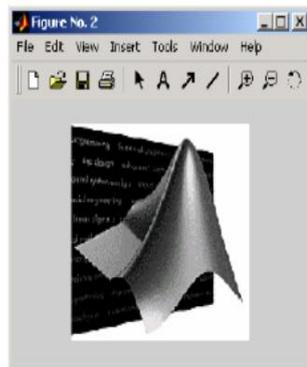


Figure 4.3: Grayscale Image

## 5. CONCLUSION

- Palm print recognition performs a critical function within the area of biometrics.
- All different recognition techniques consisting of Iris, Face, and Finger may be manipulated in comparison to palm. That's the motive we are introducing the palm print reputation approach. The usage of the decision tree technique can deliver good results in accuracy.

### Conflict of interest statement

Authors declare that they do not have any conflict of interest.

## REFERENCES

- [1] A new hybrid approach for palm print recognition in PCA based palm stamp recognition system by Shivkant Kaushik Jaipur Engineering College, Jaipur, Rajasthan, India in 2019.

- [2] Multi-modal biometric system using palm print and palm vein features by Dipali Patalau Gaikwad Dept. E&T.C Sinhgad College of Engineering, Vadgaon Pune, India in 2019.
- [3] Implementation of multimodal biometrics recognition system combined palm print and palm geometry features by Yanuar Adhinagara Fakultas Informatika Institut Teknologi Telkom, Telekomunikasi Street No 1, 40257, Bandung, Indonesia in 2019.
- [4] 3-D Palm print Millimeter Wave Quasi-Optical Lens System for 60 and 100 GHz Applications by Chris D. Fisher Harris Corporation 2400 Palm Bay Rd NE, FL, 32905, Palm Bay in 2019.
- [5] Palm print identity the usage of fractional coefficient of converted part palm pictures with Cosine, Haar, and Kekre remodel by means of Sudeep D. Thepade Dean of Research and Development Pimpri-Chinchwad College of Engineering Pune, India in 2019.
- [6] Parvathi, D. S. L., Leelavathi, N., Ravikumar, J. M. S. V., & Sujatha, B. (2020, July). Emotion Analysis Using Deep Learning. In 2020 International Conference on Electronics and Sustainable Communication Systems (ICESC) (pp. 593-598). IEEE.
- [7] Kumar, J. R., Sujatha, B., & Leelavathi, N. (2021, February). Automatic Vehicle Number Plate Recognition System Using Machine Learning. In IOP Conference Series: Materials Science and Engineering (Vol. 1074, No. 1, p. 012012). IOP Publishing."