Convolutional Neural Network Based Finger Print Verification

G.Bharathikannan[1], T.Priya[2], S.Priya[3]
[1]Assistant Professor, Dept of CSE
[2, 3]Dept of CSE
[1, 2, 3] Sembodai Rukmani Varatharajan Engineering College

I. INTRODUCTION

Fingerprint verification systems are widely used in personal identification and verification systems. In the early twentieth century, fingerprint recognition has been accepted officially for personal identification. The fingerprints left on suitable surfaces has been used by the security departments to identify the criminals and also special fingerprint reader systems are used to verify the identity of the persons at security checks such as in airports and critical building access points. There are many methods proposed for fingerprint recognition in the literatures. After the introduction of the first paradigm of the Cellular Neural Networks (CNN) by Chua and Yang, many papers have been published about the CNN and its application in image processing. The parallel and simple structure of CNN makes it very suitable for image processing.

The CNN architecture contains many processing cells which operate in parallel in a 2D grid where each cell is connected to the cells in its local neighborhood only. The CNN cells are very simple circuit nodes and hence many of them can easily be integrated into a single chip. Consider an image of 64x64 pixels to be processed, then a 64x64 CNN cells can be used to process the image by using a series of CNN algorithms, in other words each pixel corresponds to each cell in the CNN. The built in parallelism provides faster processing. The structure of the CNN is very simple and suitable for VLSI implementation. By changing the template coefficients of the CNN, different image processing tasks, such as edge detection, noise removal, contrast stretching, dilation and erosion can be performed.

II. RELATED WORK

2.1 INFORMATION FORENSICS: AN OVERVIEW OF THE FIRST DECADE

MATTHEW C. STAM **(**2018) has discussed the evolution of information technologies from the development of VLSI technologies, to communication and networking infrastructure, to the standardization of multimedia compression and coding schemes, to effective multimedia content search and retrieval. As a result, multimedia devices and digital content have become ubiquitous. This path of technological evolution has naturally led to a critical issue that must be addressed next, namely, to ensure that content, devices, and intellectual property are being used by authorized users for legitimate purposes, and to be able to forensically prove with high confidence when otherwise. When security is compromised, intellectual rights are violated, or authenticity is forged, forensic methodologies and tools are employed to reconstruct what has happened to digital content in order to answer who has done what, when, where, and how. The goal of this paper is to provide an overview on what has been done over the last decade in the new and emerging field of information forensics regarding theories, methodologies, state-of-the-art techniques, major applications, and to provide an outlook of the future.

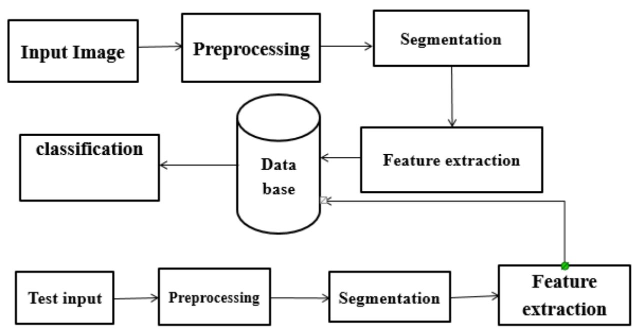
2.2 AN OVERVIEW ON IMAGE FORENSICS

Alessandro Piva**(**2013**)** has discussed The aim of this survey is to provide a comprehensive overview of the state of the art in the area of image forensics. These techniques have been designed to identify the source of a digital image or to determine whether the content is authentic or modified, without the knowledge of any prior information about the image under analysis (and thus are defined as passive). All these tools work by detecting the presence, the absence, or the incongruence of some traces intrinsically tied to the digital image by the acquisition device and by any other operation after its creation. The paper has been organized by classifying the tools according to the position in the history of the digital image in which the relative footprint is left: acquisition-based methods, coding-based methods, and editing-based schemes.

III. PROPOSED METHODOLOGY

In existing system SVM based fingerprint verification has been implemented. Robust verification system based on features extracted from human fingerprints and a pattern classifier called Support Vector Machine (SVM). A performance factor for SVM classification optimization is defined. Based on this performance factor, a quantitative optimization strategy is established, which can yield the optimal values of the SVM kernel function and training sample proportion.

In existing system finger vein based scheme has been implemented. Palm print verification scheme has been implemented. The field of personal verification using palmprint features has drawn considerable attention and researchers have proposed various methods. The palmprint features are said to be composed of principal lines, wrinkles, minutiae, delta points of the palm.



3.1. PROPOSED SYSTEM

- Propose an end-to end deep learning framework for fingerprint recognition using convolutional neural networks (CNNs) which can jointly learn the feature representation and perform recognition.
- This framework is applicable for other biometrics recognition problems, and is especially useful for the cases where there are only a few labeled images available for each class.

3.1.1 Merits

- High accuracy
- It is used for run time application
- Efficiency is high

IV. CONCLUSION

Experiments on forgery localization provide support to this statement, but many more forensic applications can be envisioned, which certainly deserve thorough investigation. Despite the promising results, one must keep in mind that no tool can solve all forensic tasks by itself. As an example, noise prints will probably allow excellent camera model identification, but cannot help for device identification. Therefore, the fusion of noise print-based tools with other approaches is a further topic of interest for future research.

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