

Offline Signature Cognition and Verification Using Artificial Neural Network

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Abstract: The signature verification is the oldest security technique to verify the identification of person. Recently, signature recognition schemes are growing in the world of security technology. It offers two different types of schemes those are offline and online method. The offline technique means to verify a signature written on paper which is scanned to convert it into a digital image, where as the online system required an online device such as Tablet PC, touch screen monitor by a pressure sensitive pen to verify the signature. Offline signature verification scheme is considered as a highly secured technique to recognize the genuine person's identity. Project will implement offline signature verification technique using Artificial Neural Network (ANN) approach.

Keywords: ANN, Authentication, Offline Signature Verification, Neural Network.

I. INTRODUCTION

A. Project Idea

We all know that the world is shrinking day by day and many manual processes are becoming online. So there is necessity of security of every person who goes through all these new technologies. One of the basic needs is signature which should be recognised correctly.

Signature recognition technique has better advantage than any other biometric security verification technique such as fingerprint, voice and sound recognition. This project deals with offline facility to verify hand written signature of person which can be used for daily routine procedure such as bank operation, document analysis electronic funds transfer and many more developing technologies

B. Motivation

Due to increased speed of working the demand for invention should be convenient. There are many online types of software that can verify the signature but because of high load on server it can give some wrong or incorrect result which is not reliable for high secured systems.

The idea behind this new project work is to develop the offline software that can be handy for society systems. The motivation behind the project is the growing need for a full proof signature verification scheme which can guarantee maximum possible security from fake signatures. The idea behind the project is also to ensure that the proposed system is feasible.

II. EXISTING SYSTEMS

A. Template Matching Technique

This is the technique which employs pattern comparison process. It is suitable for matching genuine signature via rigid matching. It is not useful in case of skilled forgeries [1].

B. Statistical Approach

Employs statistical method to determine the relationship, deviation, etc. between two or more data items. Uses the concept of Correlation Coefficients. Good at identifying

random and simple forgeries. Its graphometry based approach avails so many usable features for signature verification, e.g., calibration, proportion, guideline and base behaviour [2].

C. Structural and Syntactical Approach

Uses symbolic data structures such as strings, graphs, and tree store present recognition pattern. Employs the use of a Modified Direction Feature (MDF) to extract transition locations Appropriate for detecting genuine signatures and targeted forged signatures [3].

III. PROPOSED SYSTEM

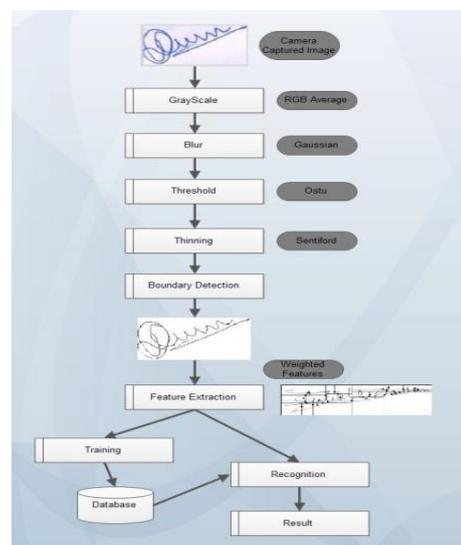


Fig1. Architecture Diagram

The project work is dependent on preprocessing and training of signature image so we have to perform following steps

- Image processing
- Training
- Detection

A. Image Preprocessing

Image processing is any form of signal processing for which input is an image such as a photograph or video frame, the output of image processing may be either an image or a set of characteristics or parameters related to the image.

Most image processing involves creating image as two dimensional signals and applying standard signal processing techniques to it. Image processing usually refers to digital image processing but optical and analog image processing is also possible.

This article is of general technique that applies to all of them. The acquisition of images referred to as imaging. Image pre-processing includes certain steps such as greyscale, blur, threshold and thinning of image.

B. Grayscale

Gray scale digital image is an image in which value of each pixel is a single sample, that is, it carries only intensity information. Images of this sort, also known as black and white are composed exclusively of shade of gray, varying from black at the weakest intensity to white at the strongest.

C. Blur

In blurring, we simple blur an image. An image looks sharper or more detailed if we are able to perceive all the objects and their shapes correctly. This shape of an object is due to its edges. So in blurring, we simply reduce the edge content and make the transition from one colour to the other.

D. Threshold

Thresholding is the simple method of image segmentation. The simplest thresholding methods replaces each pixel in an image with a black pixel if the image intensity is less than some fixed constant or a white pixel if the image intensity is greater than that constant.

E. Thinning

Thinning is morphological operation that is used to remove selected for edge pixels from binary images. It is commonly used to tidy up the output of edge detectors by reducing all lines to single pixel thickness.

F. Training and Detection

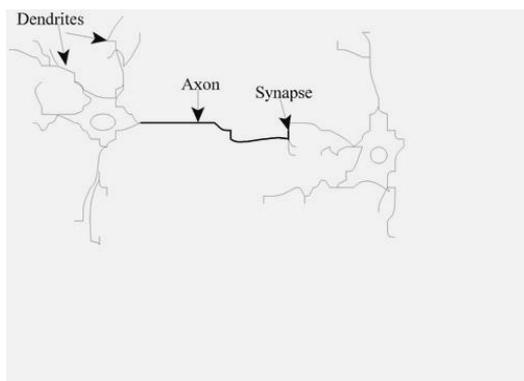


Fig2. ANN Diagram

Training is carried out using ANN. One type of network sees the no dead artificial neurons. These are called artificial neural networks (ANN). An artificial neuron is a computational model inspired in the natural neurons. Natural neurons receive signals through synapses located on the dendrites or membrane of the neuron. When the signals receive are strong enough (surpass a certain threshold), the neuron is activated and emits a signal through the axon. This signal might be sent to another synapse, and might activate other neurons. The complexity of real neurons is highly abstracted when modelling artificial neurons. These basically consist of inputs (Strength of the respective signals), and then computed by a mathematical function which determines the activation of the neuron. Another function (which may be the identity) computes the output of the artificial neuron (sometimes independence of a certain threshold). ANNs combine artificial neurons in order to process information [6].

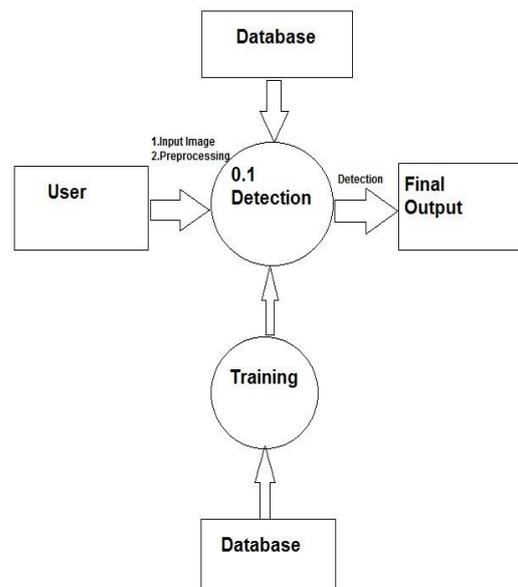


Fig3. Data Flow Diagram

IV. CONCLUSION

This paper presents a method for off-line verification and recognition by using MLP neural network that uses features like BPNN algorithm, FF algorithm, Centroid method and Serialization data base for storing sample signatures which can be extracted by image processing. The neural network was trained using back propagation algorithm. This indicates that our approach and the features are working well with a good optimization of verification of signature.

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