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A Convolutional Neural Network approach for Signature verification

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Abstract - *Signatures are a form of biometric verification technique. Its purpose is to serve as evidence of an individual's consent towards an official document. Proper verification mechanism must be in place to verify signatures and detect any malpractice. Hence there is a need for a robust signature verification mechanism to monitor the authenticity of the signatures. Our approach makes use of Convolutional Neural Networks (CNN) to monitor pixels from an image containing the signature to identify any kind of malpractice and detect and decrease any kind of forgery committed.*

In this project we build a signature verification system using CNN and train it on various shadow, texture, geometric and global features of a user signature to predict whether a given signature is genuine or forged. When a signature is given as input to the model, it will be compared with characteristic patterns of other signatures that fall under the same category. Using feature extraction and comparison we classify whether a given signature is authentic or it is forged.

***Key Words*: Signature verification, Convolutional Neural Networks, Classification, Machine Learning, Forgery Detection.**

1. INTRODUCTION

Signature verification provides a promising way to identify users. When we compare the traditional method of manual verification of signature that is carried out by a human, an automated alternative is more efficient and time saving. Therefore, development of such systems helps many organizations in cutting down costs both in terms of labor and time. Signature verification systems have a huge role in banking sectors to validate genuine signatures. Our System will take an input signature and classify whether it is genuine or not. The intention is to make use of the neural networks approach to build a model capable of performing proper classification. Such a model is built using CNN. By using CNN, we build a model capable of extracting the patterns of an input signature to our convolutional layer and generate a model that has detected the patterns from the datasets. The patterns contribute to proper classification of the signature. Our proposed system will aim to classify signatures efficiently and reduce misclassification.

2. LITERATURE SURVEY-

2.1 Pattern set estimations based on combination of recurring characteristic classifiers

Abstract: The proposed framework uses weights to help us classify the images, all the images are trained with the same characteristic patterns. A system that uses a convolutional learning techniques, uses a combination of images and sliding window characteristics patterns selected from the writing as well as images that contain words without human monitoring.

2.2 Combination of concentric square consisting of characteristic patterns in data

Abstract: A Signature Verification system where combination of concentric square based characteristic patterns, zone-based slope is made in characteristic pattern estimation with Support Vector Machine (SVM) as means of classification. The current method improves upon this approach by making use of CNN to monitor signatures on cheques, thus helping us achieve a similar outcome with a different approach.

2.3 Deep Neural Network approach

Abstract: Intensive research in the field of neural networks proves that it is difficult to train than common learning frameworks. Data obtained from their experiment using modified learning framework proved that even though they are easier than the deep neural networks, they learn and classify our input with very less errors. Hence our approach towards the problem supports overcoming the mentioned issues.

2.4 Evolution of Pattern estimation and Signature Validation

Abstract: The approach introduced a signature verification method using the fuzy logic and gene algorithm methods for classification of the images. It has two approach in its implementation, the Fuzy inference training uses a Gene Algorithm and the signature image validation. We can consider a collection of signatures to identify as a person. After the pattern estimation the images are made to pre-process for further classification. Then we extract all the features. A collection of images having random, skilled and genuine replicas of a signature image and different signatures are used to train the data. Then, the modified

verification system can be used to figure out the valid and authentic signature. The performance of the model depends on the fuzy inference system and its characteristic behavior and relies on the fuzy rule base for proper estimation and classification of the images.

3. PROPOSED SYSTEM-

This project is based on 2-tier architecture with client and server, There are 2 modules converts it to black and white. The image gets cropped and scaled down for extracting the pattern. The Writer independent is trained on signatures to generate a genuine model. The knowledge extracted from the Writer independent is used in Writer Dependent for making accurate predictions. The Writer Dependent model will make use of the knowledge of extracted features from the previous module and classify the image as genuine or forged.

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4.WORKFLOW DIAGRAM-

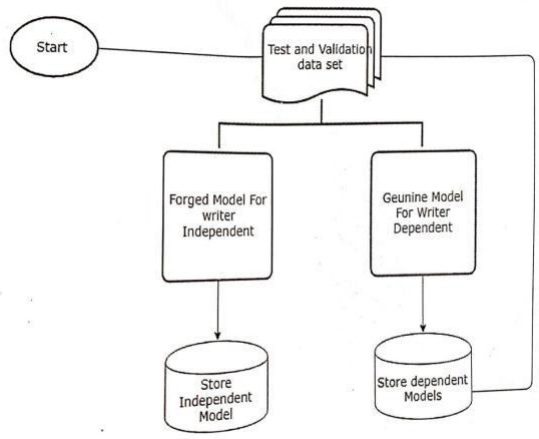

Fig-1 : Workflow Diagram of Signature verification system

5. CONCLUSION-

Our approach towards this problem uses a two-phase framework for pattern estimation. We have used two models namely Writer dependent and independent for proper classification of the images. The approach does not depend on specified patterns but it will make use of the knowledge of the patterns that are previously generated. We experimented on several signature variations on signature verification tasks. Observation was made regarding Convolutional Neural Networks, which does an excellent job of verifying signatures when the model is trained properly.

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