

A Review on Signature and Logo Identification and Extraction using Automatic Logo Based Document Image Retrieval Methods

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Abstract

In Present days we are going with paperless environment for the documentation purpose in order to save the lives of trees. The documents may consists of text, symbols, tables, graphs, logos and signatures and other features also. Out of all these features the signature and logos are having their own unique properties in the areas of verification and authentications.

In this paper we provided a detailed review of all the methods, techniques and algorithms used for the detection and extraction of signatures and logos in the documents from the huge amount of data base from the wireless network area like internet.

Keywords: Signature Detection, Logo Extraction, DT-CWT, RCWF, SIFT, SURF-Canberra Distance.

I. INTRODUCTION

In present days logo detection and signature identifications are playing vital role in almost all the offices where security and secrecy are the main concerns especially the countries like India because these two features of the document are the best ideas for the retrieval of the content information and ownership of the document. As the population is increasing day by day unique identification of a document can be done through the logos and signatures of the authorised person of a particular office.

As AADHAAR providing a unique identification for the persons to identify the logos and signatures should provide the unique identification for the documents like Marks Memoranda, Transfer Certificates and other certificates of the students, Land documents of property holders and other important documents in offices, organization, institutes and other areas like banks and insurance companies where security for the preserved documents is the main criteria for their survival and existence in the present competitive world.

In this paper our aim is to make familiarity with the methods available for signature and logo detection and extraction.

II. BASIC FRAME WORK

The general procedural frame work for the detection and retrieval of signatures and logos consists of Five Primary steps as shown in Figure 1.

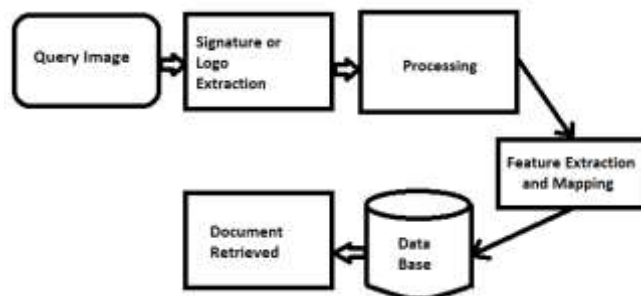


Figure 1: Basic Framework

Step1-Query image: In this step the document consists of signature and logo whose detection and retrieval is required from the large data base will be preserved.

Step2-Signature or Logo extraction: In this step the separation of signature and logo parts from the entire document is done.

Step3-Actual Processing: In this step the actual method through which the signature and logo identification and extraction to be done can be carried out.

Step4-Feature extraction and mapping: In this step the identified signature and logo parts from the document will be extracted to the required level and their mappings in the large data base processes can be taken place.

Step5-Retrieval: This final step gives available documents in the data base to which mapping of signature and logo was carried out. This can be taken as the final output.

III. OCR TECHNIQUE

In optical character recognition technique the signature or the logo image is converted to text first and then the corresponding documents can be retrieved based on the matching of the obtained text in those documents. This method is very best suitable for the applications like digital libraries. The OCR technique is facing the problems for the complex Telugu language type scripts. But this method was very successful in all the English language type scripts.

IV. IMAGE SEGMENTATION

In this method the signature or logo is portioned in to different multiple number of segments based on the similarity between the pixels of the image of signature or logo. The logo may have large number of segments compared with the signatures because a logo may consists of texts, symbols, numerals, seals and graphical content with different colours also.

V.DISCRETE WAVELET TRANSFORM (DWT)

In this method the signature or logo is first taken as different window images each of size M X N as an appropriate trial and then a DWT will be applied onto these windows to calculate the coefficients. After calculating the coefficients the energy and standard deviations of those obtained coefficients will also be calculated to have uniqueness for the retrieval from the various documents where that logo or signature is appears or presents.

VI. SHAPE AND MOMENT INVARIANT FEATURES

In this method the Hu invariant moments (Based on normalized geometrical moments, Hu introduced seven moment invariants) are used to detect the shape of signature and Logo and Euclidean distance, Tangent distance and Hausdorff distances between the pixels will be utilized along with the three classifiers NN, KNN and VSM for the extraction of moment features in the signatures and logos.

VII. SIFT AND SURF ALGORITHMS

The Scale Invariant Feature Transform (SIFT) is an algorithm consists of 4 steps for mapping of portion of the image that is logo or signature in the document. The 4 steps are first finding the spot or localization signature or logo part in the document using difference of Gaussian functions, the second step is neglecting of low contrast portions, third obtaining of local image on the basis of gradients and the last fourth step is the comparison of each key point in the logo or signature based on the centred key point with 4 x 4 sized arrays. The Speed Up Robust Feature (SURF) method is used to speed up the 4 steps SIFT Algorithm using the integral images, Fast-Hessian detectors and box filtering techniques.

VIII. RELATED WORK

Various literature works have been focussed from 1992 to 2009 on Signature and Logo detection and their extraction in document image retrieval process [1] to [19].

In 2009, [20] Guangyu Zhu and David Doermann have focussed on documents retrieval using their approach to detect, segment and matching of logos automatically. They qualitatively evaluated the effectiveness of their approach in the retrieval process of documents using logos detection and extraction.

In 2010,[21,22] Manesh B.Kokare and M.S. Shirdhonkar surveyed the technical achievements for document image retrieval and also discussed the system architecture and they also highlighted the challenges and scope for research in the field of document image retrieval along with a frame work using Discrete Wavelet Transform (DWT).

In 2013,[23] K.Pramod Sankar, R.Manmatha and C.V.Jawahar focussed on a scalable framework for the retrieval of documents using logos detection from a large data base using their approach where Optical Character Recognition (OCR) technique is robust for the languages like Telugu.

In 2014, [24] RemyaRamachandran has done survey on some of the mapping techniques and also discussed their advantages and disadvantages also. And [25] Remya Ramachandran with Andrews Jose compared the results

implemented using both Scale Invariant Feature Transform (SIFT) and Speed Up Robust Feature (SURF) methods for logo matching and recognition.

In 2015, [26] Kuparchi Jivan Dikey done a review to introduce A novel logo detection and localization approach for a new class of similarities. And [27] Shridevi Soma, B.V.Dhandra developed a system to identify the ownership of the document using logo images present in that document using segmentation and combined features of shape and moment invariant descriptors.

[28] M. S. Shirdhonkar and Manesh B.Kokare focussed on presenting an approach for the detection and extraction of logos using combined rotated complex wavelet filters (RCWF), dual tree complex wavelet transform (DT-CWT) and Canberra distance.

[29] Chinnu S Gupta, Umesh.D.Dixit done a survey on methods to give high performance for the detection and retrieval of logos and Signatures. They also highlighted the issues and challenges in document retrieval using signature detection and retrieval area.

[30] Umesh D.Dixit and M.S. Shirdhonkar focussed on detection and extraction of logos and signatures using morphological methods with some limitations.

[31] Sheetala S.C and U.D.Dixit presented a review on logo detection and extraction with some technical achievements.

In 2017, [32] Vajinath V.Bhosle and Dr.Vrushen P.Pawar worked on the originality of Transfer certificates of students along with the display of the college where the student was studied. And they also presented a model to edetect and extract the logos in the documents automatically using the Scale Invariant Feature Transform (SIFT) and Speed Up Robust Feature (SURF) algorithms. In these algorithms they have included the Segmentation, Edge detection, Content Based Image Retrieval (CBIR), thresholding and histogram based techniques.

[33] Umesh D.Dixit and M.S.Shirdhonkar used single and multi-level Discrete Wavelet Transforms (DWT) for the detection and extraction of signatures in the documents automatically. They also compared the results obtained using various distance measures like Euclidian, Canberra, City block, Chebychev, Cosine, Hamming and Jaccard distances. And they also concluded that multi-level DWT features will give better performance with City block distances than the other measures.

IX. CONCLUSION

In this paper all the existing methods for the detection and extraction of signature and logos in documents are reviewed along with their basic operation principles.

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