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Off-Line English Character Recognition with Geometric Discretization

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Abstract - **Recognition rate of handwritten English character is still limited due to presence of large variation of shape, scale and format in hand written characters. The thing that's very difficult to deal with in character recognition is that the handwriting of a person differs from one person to another and considering the human error it is impossible for one person to write the same thing over and over again where it has to be the exact writing. However this is considered individualistic where the consistent individual features are hidden in the character handwriting.**

For that reason this study going to focus on the Off-Line English language characters in order to extract geometric moment's features for the Characters shape of the Handwriting recognition. The geometric moment's features are being completed thoroughly also the presence of solo features will be legitimized by checking and investigating it granularly; therefore the idea of applying the Invariant Discretization.
By injecting the solo performance to the system through the injection of different issues for the solo feature into individual feature or standard performance this is being accomplished by the support of Invariant Discretization.

Where the advantage of the Invariant Discretization to reduce the similarity error for intra-class (of the same character), with the increase of the similarity error for inter-class (of different characters)in recognition of Off-Line handwritten English characters with Fuzzy logic .

Index Terms: Pattern recognition, individual representation, real English character , discretization.

I. INTRODUCTION

The off-line handwriting recognition (OHR) continues to be an active area for research towards exploring the newer techniques that would improve recognition accuracy because several application including mail sorting, bank processing, document reading and postal address recognition require offline handwriting recognition systems. Character recognition is nothing but Machine simulation of human reading [1], [2]. It is also known as Optical Character Recognition. It contributes immensely to the advancement of an automation process and can improve the interface between man and machine in numerous applications. Several research works have been focusing on new techniques and methods that would reduce the processing time while providing higher recognition accuracy. The methods of Character recognition have grown up sequentially [3], [4]. The recognition of isolated handwritten character was first investigated [5], but later whole words [6] were addressed. Most of the systems reported in literature until today consider constrained recognition problems based on vocabularies from specific domain e.g., the recognition of handwritten check amounts [7] or postal address [8]. Free handwritten recognition, without domain specific constraints and large vocabularies was addressed only recently in a few papers [9], [10]. The recognition rate of such system is still low and there is a need of improvement [11].
Where it is well known that character handwriting to be individualistic. So, when writing solo the outcome depends on the hypothesis putting in mind that solo or individual have handwriting (12-13, 14-15). This kind of information gave a big push to the researchers to look for a way to find a solution to character recognition. But it is still stumbling block for the human capability to observe and recognize the styles of the characters. The study implies that what the science stated about character recognition converge on the extraction of the features and classification task. Execrated features from the main task for the writer appear in different representations which degrade the classification performance. However, additional steps need to be performed in order to have a better representation of input prior to the classification task. This study will identify such additional process that can transform the different representations, which are resulted from the feature extraction task, into a better representation of individual features.

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II. Individuality of Off-line English Handwriting Character

Handwriting of English characters has been assumed individualistic, and the individuality of characters is based on the theory that every single character has handwriting that is consistent [16,21,29]. Fig.1 depicts the handwriting of the characters that are the same and Fig.2 depicts the handwriting of characters that are different by four different individuals. Every single character is assumed to have a particular texture [16,21] and maybe witnessed in the two figures. The general shape partially differs for the exact same character and somewhat varies for other characters. This is referred to as the individuality of characters in the English language. The intra-class estimation and measurement is shown for features of the same exact character, and inter-class for different characters. Suitable unique features have to generate the least similarity error for intra-class and the greatest similarity error for inter-class. As a result, it is important to obtain unique features from a character to overcome this issue for the recognition of handwritten characters in the English language.

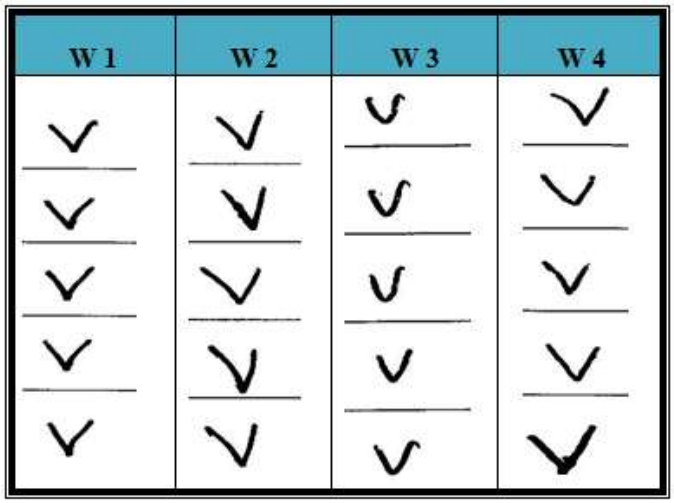

Fig. 1. Same character by different writers.

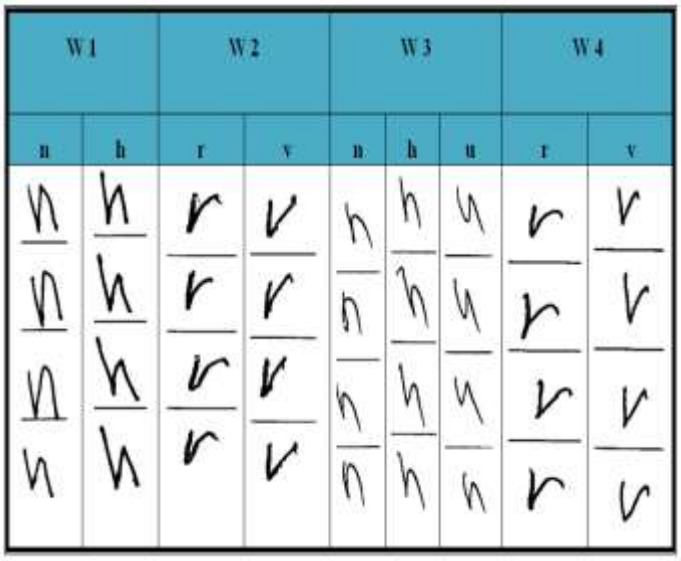

Fig. 2. Different character by different writers

III. Proposed Handwritten Character Recognition System

The creation of the system of Handwritten Character Recognition contains of numerous steps (check Fig. 3). Leading step is towards pre-processing the isolated characters. After that the following step from the isolated characters to extract all the features from it. It is a really significant step. The method of feature extraction obligated to be really in effect and well-organized where it will be the foundation of recognition or what known as the extracted features. The third step the use of the technique of Invariant Discretization based on the previous work done in [17] and it is meant to reduce the variance between features for intra-class and increase the variance between features for inter-class. and lastly these discretization features (extracted features) will after that be delivered by means of input arrangements to the system of Fuzzy logic. Once the Fuzzy logic system has been trained for these input patterns, it will be able to classify them.

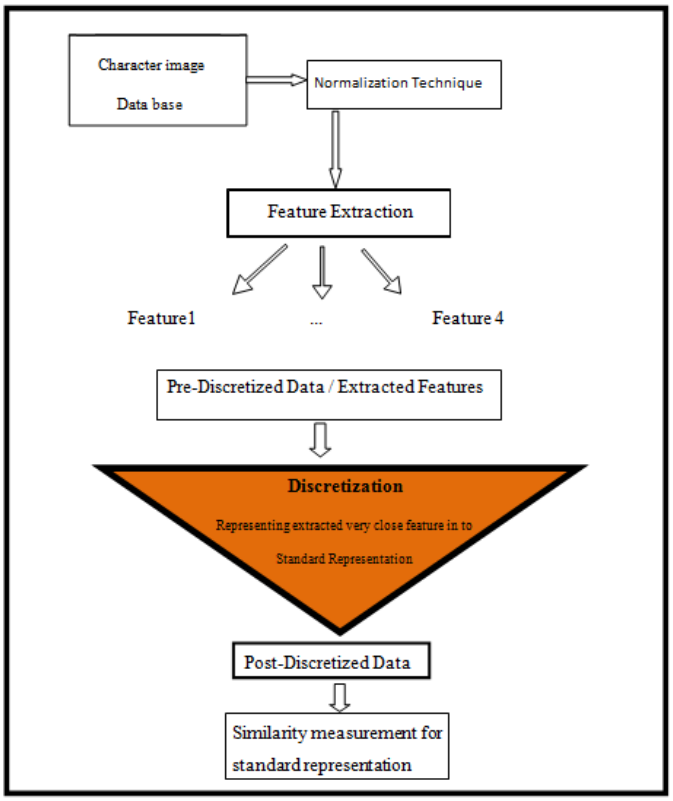

Fig. 3. Framework of discretization for character recognition for a Off-line English handwriting

IV. Discretization Process

Discretization is treating as a divider that performs two essential tasks the first task is to convert the value of the continuous characteristics into discrete. The second task is to divide the value and categorized them into appropriate intervals. The main purpose of the discretization of the continuous characteristics is to have better data representation [18,30]. Classification is highly dependent on the discretization process. There are several known methods for discretization including Equal Information Gain, Maximum Entropy, and Equal Interval Width. Another method proposed in [8], the Invariants Discretization method, has however been proven more efficient in providing higher accuracy and success rates of identification. The Invariants Discretization method is a supervised method. The method starts by searching the

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appropriate intervals to represent the writer's information [14,17,18,19].

The upper and lower boundaries are then set for each interval. The number of intervals for an image must be the same as the number of the feature vectors.

V. Adaptation in off-line English handwriting character recognition

This section describes adaptations of the proposed solution in illustrating individual features and improving the variance between features for intra-class and inter-class in off-line English character recognition.

V.1 Pre-Processing Phase

Pre-processing of an image need to be done in order to prepare the image before the features can be extracted. Fundamentally, it should start by normalizing all the images of samples into the typical dimension of 30 × 30 pixels. Then applying the technique of binarization to the normalized samples with the aim of being able to procedure the samples, considering that the images contain of two colures the black bit color (0) or the white bit (1). The preceding technique is vital on behalf of the approaching processes having the extraction of the stroke feature to be functional merely on the images of binary. The Figures of 4 and Figure 5 demonstrate the values of binary acquired by the characters input.

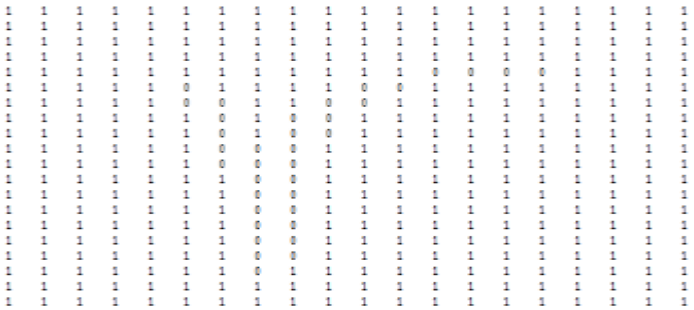

Figure 4: Binary value for Character (r)

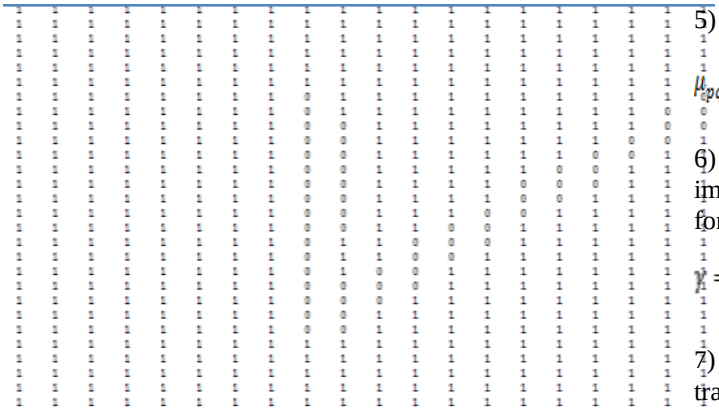

Figure 5: Binary value for Character (v)

Algorithm of Discretization

```
For each writer {
    Min = min feature; Max = max feature′
    No_bin = no_feature_invariant;
    Interval = (Max – Min)/No_bin;
    For each bin {
      Find lower and upper value of interval;
      Rep Value = (upper–lower)/2;
    }
    For (1 to _feature_invariant) {
      For each bin {
      If (feature in range of interval)
        Dis_Feature = Rep Value′
       }
      }
}
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The computation steps of geometric moments are described as below [21,24]:

1) Read an input image data from left to right and from top to bottom.

2) Threshold the image data to extract the target process area.

3) Compute the image moment value, m_{pq} until third order with formula:

$$m'_{pq} = \int\int_{\delta} (x')^p (y')^q f'(x',y') dx' dy' \quad ; \quad p,q = 0,1,2,.... \qquad (1)$$

4) Compute the intensity moment, (x_0, y_0) of image with formula:

$$x_0 = m_{10}/m_{00}; \quad y_0 = m_{01}/m_{00} \qquad (2)$$

5) Compute the central moments, μ_{pq} with formula

$$\mu_{pq} = \iint_{\delta} (x - x_0)^p (y - y_0)^q f(x,y) dx dy \; ; \quad p,q = 0,1,2 \ldots \qquad (3)$$

6) Compute normalized central moment, η_{pq} to be used in image scaling until third order with formula:

$$\gamma = \frac{(p+q+2)}{2}, \quad \eta_{pq} = \frac{\mu_{pq}}{\mu_{00}^{\gamma}} \quad , \quad p+q \le 3 \qquad (4)$$

7) Compute geometric moments, Φ_1 0 to 0Φ_4 with respect to translation, scale and rotation (geometric moment invariants) invariants with formula below:

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$$\Phi_1 = \eta_{20} + \eta_{02} \quad (5)$$

$$\phi_2 = (\eta_{20} - \eta_{02})^2 + 4\eta_{11}^2 \quad (6)$$

$$\phi_3 = (\eta_{30} - 3\eta_{12})^2 + (3\eta_{21} - \eta_{03})^2 \quad (7)$$

$$\phi_4 = (\eta_{30} + \eta_{12})^2 + (\eta_{21} + \eta_{03})^2 \quad (8)$$

V. 3 INVARIANTS DISCRETIZATION PROCESS

A suitable set of interval to represent the extracted features with a representation value is calculated in the discretization process. This representation value is called a discretized feature vector, where the "generalized unique feature" of individual features is obtained from the median of an interval. This generalized feature is used to illustrate the individual feature that is hidden in the individual character of off-line English handwriting. To acquire an interval, the range of minimum and maximum data of each writer is divided into a number of interval (cuts) with an equal size. The number of interval is defined based on the number of feature vector columns in the extracted features. As in the example, four feature vector columns are obtained from the geometric feature technique. Lower and upper approximation is given to the each interval, and each of the intervals is represented by one representation value. The invariant feature vector that falls within the same interval will have the same representation. The representation value for an interval is calculated based on the character class (supervised discretization). If two characters have a close or similar invariant feature vector, they will have the same or quite similar interval (cuts) for these two classes. The Discretization algorithm does not change the information or characteristic of character. It just represents the original extracted invariant feature vector in a standard representation with generalized features. The discretization algorithm for process is as presented here [21,25].

For characters each element is calculated like cuts and intervals. So it can be recognized because each one has its own style and it is unique to keep the characteristics features are saved and it have its own meanings. Features can be discredited to give more meaning for it and to be clear to understand, so to have a match for this concept each characters class should have an evaluation alone to have the right calculation, more details for invariants are in [19,14]. To see the transforming for the invariant vector to discredited feature vector go to Figure 6 and 7.

-5.0995	32.8712	66.0584	0.2161	h
-5.0297	30.0317	84.1113	0.0371	h
-4.9527	29.6248	112.626	0.2478	h
-5.5489	39.5976	105.192	3.5101	h
-5.5823	41.1720	188.331	2.4801	h
-5.4618	38.4310	89.7734	0.9567	h
-5.3947	36.6550	47.6791	1.6475	h
-5.0140	30.3710	7.0963	0.5946	n
-5.2929	34.6281	34.6722	0.4243	n
-5.5720	38.9690	67.6508	6.1904	n
-5.2162	33.5746	44.3877	0.3457	n
-5.2638	34.7578	45.9967	0.1476	n
-5.4938	37.7002	65.0098	3.5468	n
-5.4380	36.7971	55.7999	2.5360	n

Fig. 6 Invariant Feature Vector Data for Character (h) and (n)

The discretized feature vector obtained from the discretization algorithm clearly illustrates the individual features (unique feature) of each character in Kurdish handwriting.

18.6569	18.6569	67.1352	18.6569	h
18.6569	18.6569	67.1352	18.6569	h
18.6569	18.6569	115.6136	18.6569	h
18.6569	18.6569	115.6136	18.6569	h
18.6569	18.6569	164.0919	18.6569	h
18.6569	18.6569	67.1352	18.6569	h
18.6569	18.6569	67.1352	18.6569	h
3.5809	21.8866	3.5809	3.5809	n
3.5809	40.1923	40.1923	3.5809	n
3.5809	40.1923	58.4980	3.5809	n
3.5809	40.1923	40.1923	3.5809	n
3.5809	40.1923	40.1923	3.5809	n
3.5809	40.1923	58.4980	3.5809	n
3.5809	40.1923	58.4980	3.5809	n

Figure 7: Example of Discretized Feature Data for Character (h) and) (n)

V. 4 CLASSIFICATION PHASE

Applying the Fuzzy logic at the Character of off-line English handwriting to acquire the exact outcome for this study. The classification of Fuzzy logic require some distance within the Character of off-line English handwriting at the exact time attempts towards diminishing the inaccuracies of misclassification. Fuzzy logic was recognized on 1965 [26-27], according to Lotfi A. Zadeh. Its elementary indication is a multivalued sense it permits the values of the intermediate to be determined among the evaluation of conventional as yes/ no, true/ false, high/ low, etc. Philosophies that can be fast to be articulated arithmetically then also applied to the computers programs with the intention of spending additional human like approach [28]. Regulating and shifting the system through Fuzzy logic exclusively with the developments of complex or industrial. Furthermore to perform with a professional structure and application resembling the classification of SAR data. Two different experiments have been made with different number of training and testing data. In the first one used 70% training and 30% testing data from a combination of Un-discretized and discretized datasets. The second one used 60% to 40%. Fuzzy logic got the process of training by using a matrix of classification, and the overall accuracy was calculated for each the training and testing data. The result for them summarized in (Table 1 , Table-2) and (Fig 8, Fig 9) shows the results of recognition between some similar characters.

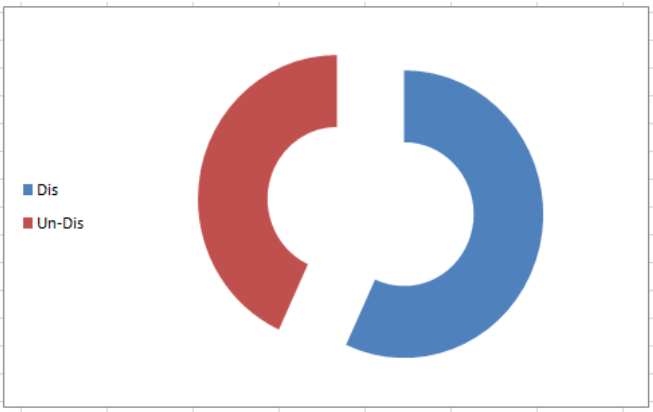

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Figure 8: Visualization of Divergence Level between Un-Discretized and Discretized off-line English Characters Datasets for all Data Training and Testing

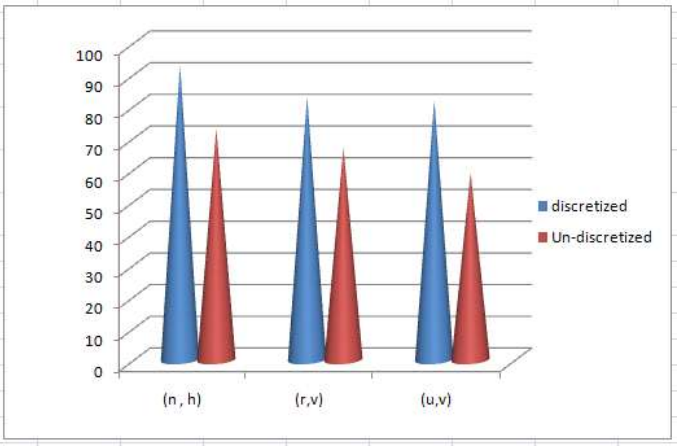

Figure 9: Visualization of Divergence Level Between Un-Discretized and Discretized off-line English Characters Datasets for all Data Training and Testing

Table 1
Over all Comparisons of Hand Written Character Rates with Different Training and Testing Datasets with Fuzzy Logic

Technique	Accuracy (%) 60% Training Data 40% Testing Data	Accuracy (%) 70% Training Data 30% Testing Data	Datasets
Fuzzy Logic	65	67	Un-Dis
	87	84	Dis

Table 2
Comparisons of Recognition Rates with Different Training and Testing Datasets with Fuzzy Logic

Technique	Characters	Accuracy (%) 60% Training Data 40% Testing Data	Accuracy (%) 70% Training Data 30% Testing Data	Datasets
Fuzzy Logic	(h,n)	76	71	Un-Dis
	(h,n)	90	96	Dis
	(v,u)	57	60	Un-Dis
	(v,u)	88	75	Dis
	(r,v)	64	71	Un-Dis
	(r,v)	83	82	Dis

VI. CONCLUSION

Here's a new outline for the determination of distinguishing the off-line English Hand Written Character. Demonstration of the properties of the discretization process. An investigation has been positively accompanied with the use of the suggested outline. The individual features in the Hand Written Character can be thoroughly signified through the use of the algorithm of invariants discretization. The consequences expose that with the practice of the invariant discretization approach, the exactness of the Character Recognition of off-line English Hand Written is meaningfully better-quality with the general arrangement to get improved accuracy paralleled to pre-discretized information. In future the comparable experimentation can be verified for supplementary characters to increase the correctness of the machine.

VII. REFERENCES

[1] U. Bhattacharya, and B. B. Chaudhury, "Handwritten numeral databases of Indian scripts and multistage recognition of mixed numerals", IEEE Trans. Pattern analysis and machine intelligence, vol. 31, No. 3, pp. 444-457, 2009.

[2] U. Pal, T. Wakabayashi and F. Kimura, "Handwritten numeral recognition of six popular scripts", Ninth International Conference on Document Analysis and Recognition, ICDAR07, Vol.2, pp.749-753, 2007.

[3] V. K. Govindan and A. P. Shivaprasad,"Character Recognition A review", Pattern recognition, vol.23, no.7, pp.671-683, 1990

[4] J. Pradeep, E. Srinivasan and S. Himavathi, "Diagonal Based Feature Extraction for Handwritten Alphabets Recognition System Using Neural Network", International Journal of Computer Science and Information Technology (IJCSIT),, vol. 3, no. 1, pp. 27-38, Feb 2011.

[5] C. Suen, C. Nadal, R. Legault, T. Mai, and L. Lam, "Computer recognition of unconstrained handwritten numerals", *Proc. IEEE* , 80(7):1162-80.

[6] J. C. Simon , "Off-line cursive word recognition", *Proc. IEEE* , 80(7):1150-61.

[7] S. Impedovo, P. Wang and H. Bunke,editors, *Automatic bank check processing*, Singapore: World scientific; 1997.

[8] S. Srihari,"Handwritten address interpretation: a task of many pattern recognition problems", International Journal of Pattern Recognition and Artificial Intelligence, 2000; 14:663-74

[9] G. Kim, V. Govindaraju, and S. Srihari, "Architecture for handwritten text recognition systems",International Journal on document Analysis and Recognition (IJDAR), vol. 2, pp. 37-44, 1999.

[10] U. V. Murti, and H. Bunke, " Using a statistical language model to improve the performance of an HMM-basis cursive handwriting recognition system", International Journal of Pattern Recognition and Artificial Intelligence, 2001;15:65-90.

[11] S. Gunter, and H. Bunke, "Off-line cursive handwriting recognition using multiple classifier systemson the influence of vocabulary, ensemble, and training set size", Optics and Lasers in Engineering, vol. 43, pp. 437-454,2005.

[12] Srihari, S. N., Huang, C., Srinivasan H. and Shah, V. A. (2006). "Biometric and Forensic Aspects of Digital Document Processing", Digital Document Processing, Springer, pp. 379-405.

[13] SN Srihari, Computational methods for handwritten questioned document examination. Ph.D. U.S. Department of Justice, 2010.

[14] B. O. Mohammed , S. M. Shamsuddin , Improvement in twins handwriting identification with invariants discretization , EURASIP Journal on Advances in Signal Processing 2012, 2012:48 doi:10.1186/1687-6180-2012-48

[15] Bayan Omar Mohammed and Siti Mariyam Shamsuddin, Feature Discretization for Individuality Representation in Twins Handwritten Identification, Journal of Computer Science 7 (7): 1080-1087, 2011, ISSN 1549-3636, © 2011 Science Publications.

[16] Bayan Omar Mohammed , (2012). ' Uniqueness in Kurdish Handwriting', International Journal of Engineering & Computer Science IJECS-IJENS Vol:12 No:06 , pp:42-50.

[17] AK Muda, SM Shamsuddin, A Ajith, "Improvement of Authorship Invarianceness for Individuality Representation in Writer Identification". *Neural Netw. World* 3(10), pp. 371-387 (2010).

[18] Fabrice Muhlenbach and Ricco Rakotomalala, (2005). Discretization of Continuous Attributes. In John Wang (Ed.) Encyclopedi,a of Data Warehousing and Mining, pp. 397-402.

[19] Bayan Omar Mohammed and Siti Mariyam Shamsuddin,(2011). Feature Discretization for Individuality Representation in Twins Handwritten Identification, Journal of Computer Science 7 (7): 1080-1087, 2011, ISSN 1549-3636, Science Publications.

[20] ID. Trier and AK. Jain. (1996). Feature Extraction Methods for Character Recognition- A Survey," Pattern Recognition, vol. 29, no. 4, 641- 662.

[21] Bayan Omar Mohammed , (2013). HANDWRITTEN KURDISH CHARACTER RECOGNITION USING GEOMETRIC DISCERTIZATION FEATURE , Volume 4, Number 1 , January-June 2013 pp. 51-55.

[22] H. Takahashi (1991). A Neural Net OCR using geometrical and zonal pattern features. In Proc. 1th. Conf. Document Analysis and Recognition, 821-828.

[23] K. Azmi, R. Kabir and E. Badi ,(2003). Recognition Printed Letters wit Zonong Features. Iran Computer Group, vol. 1, 29-37.

[24] R.Muralidharan,C.Chandrasekar,(2011) . Object Recognition using SVM-KNN based on Geometric Moment Invariant , International Journal of Computer Trends and Technology , ISSN: 2231-2803 , pp. 215-219.

[25] Anil K. J., Robert P. W. and Jianchang, D. M. (2000). Statistical Pattern Recognition: A Review, in *Proc. 4th IEEE Trans on Pattern analysis and Machine intelligence*, 22, 4-37.

[26] L.A. Zadeh, Fuzzy Sets, *Information and Control*, 1965 .

[27] L.A. Zadeh, "Fuzzy Algorithms", *Info. & Ctl.*, **12,** 1968, pp. 94-102.

[28] L.A. Zadeh, "Making Computers Think Like People", *IEEE. Spectrum*, 8/1984, pp. 26-32.

[29] Bayan Omar Mohammed , (2015) . Individuality Representation in Character Recognition , Vol. 1 , No. 2 , April 2015 , pp. 300-305.

[30] Bayan Omar Mohammed , (2015). 'Individuality Representation in Character Recognition, Journal of University of University of Human Development, Vol:01 No:02 , pp:300-305.

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2) ***Bayan Omar Mohammed*** *& Siti Mariyam Shamsuddin. 2012. Improvement in twins handwriting identification with invariants discretization. Springer Open , EURASIP Journal on Advances in Signal Processing 2012, 2012:48 doi:10.1186/1687-6180-2012-48 (Impact Factor: 1.01).*

3) ***Bayan Omar Mohammed****. 2012. Uniqueness in Kurdish Handwriting. International Journal of Engineering & Computer Science 1218206-7575-IJECS-IJENS ©December 2012 IJENS, Vol:12 No:06 PP:42-50(Impact Factor:0.44) .*

4) ***Bayan Omar Mohammed.*** *2013. HANDWRITTEN KURDISH CHARACTER RECOGNITION USING GEOMETRIC DISCERTIZATION FEATURE. IJCSC .Volume 4 • Number 1 • January-June 2013 pp. 51-55 (Impact Factor:0.47) .*

5) ***Bayan Omar Mohammed*** *, (2015). 'Individuality Representation in Character Recognition, Journal of University of University of Human Development, Vol:01 No:02 , pp:300-305.*

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INTERNATIONAL JOURNAL PUBLICATIONS

1) Zana Azeez Kakarash , Hoger Mahmud Huseen and Mazen Ismaeel Ghareb. **An Investigation into News Webpage interface Design in Kurdistan Region of**

Iraq. Second International Scientific Conference held by the University of Human Development 2015.

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2) *I work on Archiving System from my project to create small System by Oracle 10g and Form Builder for computer science department.*
3) *My MSC project working on Title (Sales Analysis implemented by KDD and Data Mining) .*
4) *For one year working in private sector (Fanoos telecom).*
5) *Now I am Teacher in University of Human Development.*

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