Design of Digital Signature Verification Algorithm Using Relative Slopemethod

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Abstract: In the era of growing technology, security is theMajor concern to avoid fakes and forgeries. There are variousBiometric systems which help in personal identification, amongstthose verification systems, one system is Signature VerificationSystem, Signature is a behavioral biometric. It is not based onFigure print or face like physical properties, according to the dataavailable in the input signature verification split into two part.. Online and Offline. It also referred as static and dynamic.Signature verification also used to provide authentication to user.The main advantages of signature verification are that it usedfor e-business which helps in banking applications. The proposedpaper present review of various techniques of digital signatureVerification and also various algorithms for signature verification.

Keywords: Segmentation, Hidden Marko Method, Offline signature algorithm, online signature algorithm, Support Vector Machine. Relative slope algorithm

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1. INTRODUCTION

Human usually recognize each other by various ways like their voice when we speak them, by their eyes when we meet them.To achieve more reliable information for verification and identification we should use something that really recognize given person signature verification is one in that .Signature verification techniques utilize many different characteristics of an individual's signature. in order to identify that individual The advantages of using such an authentication techniques are:Signatures are widely accepted by society as a form of identification and verification.. Information required is not sensitive .Forging of one's signature does not mean a long-life loss of that one's identity .The basic idea is to investigate a signature verification technique which is not costly to develop, is reliable even if the individual is under different emotions, user friendly in terms of configuration. In signature verification application, the signatures are processed to extract features that are used for verification. There are two stages called enrolment and verification.Two types of signature verification are:
Offline and online signature based on data available in the input.

Offline signature (static): the input of offline signature verification is the image of signature and is useful in automatic verification signature found on bank check and account

Online (Dynamic): Signatures that are captured by data acquisition devices like pressure-sensitive tablets and webcam that extract dynamic features of a signature in addition to its shape (static), and can be used in real time applications discredit card transactions, protection of small personal devices (e.g. PDA), authorization of computer users for ccessing sensitive data or programs, and authentication of individuals for access to physical devices or buildings. In the point of view of adaption in the market place, signature verification presents three likely advantages over other
biometrics techniques. First nowadays it is a socially accepted verification method already in use in banks and credit card transaction. Second, it is useful for most of the new generation of portable computers and personal digitl assistants (PDAs) use and writing as the main input channel. Third, a signature may be changed by the user. Similarly to a password while it is not possible to change finger prints iris or retina patterns. section 2 present literature review of the project .section 3 present proposed system,propoed architecture of the project. section 4 represent methodology ,algorithm used for proposed,section 5 represent
result/analysis of the project and section 6 represent references for the project.

2. LITERETURE REVIEW

S.Srihari. K. M. Kalera. And A. XU [1], proposed a system which represent Hidden Markov model is one of the widely used modelsfor sequence analysis in signature verification techniques. Using optimized HMM we can calculate the segment of the signature. It also gives less error rate than other(18.4%).

H. S. Sridhar and M. Beall [2], suggested that It extracts the set of feature representing the signature which provide different sample from several sample. 2nd step is for NN to learn the relationship between signature and its class either genuine or forgery. The proposed system highly suitable for global aspect of handwritten signature.

S.Srihari. K. M. Kalera. And A. XU [3],present a system the gives idea about Proposed method used two techniques based on template matching. one of them is depend on the optimal matching and the other based on the elastic matching. The proposed system tested both the binary and gray signature every time.

Martinez, L.E., Treviso, C.M, Alonso, J.B., and Ferrer,M.[4] suggested that The proposed system uses global directional and grid features of the signature and SVM for classification and verification. Support vector machine used various techniques like **Lcss-Global And Lcss-Local**. Lcss is nothing but local common subsequence used to find the approximate value of verified signature.

3. PROPOSED SYSTEM:

3.*1Proposed approach*:

This project proposes a new algorithm slop calculation for online pen input signature verification .The algorithm considers writer's signature in the form of slopes which evolves, over time. So that is dynamic The working of process is like, the slope value of input signature which is already present in database and the slope value of signature taken by the digital pen is match. If the slope value match unto some approximation (i.e. approximate value decided by user, like 8o%, 70%), then the signature will be genuine otherwise forgeryThe verification phase, the scheme computes a difference between the slope value of signature which is already store in database and the current slope value of the pen input. Care needs to be taken in computing the difference function because the length of the input signature different from that of the digital signature even if the signature is genuine. If the computed difference does not exceed a threshold value, the input signature is predicted to be genuine; otherwise it is predicted to be forgery. System uses various parameters to match both the signature. like, threshold value, time of signing, speed of signing ,pen pressure etc. The system take various stage to verify e signature like data acquisition, prepossessing, feature extraction, relative slope extraction, two tier time metric extraction vie**w**

3.2 Proposed Architecture:

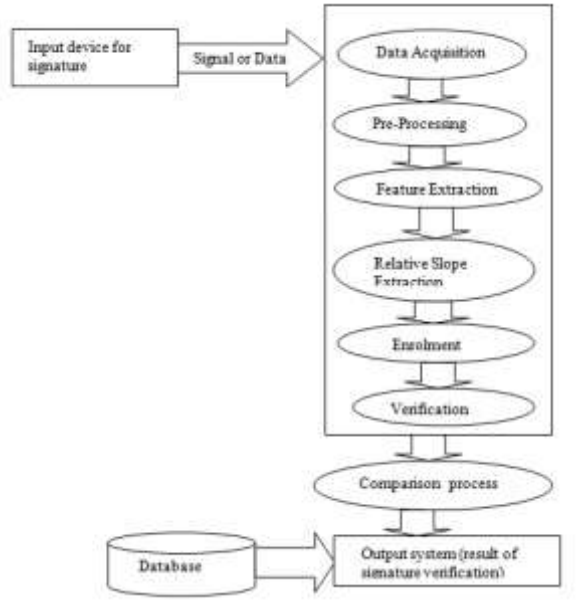


Fig: General Overview Of System

4. Methodology:

4.1 Modolous:

1) ***Database Module:***

The first database module used to sore and represent all the slope value in the database form. In this module first system takes the signature through digital pen and pad .This signature get store in database with all the values like slope value ,theta value ,vector in the form of matrix, Eigenvector etc .System use dataset of vb.net to store the value.

2)***Relative Slope Algorithm.***

In this module system calculate all the slope value of the store signature. This module helps to calculate all the parameters of the signature like pen pressure, threshold value ,time ,speed etc of the signature. This algorithm use optimized HMM method to calculate other values like slope of line, perpendicular, intersection, centroid of the circle etc.

3)***Comparison Module****:*

This is the lat module of the project .this module shows the comparsion between two images or signature done by the pen .the comparision done by various parameter like pen pressure ,location, threshold value, speed and time of the signature and if the both signature matches upto the mark or upto particular percentage then signature is genuine otherwise forgery.

4.2 Relative slope algorithm:

Steps:

1) Preprocess and normalize the algorithm.

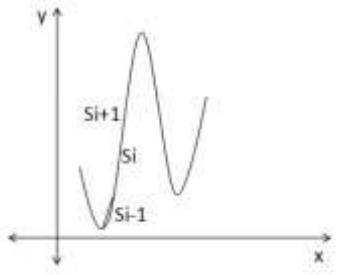
2) Divide the signature into segment using optimized HMM method.

3) Based on requirement combine these segments into line segment.

4) Calculate the relative slope value of each segment with respect to previous segment.
5) Carry step (4) till all segment are processed else step (6).
6) Store the slope value of each segment which can be used for verification.
7) End

Using relative slope algorithm we can minimize the time and maintenance cost.For this purpose the system is classified in below

1) Data Acquisition
2) Preprocessing
3) Feature Extraction
4) Relative slope Extraction
5) Two tier time metric extraction
6) Signature alignment and enrollment
7) Verification



Here Si**: =slope of segment i with respect to previous segment i-1**.

Example: The Fig. Shows the Part of Signature

1)Using optimize HMM we can calculate the segment of the signature. Then segment can be combine to form a line segment.
2) After the line segment are obtained the relative slope are calculated.
3) Slope of line:**S=dy/dx**
Where :dx=x2-x1 dy= y2-y1
4) For the first segment we calculate the slope between the starting point of the first segment and the ending point of the last segment
5) however, the for the further line segment the slope is calculated based on the previous line segment
In the first step global time required to put the signature and calculate.
6)The second step used to calculate the length of signature completed in unit time for this two tier time metric extraction algorithm is used .
7)And finally in verification step two level verification algorithm used in first level of verification relative slope value compare with previous value
8)And the second level extract the global and local features consisting of relative slope value, total length and global time.
if the signature passes the second level of verification it considered as genuine signature

4.3Contribution:

Before using the method ,the accuracy and some parameters like thershold value ,pen pressure, speed, time of signature was not upto the mark but after using new this method with new concept and design method the project gives more accuracy, threshold value ,pressure all are improved and gives approximate or s
atisfied result of the project

5.RESULT /ANALYSIS

In this chapter, first the snapshot of implemented modules are shown and then result and discussion is carried out. Result section shows the graph taken by using various parameter like time and pressure, x and y movement of the pen and time and accuracy and speed which is the final graph of the project that also include old and new database of the signature. Result also shown comparisons graph on which basis the system can conclude that whether the signature of particular person is forgery or genuine.

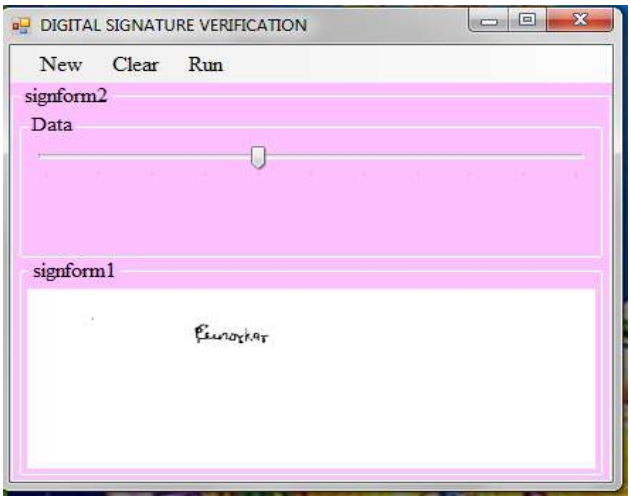


Fig 5.1: Fig Shows the Signature Taken By the Pen 1st Time

As the project based on the comparison between two signature. i.e. 1st signature which is already stored in the database and when person came next time he again sign. The above graph shows 1st time signature which is already stored in the database.

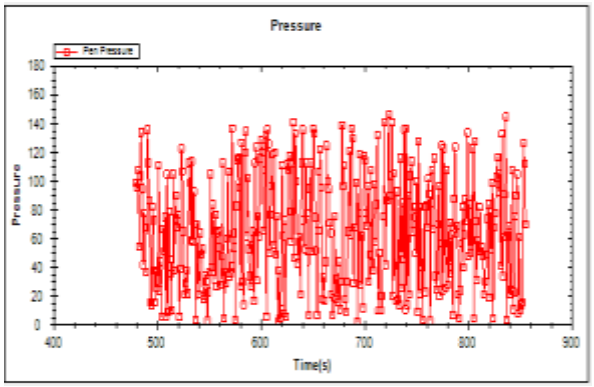


Fig 5.2: Graph shows pressure and time applied by the pen.

The above graph shows some of the parameter of the project. It includes parameter like pressure versus time measured by thepenwhen usersign 1st time.

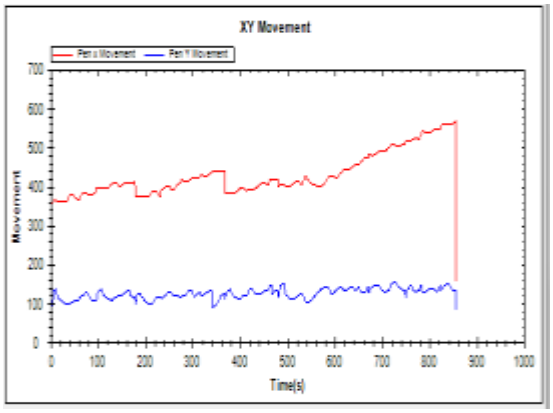


Fig5.3: Graph Shows XY Movement Applied By Pen

The above graph shows another parameter measured by the pen i.e. XY movement of pen when signature taken by 1st time by pen.

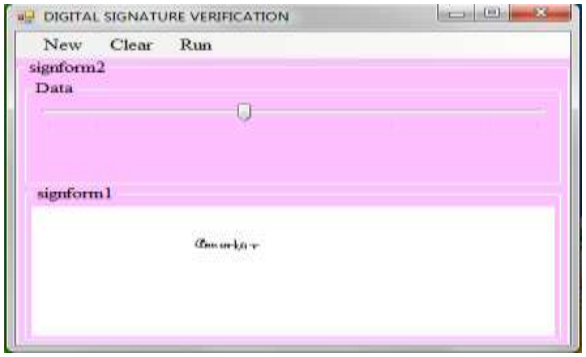


Fig 5.4: Fig Shows the Signature Taken By the Pen 2nd Time

As the project based on the comparison between two signature. The above fig. shows the signature taken by the pen when user comes 2nd time

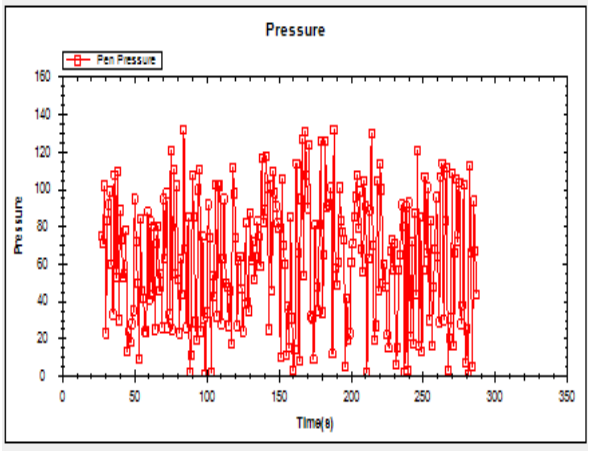


Fig 5.5. Graph Shows Pressure Vurses Time Applied By The Pen

As system compare two signature so the above graph shows the pressure and time applied by the pen 2nd time when signature taken by the pen.

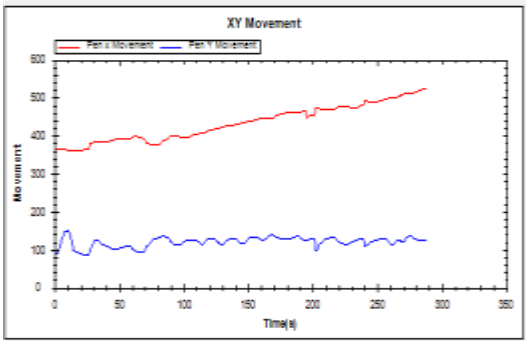


Fig 5.6. Graph Shows XY Movement Measured By The Pen 2nd Time

The above graph shows XY movement and time taken by the pen when signature taken by pen 2nd time

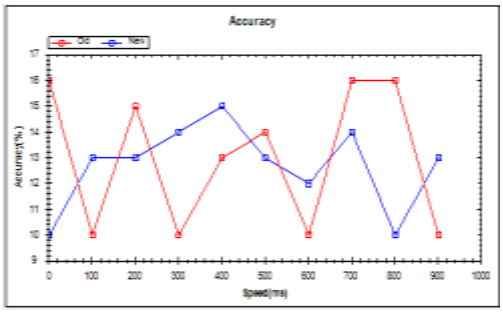


Fig 5.7: Graph Shows Comparison Of Two Graph

The above graph shows the comparison between old and new graph i.e. comparison between two signature taken by the pen. .if the signature taken by the pen matches up to some percentage (i.e. approximate up to 80% in this) then it is valid i.e. genuine otherwise forgery signature.

Fig4.8: Message Box Shows The Matching Percentage Between Two Signature

The above fig shows the message box which gives the matching percentage between two signatures. The above signature matches up to 90% means it is genuine.

Fig 5.9: Picture Box Shows The Image Of The Signature

The above fig. shows the picture box containing images of the signature done by the user. In that old signeture is already stored signature in database and
new signature done by user when he came next time.

5.2 CONCLUSION:

As there are various techniques for digital signature verification. The developed system uses Relative Slope Algorithm and Gaussian Elimination Method to verify the signature because both the technique gives more accurate result than other (more than 80%).The efficiency and accuracy of matching signature is more perfect and accurate in less parameter than other. With the help of above developed system the chances of forgery become less.

REFERENCE

[1] Tahura Bijapure 1, Suchita Rane 2, Sumaya Shaikh 3, Fatima Anees Ansari 4,"Dynamic Signature Recognition", International Journal of Engineering Research & Technology (IJERT) Vol. 2 Issue 9, September – 2013 ,ISSN: 2278-0181.

[2] Diana Kalenova"Personal Authentication Using Signature Recognition" Department of Information Technology, Laboratory of Information Processing .

[3] Sudarsha Madabashi,Vivek Shriniwas,"Online Offlinesignature verification using relative slope algorithm." international workshop on measurement system IEEE, March2005.

[4] Renu Bhatia , "Biometrics and Face Recognition Techniques", International Journal of Advanced Research in Computer Science and Software Engineering,Volume 3, Issue 5, May 2013 Issn: 2277 128x.

[5] S.Srihari.K.M.Kalera.AndA.XU,"Offline Signature Verification and Identification Using Distance Statistics, "International Journal of Pattern Recognition And ArtificialIntelligence, vol. 18, no. 7, pp. 1339–1360, 2004.

[6] H S. Sridhar and M.Beall, "Signature Verifications Using Kolmogron Smirnov Statistic, "Proceedings of internationalGraphonomics Society, Salemo Italy, pp. 152–156, June, 2005.

[7] R.L. Rivest, A. Shamir, And L. Adleman, "A Method for Obtaining Digital Signatures and Public-Key Cryptosystems"

[8] Ashwini Pansare, shalini Bhatia,"Handwritten Signature Verification using Neural Network," International Journal of AppliedInformation Systems (IJAIS)–ISSN:-2249-0868

[9] Ming Meng, Xugang Xi, Zhizeng Luo, "On-Line Signature Verification Based On Support Vector Data Description And Genetic Algorithm" Proceedings of the 7th World Congress on Intelligent Control and Automation June 25 - 27, 2008, Chongqing, China.