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IMPLEMENTATION OF ONLINE SIGNATURE VERIFICATION USING MATLAB AND GSM

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ABSTRACT

Online signature verification using MATLAB and GSM is based on the simulations in MATLAB and mobile devices. We introduce a effective method for online signature verification. An online signature is computed in linear time. The resulting signature template is compact and requires same space. This has been verified over a set of images. The results show that the performance of the proposed technique is similar and often higher level to state-of-the-art algorithms despite its simplicity and efficiency. In order to verify the proposed method on signatures on camera devices, a data set was collected from an uncontrolled environment and over multiple periods. Experimental results on this data set confirm the effectiveness of the proposed algorithm. The results demonstrate the problem of within user variation of signatures over multiple sessions.

Keywords: signature verification, biometrics, skilled forgeries, density pixels, deep training.

1. INTRODUCTION

Handwritten signatures are socially and legally accepted in our day to day life. These are used as traits for the biometrics based on each person. Until today typically there are mainly two types of verification systems for handwritten signatures. They are online signature verification and offline signature verification. and Offline method explains about the methods of template aging, feature extraction, segmentation, pre-processing, data set images similarity measurements. But they are useful only in cases of small scale verifications such as schools, colleges and other places. But considering the projected view of very large scale usage of this method we can implement it in the places of banks, passport verifications and highly authorized places. That is why we are proposing a few methods in the implementation of online signature verification. Basically the forged signatures are classified into two types. They are either free hand or skilled. Freehand signatures are done randomly or lethargically without any interest. They are generally easily to identify with naked eye on practice. Skilled method consists of tracing. In the existing system verification process is obtained from traditional data sets. We will be collecting all the signatures from a place such as banks and maintain a database for all the signatures. There are two types of databases. They are MCYT-100 and SUSIG datasets. In the existing system we first give a input image then it receives the image it divides the image into x and y co-ordinates and then pre-processing is done. An image can be processed adoptically or digitally using a computer. Pre-processing is basically the term for operations on images at the lowest level of concept. It can be based on colour or gray level techniques. After the pre-processing segmentation is done which means decomposition of the scene into different components. Then the features are extracted from the signature to perform the information packing, dimension reduction, salience extraction, and noise cleaning. In the proposed system we are implanting the ARM controller based on the simulations in MATLAB by connecting a camera to the personal computer such that we get a message through the GSM technique. We are using the GSM to verify the signature with the respective person by sending a message to the persons personal mobile number that is stored in the database along with his account.

ARM-acorn risc machine is being used for the proposed system by using a 32 bit microcontroller. The main idea of using a ARM controller is that we can use it in the real time. It contains 37 registers and it is 32 bit longer. Then the key concept in the system is GSM technology. GSM means global system for mobile communication. It I an external device connected to a pc by a serial cable. The main advantage of using this technology is that we can locate the associated person globally anywhere in the world and we can pass on the information. It can send the message signals and can monitor the signal strength.

The transmission of data in computers is done in two ways namely serial communication and parallel communication. The usage of serial communication is for the very fast communication through the controllers. For short distance transfer there is no use of modulators but for the long distance communication we must use the modems.
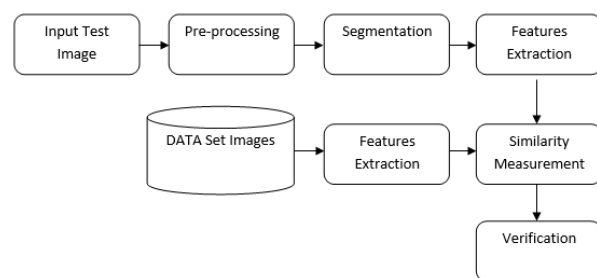
2. EXISTING METHOD

Conventionally the verifications are either functional or based upon the features. So the techniques belonging to the matching methods are in use commonly. Primarily a input image is given to the system for manipulation in the form an image through several possible techniques. First the image is interrupted in a 2 dimensional array of brightness values which is popularly used in photographic print, television screen, movie screen. The image can be processed either digitally or adaptically. To process an image digitally first we need to diminish the image to a series of numbers that can be manipulated by the computer. Each number represents the brightness value of the image at a particular location which can be called as a picture element or pixel. A

typical digitized image may have 512 × 512 or roughly 250,000 pixels, although much larger images are becoming common. Next we do the pre-processing. Image pre-processing is the term for operations on images at the lowest level of concept. These operations do not increase image information content but they decrease it if entropy is an information measure. Aim of pre-processing is an improvement of the image data that defeat undesired deformations or enhances some image features relevant for further processing and analysis task. There are also some methods for the image pre-processing. Preprocessing techniques are needed on colour, grey-level or binary document images containing text and/or graphics. In character recognition systems most of the applications use grey or binary images since organizing colour images is computationally high. Thus, to achieve this, several steps are needed, first, some image improvement techniques to remove noise or correct the contrast in the image, second, thresholding to remove the background. These are the basic methods used in the method of pre-processing. Corresponding to the given pre-processing we complete the image segmentation next. Technically speaking, image segmentation refers to the spoilage of a scene into different components (thus to facilitate the task at higher levels such as object detection and recognition) scientifically speaking, analysis is a hypothetical middle-level vision task performed by neurons between low-level and high-level critical areas. It is the process of dividing an image into multiple parts. This is typically used to identify objects or other applicable information in digital images. There are also many different ways to perform image segmentation. Next comes the process of feature extraction. The signatures are extracted from the image. Feature extractions are performed to do the information packing, Dimension reduction, silence extraction and noise cleaning. After this step a face patch is usually changed into a vector with fixed dimension or a set of fiducial points and their corresponding locations. The accuracy of the existing system is very low and the illumination occurrences are very low as the error is high.
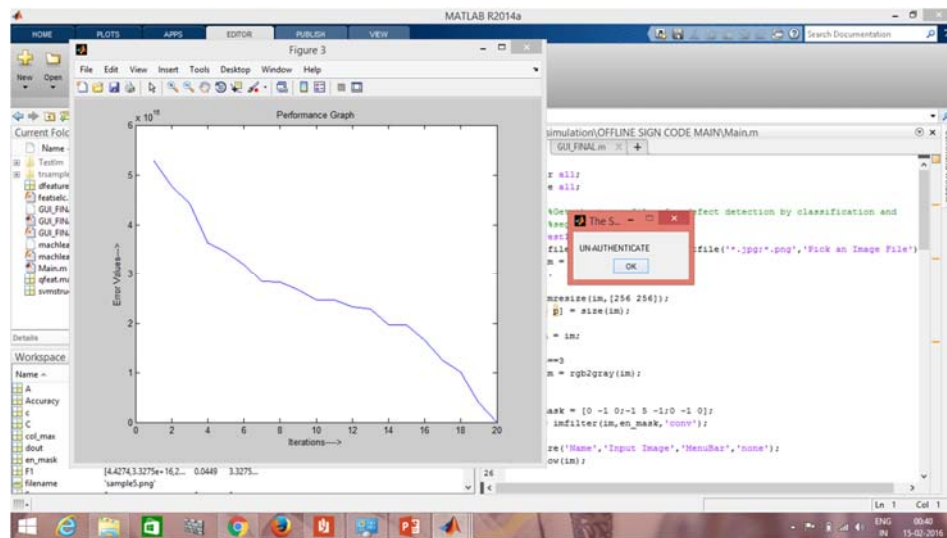
A. Block diagram showing existing system

B. Authenticated output of the existing system

Image showing the existing method

## C. Un authenticated output of the existing system

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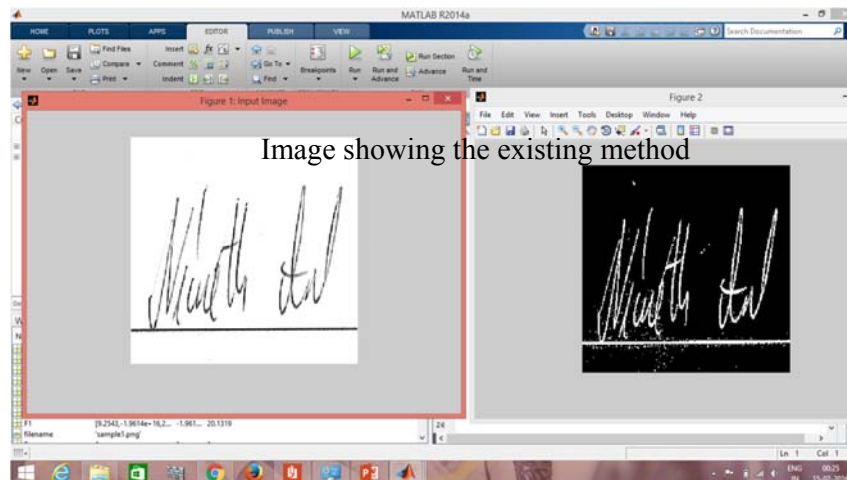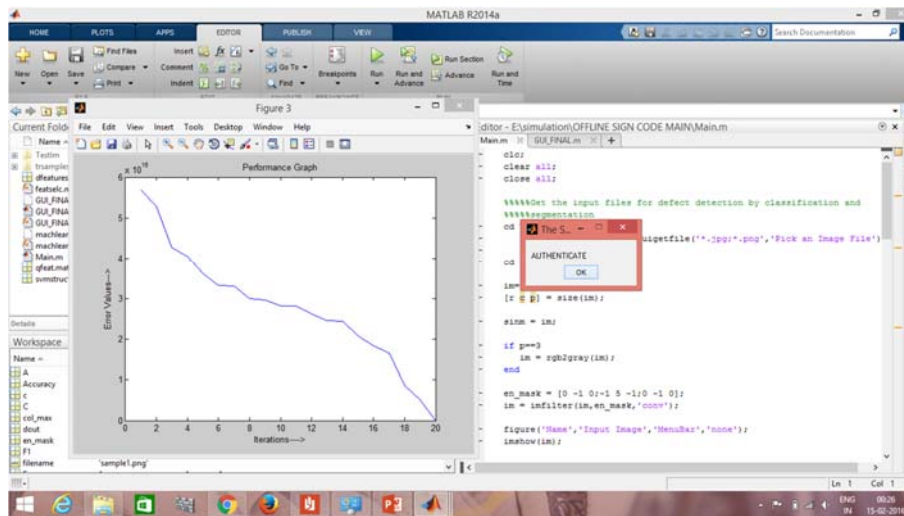
3. PROPOSED METHOD

In the proposed work we are adding a arm controller board along with the GSM kit. So we are connecting the arm controller with the personal computer and the GSM is connected with the arm controller. We are verifying it using a camera that is connected to the personal computer that works on the simulations in MATLAB. Usually GSM is being used in the process of offline signature verification. So we are implementing the usage of MATLAB software for the sake of online signature verification which can be used in all real time applications. The ARM controller we are using consists of a 32 bit ARM7TDMI-S microcontroller. The 128 bit wide accelerator enables high speed 60MHz operation. This controller is a advanced RISC machine as the main use is low power, less coverage area, high speed transferring rates of data, high efficiency, accuracy, low cost. It has a pack of 37 registers which is 32 bit longer. However these are arranged into several banks, with the accessible bank being governed by the current processed mode. An ARM is designed efficiently access memory using a single memory access cycle. So word access must be on a word address boundary. On chip inter connection promotes the IP reuse and established open specification. 90% of mobile handsets use ARM technology. It is used mainly in five key markets which are based on embedded solutions, enterprise solutions, home solutions, mobile solutions and emerging applications. GSM is a globally accepted standard for digital cellular communication. GSM is based on a wireless network. Initially in GSM they have been using TDMA method rather than the FDMA process. This GSM system consists of mainly of three subsystems that are classified as mobile system, base station subsystem and the network sub system. In the mobile system we will

be having a mobile set in our hands which is connected to a SIM. This helps in locating the person and receiving the message.

There will be separate registers for the location such as home location register and visitor location register that are connected with the authentication centre and element identification register. So in our proposed system the message is received by the person with the help of GSM only. It sends the message of either authenticated or not-authenticated. That is how the program is being designed in the MATLAB. The camera we are using is a basic ordinary camera that captures the image and sends to the software for verification. As we already discussed about the communication type we are using, we are taking the help of serially connecting cables .we are also adding a audio device to tell whether the signature is authorized or not.
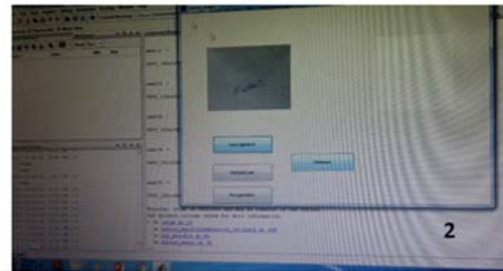
A. Block diagram showing proposed system
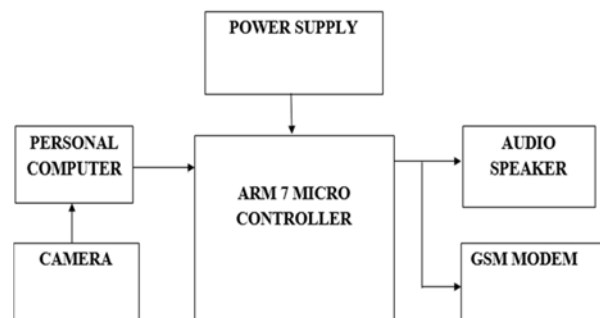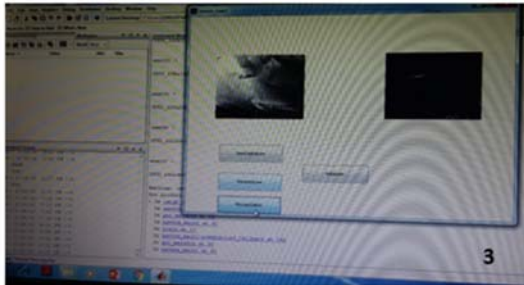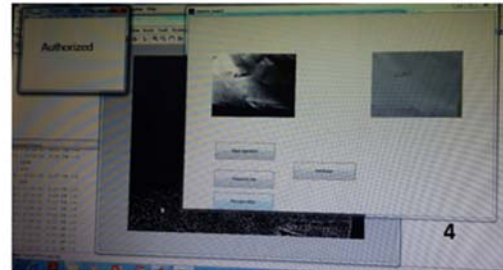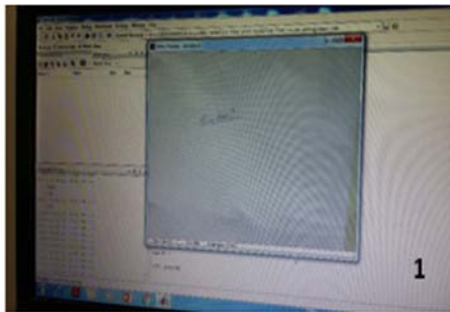

B. Authorized output of the proposed system

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Authorized output
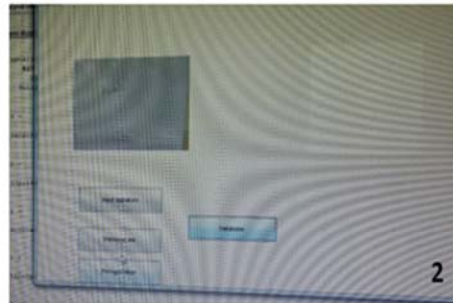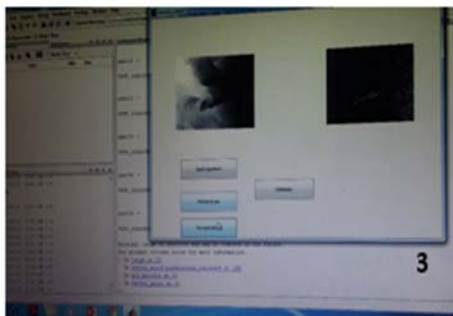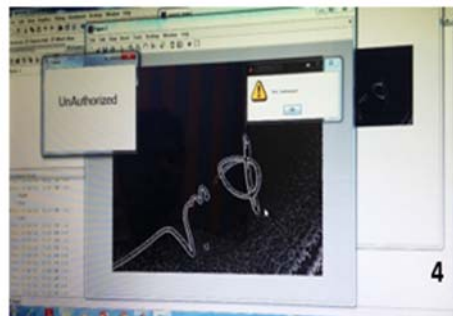

C. Unauthorized output of the proposed system

Unauthorized output

4. RESULTS

After all the connections given we will be starting the project by taking a signature randomly. Then we will be taking the snap by recording the pic using the camera that is connected to the pc. In case of offline the GSM services are used directly but as we are using it in the online method we the help of MATLAB for real time applications. So as soon as the image is taken by the camera all the process of pre-processing, image segmentation and the feature extraction is taken place. Then in the software it just checks with the database that is already provided to the pc. It goes through all the signatures in the database and finds for the nearly matching or the approximate signature for the given signature using the process of performance evaluation. Performance evaluation process is also a new concept that we are introducing in this system. In this concept after the signature is read, the percentage of either wrong or right of

the signature is being evaluated through certain techniques. Finally the signature will be found out in database. Then it checks and crosschecks the booth signature and sends the information. Finally the GSM part is being alerted for the message to be sent. It is also connected to the ARM controller. The whole process of verification is done with the help of the ARM controller only which is connected to the both GSM and pc. So finally the output message is selected from the two main messages that has already been stored kin the database. If the signature is being verified then the message saying authorized is sent to the person and in the same way if the signature is not matched the message saying not authorized is sent to the respective person.

5. CONCLUSIONS

Therefore the proposed system has succeeded in all ways in which we have been implementing. Additional to that the usage of a audio device made the verification a bit simpler. All the cases of verifications are being possible at the end. But the camera needs to be pointed according to the co-ordinates itself. But we can still improve the quality by adding a CMOS camera which can take the images clearly that can capture the signatures irrespective of their sizes and colour. The audio device provided in the kit talks about saying whether the sign is authorized or unauthorized and in the same way we can get a text message to our personal mobile number about the verification that is whether it is authorized or not.

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