TABLE 2: THE PERFORMANCE OF THE PROPOSED ALGORITHM

OFFLINE SIGNATURE VERIFICATION

INSTITUTE OF ENGINEERING & MANAGEMENT
Good Education, Good Jobs

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Introduction

- Human being **authentication** by offline handwritten signature biometric research has been increasing, especially in the last decade. The fact that the signature is widely used as a means of **personal verification** emphasizes the need for an **automatic verification system.**
- Our goal is to present an **offline signature verification mechanism** based on **a Histogram of gradient** and **artificial neural network[2].**

Challenges

- Extract **signature part** and to remove any noise present from different **scanned images.**
- Construction of **Histogram Orientation Gradient (HOG)**[1], in order to be passed into Artificial Neural Network for the recognition operation .
- Avoid the **inn-Accuracy** in verification **.**

Our Approach

- In our approach, initially the pre-processing of images is done. The pre-processing stage includes: Denoising, Color inversion, Filtering and Binarization of image.
- Histogram of oriented gradients is constructed based on the feature extraction.
- The extracted data is sent to neural network, which is already trained from the training signatures.
- The trained neural network allows us to test and distinguish different signature.

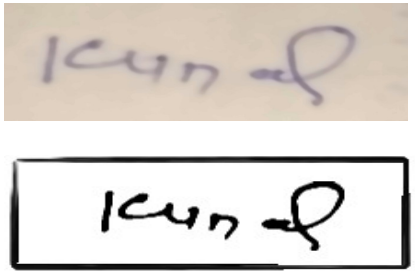

Fig. 1. (1) Before pre-processing of image (2) After pre-processing of images.

Results

FAR %	FRR %	Accuracy %
3	3.35	96.8

Existing Techniques	FAR (%)	FRR (%)
Normalized Static Features and ANN Classification	5.05	4.25
Normalized Weighted Coefficients[18] / 2016	4.9	5.2
Proposed Scheme	3	3.35

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Discussion

- Our implementation robustly and accurately addressed the challenges previously presented.
- The approach for the **offline signature verification** is **simple** to apply, and require previously **training data sets**.

Future Work

- This project model can be made more handy and visually effective if a UI is connected with it.

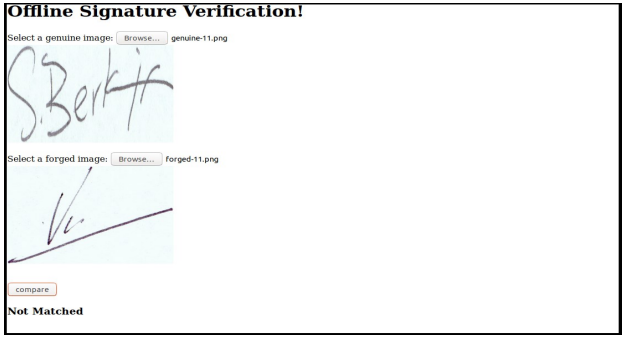

Fig. 5: A basic UI design that can be linked to the implemented project to give a better visual effect.

References

[1]N. Dalal and B. Triggs. Histograms of oriented gradients for human detection. In *Proceedings of the 2005 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'05) - Volume 1 - Volume 01*, CVPR '05, pages 886–893, Washington, DC, USA, 2005. IEEE Computer Society.

[2] Wikipedia. https://en.wikipedia.org/wiki/Artificial_neural_network