

Signature Forgery Detection Using Deep Learning

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Abstract: *One of the most challenging problems of the biometric authentication is handwritten signature authentication due to the high disparity of writing style, signature and creation of forgery techniques. The proposed project offers an effective offline signature verification algorithm that will make use of a hybrid deep learning network that will help to integrate the advantages of the Convolutional Neural Networks (CNNs) and Vision Transformers (ViTs). Specifically, we propose two hybrid models that use ResNet-18 and a Vision Transformer as well as MobileNetV2 and a Vision Transformer. These models are supposed to capture the local (stroke, shape), and the global (spatial structure) content of signature images.*

To improve performance, we introduce a variety of innovations in this, by removing the last CNN layers into higher integration of the transformer, and by data augmentation and preprocessing to regularize the input with diversified datasets. We test our models using CEDAR datasets and show remarkable accuracy rates, including a

99.89 percent accuracy rate on CEDAR. Along with achieving low False Acceptance Rates (FAR) and False Rejection Rates (FRR), the suggested system maintains efficient execution durations, which makes it appropriate for mobile and real-time applications. In addition to providing a high-performing solution to the offline signature verification problem, this work demonstrates the usefulness of hybrid deep learning models in enhancing the security and dependability of digital authentication systems.

Keywords: Signature forgery detection, Deep Learning, Convolutional Neural Network (CNNs), Vision Transformers (ViTs), ResNet-18, MobileNetV2, Image Processing, PyMuPDF, Machine learning

