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(71)**Name of Applicant :**
1)Painam Surendrakumar
Address of Applicant :Dr. Painam Surendra kumar, Associate Professor, Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. ---------- ----------
2)Mr. Tatikonda Krishna Chaitanya
3)Smt. Dasari Swetha
4)Smt. Ch. Madhavi
5)Ms. Sanagapalli Satya Venkata
6)Ms. Betala Syamala
7)Ms.Sathuluri Mahitha
8)Mr. Shaik.Ziyauddin
9)Mr. Amboru Gururajan
10)Bapatla Engineering College,
Name of Applicant : NA
Address of Applicant : NA
(72)**Name of Inventor :**
1)Mr. Tatikonda Krishna Chaitanya
Address of Applicant :Mr. Tatikonda Krishna Chaitanya, Assistant Professor Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. Bapatla ---------- ----------
2)Mr. Painam Surendra Kumar,
Address of Applicant :Mr. Painam Surendra Kumar, Assoc. Professor, Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. Bapatla ---------- ----------
3)Smt. Dasari Swetha
Address of Applicant :Smt. Dasari Swetha, Assistant Professor, Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. Bapatla ---------- ----------
4)Smt. Ch. Madhavi,
Address of Applicant :Smt. Ch. Madhavi, Assistant Professor, Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. Bapatla ---------- ----------
5)Ms. Sanagapalli Satya Venkata Naga Manasa
Address of Applicant :Ms. Sanagapalli Satya Venkata Naga Manasa, Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. Bapatla ---------- ----------
6)Ms. Betala Syamala
Address of Applicant :Ms. Betala Syamala , Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. Bapatla ---------- ----------
7)Ms.Sathuluri Mahitha
Address of Applicant :Ms.Sathuluri Mahitha, Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. Bapatla ---------- ----------
8)Mr. Shaik.Ziyauddin
Address of Applicant :Mr. Shaik.Ziyauddin, Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. Bapatla ---------- ----------
9)Mr. Amboru Gururajan
Address of Applicant :Mr. Amboru Gururajan, Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India Bapatla ---------- ----------
10)Bapatla Engineering College
Address of Applicant :Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India Bapatla ---------- ----------

(57) Abstract :
An important part of identifying and authenticating legal documents is verifying signatures. More sophisticated approaches have been developed because traditional methods cannot reliably detect true signs of counterfeiting. To improve efficiency and accuracy, this study proposes an offline signature verification method based on Convolutional Neural Networks (CNN). The CNN model is developed by the system using the deep learning framework TensorFlow. Preprocessing techniques such as grayscale transformation and binary transformation are used to extract meaningful features from signature images. Various features such as ratio, centroid, eccentricity, robustness, skewness and kurtosis are distinguished to characterize signatures. A CNN model is trained on a dataset containing genuine and fake signatures whose features are standardized by a scaler. The architecture of the model consists of convolutional layers, followed by pooling and dense layers, culminating in a sigmoid result of binary classification. Model training includes binary cross-entropy loss optimization with the Adam optimizer and early stopping to avoid overfitting. The trained model is evaluated on test data to assess its effectiveness in distinguishing between genuine and forged signatures. Finally, a signature verification function is implemented that takes an image path as input, extracts features, scales them, and predicts the authenticity of the signature using a trained CNN model. The proposed CNN-based signature verification system shows promising results, demonstrating its potential for accurate and reliable signature verification in legal documents and banking transactions.

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