Smart Kernal Block Based Morphing Detection and Prevention for Secure Server Infrastructure

Mrs.A. Sangeetha[1],Balamani.S[2], Periyamma.P[3], Varshini.K[4], Dr. R Umamaheshwari [5,]
[1],*Assistant Professor,* [2,3,4],*UG Students, Department of CSE,*
Gnanamani College of Technology, Namakkal,Tamilnadu, India.
[5,] *Professor & Head of the Department of CSE, Namakkal, Tamilnadu, India*

ABSTRACT -Several manipulations have been made in images due to high powerful tool evolvement. A copy and move forgery may occur in images where they cannot be easily. The image are get analyzed particularly for the region where the image get forged. The region of the image get copy and paste will be known with the proposed Gaussian RBF kernel PCA. The dimensionality of the feature vector representation gets high key points for the image matching. The proposed method detects the image feature with blurring, noise contaminated and the compression will be eradicated. Easiest identification of the image forgery with the editing technology or morphing can be made with computational efficiency. The result of this study are intended to aids in the development of training programs that will prevent security failures while determining whether an images is bona fide or altered. It utilizes the combination of three blocks' structures for learning. By outputting the probability of each bona fide or morphed face patches, the whole face features are integrated for recognition. Experimental results and analysis show this method can significantly improve the detection accuracy of face morphing attacks. Compared with the existing methods, this method has the characteristics of high computational efficiency and strong robustness. It has great application potential in enhancing the security of the face recognition system.

Index Terms-Biometrics, Morphing Attack Detection, Face Recognition, Human expert, ID Examination, Facial Comparison.

I.INTRODUCTION

The ambition behind the image content forgery is to perform manipulations in a way, making them hard to reveal through the naked eye, and use these forensics, has emerged which finds the evidence of forgeries in digital images. As an important biometric technology, face recognition has been widely used for banks, hotels, transportation, and other areas for identity verification. After the human's face was chosen by International Civil Aviation Organization (ICAO) as a biometric feature in electronic machine-readable travel documents (eMRTD) for assisting identity verification, face recognition technology was gradually applied to Automatic Border Control (ABC) system. Recently, a variety of attacks against face recognition systems appeared, among which face morphing attack posed a serious threat to the security of the existing face recognition systems (FRS).Face morphs include splicing morphs, complete morphs, and combined morphs. Generally, a morphed face image is generated by two subjects. Complete morphs are a result of warping and blending the entire image. Splicing morphs use the convex hull representing a face and it is cut from the input images. Combined morphs use Poisson image editing to hide face and background. Then warp and blend operations are performed. For splicing morphs and combined morphs, the morphed image looks realistic because it is performed only in the face areas of two subjects, while for the complete morphs, the morphing operation is performed on the entire face, which usually leads to spurious shadows and tremendous visual inconsistencies in the hair region; therefore complete morphs are not creations for malicious purposes. In recent years, an exciting field, digital image appropriate for the morphing attack. Ferrara et al. showed the feasibility of face morphing attacks. A criminal and an accomplice generate a morphed face image, and it is visually similar to the face images of criminal and accomplice, and it has both biological characteristics. The Morphing face detection has gained a surge of interest among the biometric and vision communities. Facial images morphing attacks have posed a serious threat to the functionality of face recognition systems, especially those adopted at borders. Using a morphed image, a criminal can share a passport with his/her innocent accomplice to evade identification and detection. To detect morphed face images, a novel method based on face patch- level features and lightweight networks is proposed in this paper. This method aims to make full use of the existing dataset and extract features by using lightweight convolution network. The main contributions are summarized as follows. A face patch- level feature learning approach is proposed and a two-level classification model is adopted. The use of patch-level features can expand the dataset and facilitate the extraction of identification information. The first-level classification uses the lightweight network to output the probability value of the face patch, and the second level of classification integrates the patch features of the whole face for discrimination. The two- level classification helps to improve the detection performance.

III. LITERATURE SURVEY

A systematic review was carried out using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) process. This systematic review is organized to cover the study's breadth under consideration by categorizing and evaluating existing publications. The first step is to define the research questions so that the coverage rate of current works is accurately described. There should be some perspectives that can help researchers generate new ideas by analyzing similar results. lists the research questions used in SR Research aims to review the published work. The purpose of research is to list all possible attacks on face Presentation of the available datasets explored in FPAD is addressed with research. A few prominent FPAD methods are to be studied in research. The limitations and challenges of existing prominent methods have to be listed in research. Future work and progress directions are expected to be chalked out in research. The first step in conducting SR is to identify information sources.Related manuscripts were found using the most popular Scopus and Web of Science. The next step is to develop procedures for reviewing the technical and scientific articles that these searches produced to identify relevant papers. The proposed approach is divided into two phases. The first phase uses Boolean operators AND/OR to identify search terms from research questions and prepare a list of keywords. The second phase uses Boolean operators AND/OR to select queries to search for and collect all relevant data gives the list of fundamental, Primary & Secondary Keywords.

PROBLEM STATEMENT

In the proposed secure scan design, the test authorization code is used to manage scan operation. Normal scanning operation can only be enabled by entering the correct test authorization code. Due to the different texture features between the morphed face image and the bona fide face image, some image descriptors, such as Local Binary Patterns (LBP) [8], Binarized Statistical Image Features (BSIF) [9], and Histogram of Oriented Gradient (HOG) [10], have been successively used for face morphing attack detection. In [11], the authors proposed to identify the authenticity of the face image using BSIF and Support Vector Machine (SVM). Scherhag et al.proposed a multialgorithm fusion approach to detect morphing attacks using LBP, BSIF, HOG, and other features [12]. Then, a morphed face detection scheme based on hybrid color features was put forward in [13]. A novel algorithm is presented to detect the morphed images by leveraging the collaborative representation of microtexture features and deriving the information from different color spaces [14]. In [15], the authors designed a morph attack detection algorithm that leveraged an undecimated 2D Discrete Wavelet Transform (2D-DWT) for identifying morphed face images. Another work [16] also employed 2D- DWT to highlight inconsistencies between a real and a morphed image. In a texture difference-based method was the morphed face detection using facial landmarks. The current texture difference-based methods were all tested by a single image dataset, and they have poor adaptability.

ALGORITHM

The morphing algorithm in feature-based metamorphosis While cross-dissolving is simple, image warping is accomplished by giving control to the user. An user specifies the corresponding features on the source and destination images. In this setup, one line is given for source image, and another for the destination image that specify the corresponding features in the source and the destination image. For e.g., for facial morphing (i.e., when the source and destination images are faces), one could specify a line along the forehead for the source and destination images. Our implementation is about 3200 lines of C code, which used many of the pieces of the Impressionist project [1] like bitmap handling, fltk application etc. We implemented a simple user interface to load source and destination images, allow user to specify control lines on them. The tool then allows the user to run the morphing algorithm with that input and it generates intermediate images as bmp files. One could use a command like convert to create a video out of these image files. The result would be a video that shows the morphing for the user specified images and control lines. We also enhanced the user interface to allow users to use the grid lines to make better decisions about the control lines. Figure 1 shows a screen shot of the UI with grid lines and control lines.

$$u = \frac{(X - P).(Q - P)}{||Q - P||2}$$

1. for each pixel X in the destination image
2. find the corresponding u and v
3. find the X 0 in the source image for that u and v
4. destination Image(X) = source Image(X 0)

advantages :

1) The system will identifies the block which are forged in the image

2) The extraction field are correctly known from the image
3) The system will identify the exact block matching algorithm system.
4) The probably biggest advantage of this technique.
5) That it is very impressive and the animator is free to position the lines.

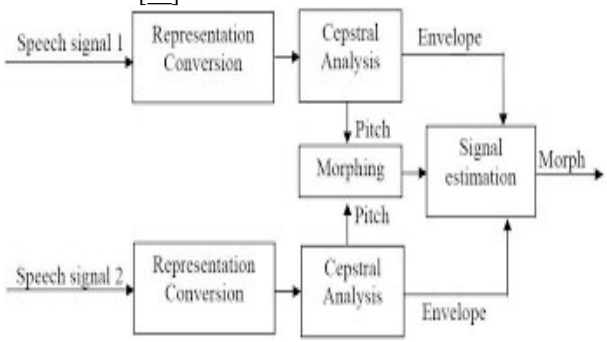
he wants for the image to build the reference base lines during the morphing process, corresponding from the source image to the destination image

Block diagram

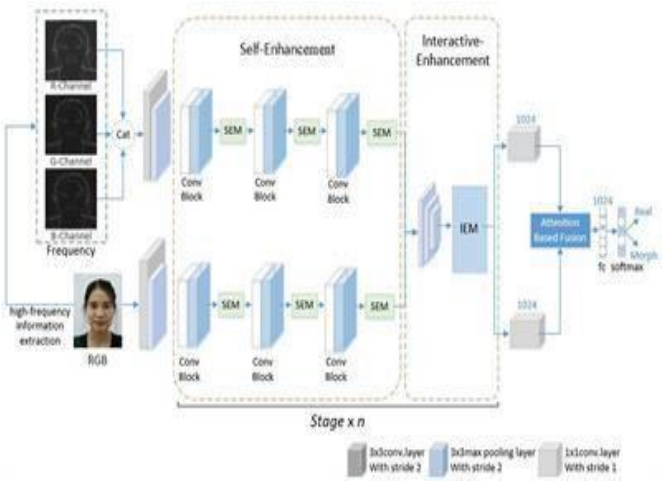
Morphing is this technique is used for the purpose of impovisation or bring about the change in the model used for real time. Type of Morphing. Domain (Box) Morphing. There are different approaches, but the fundamental meaning of morphing remains

Working

Morphing is a special effect in motion pictures and animations that Traditionally such a depiction would be achieved through dissolving techniques on film. During the morphing process, various artefacts are created, which can be detected by analysing the texture. Due to the averaging of two images, the resulting morph is smoothed, e.g. the skin textures will loose their sharpness. Furthermore, ghost artefacts or half- shade effects occur if the two morphed images are not aligned correctly and if there are too few or incorrectly positioned landmarks. Especially in the area of the pupils and the nostrils, these artefacts occur more frequently. Other artefacts detectable by texture descriptors are distorted corners and offset image areas. In several publications, the use of common texture descriptors, e.g. local binary patterns (LBPs) [38] or binarised statistical image features (BSIFs) [39], has already been demonstrated. An extension of these algorithms to several colour channels [13, 14] or higher dimensions [22] can



lead to further improvements. Other texture descriptors, such as unified LBPs (ULBPs) or weighted local magnitude patterns (WLMPs) [16] have also been tested.The distortion and blending during the morphing process influence the high-frequency information of the image. These changes can be analysed by image forensics-based detection methods. For example, it has been shown that morphs can be detected by analysing photo response non-uniformity (PRNU) or sensor pattern noise (SPN) [28]. Moreover, the quality of the images is reduced by editing and saving them in the morphing process. Under the assumption that the quality of morphed images is always lower than those of bona fide images, image quality can be used for morph detection. This can be done by either analysing intentional degradation of the image in question [23] or by using several quality features in combination with a classifier. Under the assumption that the images are stored in a lossy compression format.



CONCLUSION

In this project, we focused on finding the ways through which we can assure the detection of copy-move forgery in digital images. The dimension of the feature length with the block extracted changes with the features identified makes a variance keeps
good identification of the forgery image Furthermore, this technique does not require any prior information embedded into the image and works in the absence of digital signature or digital watermark.

FUTURE ENHANCEMENT Image morphing is important because it creates an accurate approximation of different images and animation that may be expensive with other methods. Through image morphing, we are able to view gradual changes that occur in our environment. Morphing is an effect which sees one shapes or object transform into another in a seamless transition. There are different approaches, but the fundamental meaning of morphing remains the same.

REFERENCE

[1] Qi Yan, Rui Yang,Jiwu Huang,Robust Copy–Move Detection of Speech Recording Using Similarities of Pitch and Formant, IEEE Transactions on Information Forensics and Security (Volume: 14 , Issue: 9 , Sept. 2019)
[2] Hema Rajini N, Image Forgery Identification using Convolution Neural Network, International Journal of Recent Technology and Engineering (IJRTE), Volume-8, Issue-1S4, June 2019\
[3] Yuanfang Guo, Xiaochun Cao, Wei Zhang, Rui Wang, Fake Colorized Image Detection, IEEE Transactions on Information Forensics and Security(Volume: 13 , Issue: 8 , Aug. 2018)
[4] Mohammed Ikhlayel , Mochamad Hariadi , I Ketut Eddy Pumama , Modified Multi-scale Feature Extraction for CopyMove Forgery Detection Based on CMFD-SIFT, International Conference on Computer Engineering, Network and Intelligent Multimedia (CENIM), 2018
[5] Srinivasan Ramakrishnan ; Sivasamy Nithya, Two improved extension of local binary pattern descriptors using wavelet transform for texture classification, IET Image Processing (Volume: 12 , Issue: 11 , 11 2018).
[6] C.Nagarajan and M.Madheswaran - 'Experimental verification and stability state space analysis of CLL-T Series Parallel Resonant Converter' - Journal of ELECTRICAL ENGINEERING, Vol.63 (6), pp.365-372, Dec.2012.
[7] C.Nagarajan and M.Madheswaran - 'Performance Analysis of LCL-T Resonant Converter with Fuzzy/PID Using State Space Analysis'- Springer, Electrical Engineering, Vol.93 (3), pp.167-178, September 2011.
[8] C.Nagarajan and M.Madheswaran - 'Stability Analysis of Series Parallel Resonant Converter with Fuzzy Logic Controller Using State Space Techniques'- Taylor & Francis, Electric Power Components and Systems, Vol.39 (8), pp.780-793, May 2011.
[9] C.Nagarajan and M.Madheswaran - 'Experimental Study and steady state stability analysis of CLL-T Series Parallel Resonant Converter with Fuzzy controller using State Space Analysis'- Iranian Journal of Electrical & Electronic Engineering, Vol.8 (3), pp.259-267, September 2012.
[10] Nagarajan C., Neelakrishnan G., Akila P., Fathima U., Sneha S. "Performance Analysis and Implementation of 89C51 Controller Based Solar Tracking System with Boost Converter" Journal of VLSI Design Tools & Technology. 2022; 12(2): 34–41p.
[11] C. Nagarajan, G.Neelakrishnan, R. Janani, S.Maithili, G. Ramya "Investigation on Fault Analysis for Power Transformers Using Adaptive Differential Relay" Asian Journal of Electrical Science, Vol.11 No.1, pp: 1-8, 2022.
[12] G.Neelakrishnan, K.Anandhakumar, A.Prathap, S.Prakash "Performance Estimation of cascaded h-bridge MLI for HEV using SVPWM" Suraj Punj Journal for Multidisciplinary Research, 2021, Volume 11, Issue 4, pp:750-756
[13] G.Neelakrishnan, S.N.Pruthika, P.T.Shalini, S.Soniya, "Perfromance Investigation of T-Source Inverter fed with Solar Cell" Suraj Punj Journal for Multidisciplinary Research, 2021, Volume 11, Issue 4, pp:744-749
[14] C.Nagarajan and M.Madheswaran, "Analysis and Simulation of LCL Series Resonant Full Bridge Converter Using PWM Technique with Load Independent Operation" has been presented in ICTES'08, a IEEE / IET International Conference organized by M.G.R.University, Chennai.Vol.no.1, pp.190-195, Dec.2007
[15] M Suganthi, N Ramesh, "Treatment of water using natural zeolite as membrane filter", Journal of Environmental Protection and Ecology, Volume 23, Issue 2, pp: 520-530,2022
[16] M Suganthi, N Ramesh, CT Sivakumar, K Vidhya, "Physiochemical Analysis of Ground Water used for Domestic needs in the Area of Perundurai in Erode District", International Research Journal of Multidisciplinary Technovation, pp: 630-635, 2019detection. In Proceedings of the 2018 26th European Signal Processing Conference (EUSIPCO), Rome, Italy, 3–7 September 2018; IEEE:

Piscataway, NJ, USA, 2018; pp. 1027–1031.
[17] Scherhag, U.; Rathgeb, C.; Merkle, J.; Breithaupt, R.; Busch, C. Face recognition systems under morphing attacks: A survey. IEEE Access 2019, 7, 23012–23026.
[18] Scherhag, U.; Budhrani, D.; Gomez- Barrero, M.; Busch, C. Detecting morphed face images using facial landmarks. In Proceedings of the International Conference on Image and Signal Processing, Cherbourg, France, 2–4 July 2018; Springer: Berlin/Heidelberg, Germany, 2018;
[19] Hearst, M.A.; Dumais, S.T.; Osuna, E.; Platt, J.; Scholkopf, B. Support vector machines. IEEE Intell. Syst. Their Appl. 1998, 13, 18–28.
[20] Ferrara, M.; Franco, A.; Maltoni, D. Face demorphing. IEEE Trans. Inf. Forensics Secur. 2017, 13, 1008–1017.