



Survey on Image Forgery Detection System Using Machine Learning

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Abstract: As many image tampering frauds are increasing day by day it's important to alert people about it and help to create an system with high accuracy. In this paper an image forgery detection system is purposed using CNN which will identify tampering by comparing two original and tampered datasets and show different types of tampering and detect with high accuracy in CASIA dataset. In image forgery detection, LBP can be utilized to capture the unique texture characteristics of an authentic image. Any alterations or forgeries may lead to changes in these texture patterns, allowing the system to detect inconsistencies. LBP has been proven effective in various image analysis tasks, including face recognition and texture classification, making it a valuable tool in image forgery detection systems.

I. INTRODUCTION

An image forgery detection system is a technology designed to identify and detect manipulations or forgeries in digital images. It aims to ensure the authenticity and integrity of images by analyzing various features, patterns, and characteristics within the image data. Image forgery poses challenges in various fields, including journalism, forensics, and legal proceedings, as it can lead to misinformation and false representations. To counter image fraud, advanced image forgery detection systems and forensic techniques are employed to identify inconsistencies and alterations in digital images. Image forgery involves the manipulation or alteration of digital images with the intent to deceive or mislead.

There are two approaches to image forgery: active and passive. Active approaches include digital signatures in images and watermarks; passive approaches include copying, splicing, image morphing, image retouching, and image enhancement. Image forgery involves the manipulation or alteration of digital images with the intent to deceive or mislead. Various types of image fraud can occur, including:

1. Image Splicing:

Image splicing is a form of digital image manipulation where different portions of two or more images are combined to create a new composite image. This process involves copying regions from one image and pasting them onto another, resulting in a deceptive representation that can be used to mislead or deceive viewers.



Tampered Image Real Image
 Fig.1.Image Splicing

2. Copy-Move Forgery: Duplicating or copying a portion of an image and pasting it onto another part of the same image to create a misleading effect.

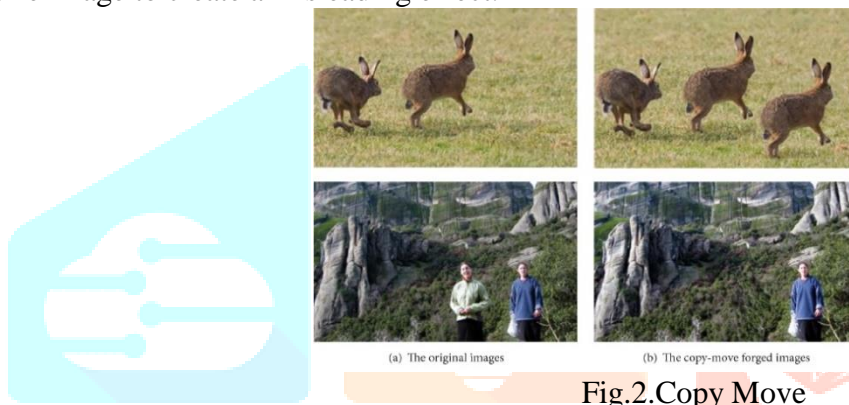


Fig.2.Copy Move

3.Steganography: Hiding information within an image in a way that is not immediately apparent. This could involve embedding text or other images within the pixels of the original image.

4.Photo Manipulation: Editing or retouching images to alter their content. This could involve removing or adding elements, changing colors, or adjusting details.

5.Deepfake Technology: Using advanced machine learning techniques to create realistic fake images or videos by superimposing someone's likeness onto another person's body or scene.

6.Metadata Manipulation: Editing the metadata of an image, such as timestamps or geotags, to mislead viewers about the time or location of the depicted events.

7.Photoshopping Official Documents or IDs: Forging official documents or identification cards by manipulating images to change names, dates, or other critical information.

II. Literature Survey:

Ref no.	Paper Title/ Publication details	Methodology	Dataset	Accuracy	Future Scope /Conclusion
1	A New Method to Detect Splicing Image Forgery Using Convolutional Neural Network. Author- Akram Mortada, Nabil Lashin;2023	CNN, SVM, DWT domain.	CASIA	99.1%	The proposed approach worked only with the image splicing forgery problem.
2	Image Forgery Detection Using Deep Learning by	CNN-based network	CASIA	92.23%	The proposed technique can efficiently detect image

	Recompressing Images. Author- Neetesh Saxena, Syed Sadaf Ali;2022				splicing and copy-move types of image forgeries.
3	Image forgery detection: a survey of recent deep-learning approaches. Author-Riccardo Leonardi, Marcello Zanardelli;2022	DCT transform are used as pre-processing,	DVMM, MICC, CASIA	95%	The technique presented is able to identify both the copied regions and the original ones used as source for the attacks.
4.	Study on Deep Learning Based Techniques for Image Tamper Detection. Author- Anirudha Malpani, Punyashree .M;2022	PCA on image blocks before image processing.	CASIA	79%	These algorithms have focused on training the CNN to see the most effective features to classify camera models.
5	Image Forgery/Tampering Detection Using Deep Learning and Cloud. Author- Misbah Shaikh, Dipak Patil;2022.	Cloud service to grab data from uploaded documents.	CASIA	95.0 %	This demonstrated to be capable of automatically learning abstract and complicated attributes required for the identification of tampered regions.
6	IMAGE TAMPERING DETECTION USING MACHINE LEARNING TECHNIQUES. Author-Surya Prakash, Sunil Varma ;2022.	SVM and KNN classifier	Columbia	90 %	The proposed scheme, employs a DCT and SVD based technique to extract image features to detect and classify the tampered images.
7	Image Forgery Detection System Using ML. Author-Shanthraj Selvaraj, Prof. Ramya I M;2022.	CNN	Dataset of Images	81 %	The dataset of Images is used to classify the forged and genuine images.
9.	Image forgery detection review Author- Hiba Benhamza, Abbas Cheddad;2021	Watermarking, SVM	CASIA, COMOF OD and UCID	95.42%	Showed the most used techniques for feature extraction and training stages and presented the most used datasets and the performance measurements for evaluation
10.	Deep Learning-Based Digital Image Forgery Detection System Author- Tanveer Zia, Abdulrazaq Almorjan;2021	RRU-Net, Image residuals	Columbia, CASIA	99.30%	The proposed system will help in the image manipulation detection domain and also paves the way for future research in detecting multiple types of image forgery manipulations.
11.	A Survey on Image Forgery Detection Using Different Forensic Approaches	Digital image watermarking, DWT	Image Dataset	87%	The techniques investigated in this paper are digital signature, digital watermarking, copy-move,

	Author- Akram Hatem Saber, Mohd Ayyub Khan;2020				image splicing, and image cloning.
12.	Deep Learning Local Descriptor for Image Splicing Detection and Localization Author- YUAN RAO;2020	Image splicing detection	CASIA, DSO-1	97.50 %	In our method, the CNN model serves as a local feature descriptor, which is trained based on the labelled patches sampled from the training images.
13.	Morphological Filter Detector for Image Forensics Applications Author- GIULIA BOATO;2020	Mathematical morphological filter detector	UCID,R AISE	81.21%	we propose an effective detection strategy to assess the use of morphological filtering in a grayscale context.
14.	Constrained Image Splicing Detection and Localization With Attention-Aware Encoder-Decoder and Atrous Convolution Author- YAQI LIU, XIANFENG ZHAO;2020.	CASIA			we propose a novel attention aware encoderdecoder deep matching network .

III. Conclusion:

In conclusion, the image forgery detection system project aims to enhance the integrity of digital images by implementing robust algorithms and techniques. By leveraging advanced image processing and machine learning methods, the system can effectively identify and flag potential instances of forgery, contributing to the overall security and trustworthiness of digital content. The success of the project relies on continuous updates and adaptation to emerging forgery techniques, ensuring a reliable defense against evolving threats in the digital imaging domain. CNN play a crucial role in automating the process of feature extraction and classification.

IV. REFERENCES

1. "A New Method to Detect Splicing Image Forgery Using Convolutional Neural Network." Akram Mortada, Nabil Lashin;2023
2. "Image Forgery Detection Using Deep Learning by Recompressing Images."Neetesh Saxena, Syed Sadaf Ali;2022
3. "Image forgery detection: a survey of recent deep-learning approaches." Riccardo Leonardi, Marcello Zanardelli;2022
4. "Study on Deep Learning Based Techniques for Image Tamper Detection." Anirudha Malpani, Punyashree .M;2022
5. "Image Forgery/Tampering Detection Using Deep Learning and Cloud."Misbah Shaikh, Dipak Patil;2022.
6. "IMAGE TAMPERING DETECTION USING MACHINE LEARNING TECHNIQUES."Surya Prakash, Sunil Varma ;2022.
7. "Image Forgery Detection System Using ML."Shanthraj Selvaraj, Prof. Ramya I M;2022.
8. "Image forgery detection review" Hiba Benhamza, Abbas Cheddad;2021
9. "Deep Learning-Based Digital Image Forgery Detection System"Tanveer Zia, Abdulrazaq Almorjan;2021
10. "A Survey on Image Forgery Detection Using Different Forensic Approaches" Akram Hatem Saber, Mohd Ayyub Khan;2020