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Detection Algorithm for Copy Move Forgery in Digital Images

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ABSTRACT : With the availability of the powerful editing software and sophisticated digital cameras, region duplication is becoming more and more popular in image manipulation where part of an image is pasted to another location to hide undesirable objects. With these improved forgery techniques most of the digital images are being used by culprits to hide important data from being caught. The most used forgery is Copy Move Forgery(CMF). So these manipulations can be detected using object detection algorithms. The proposed algorithm finds the forged part of the image with high accuracy and less time by using Discrete Cosine Transform(DCT) technique on these images.

KEYWORDS: Copy Move Forgery(CMF), Discrete Cosine Transform(DCT)

I. INTRODUCTION

Nowadays, with the popularity of low-cost and high-resolution digital cameras, digital media is playing a more and more important role in our daily life, however, due to the sophisticated editing software (for example, Photoshop, 3D Max), digital images can be easily manipulated and altered without leaving visible clues, thus, it poses a serious social problem as to how much of their content can be trusted, whether it is authentic or tampered especially as a witness in a courtroom, insurance claims and scientific fraud. According to some statistics in one journal, as many as 20% of accepted manuscripts contain figures with inappropriate manipulations, and 1% of which with fraudulent manipulations. As a result, when the counterfeit images are used for vicious purpose, it may result in inestimable lose. To combat this problem, digital image forensics has emerged as a new research filed to reveal digital tampering in images. There are several types of tampering, however, concealing some objects from natural images is a common form of digital image tampering, known as copy-move forgery (CMF).

II. RELATED WORK

Various CMFD techniques have been proposed so far to effectively address the region duplication problem. In this regard, the research is intended towards the representation of image regions in a more powerful way to accurately detect he duplicated regions. In Fridrich et al. for the first time presented the copy-move forgery detection technique using DCT on small overlapping blocks. The feature vectors are formed using DCT coefficients.The similarity between blocks is analyzed after sorting the feature vectors lexicographically. In image blocks are represented through principal component analysis (PCA). Exploiting one of the features of PCA, the authors used about half of the number of features utilized by Fridich. It makes this technique effective but failed to detect copy-move forgery with rotation. In a sorted neighborhood technique based on Discreet Wavelet Transform (DWT) is proposed. The image is decomposed into four sub bands and applied the Singular Value Decomposition (SVD) on low frequency components for getting the feature vector. The technique is robust to JPEG compression up to the quality level 70 only.

III. PROPOSED APPROACH

Design consideration

- Convert image to gray scale image.
- Decompose image into small NxN pixel blocks
- All the blocks undergo DCT to represent blocks as sum of sinusoidal signals.
- Blocks are then lexicographically ordered based on frequency and magnitude

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- Euclidean distance operation is done on image blocks
- Then the forged image blocks are represented

Description of proposed algorithm

The forged image which need to be detected is turned into a gray scale image and decompose them into a small pixel blocks to perform image processing operations. So these images are represented as matrix. These decomposed pixel blocks undergo DCT to represent these blocks as sum of sinusoidal signals and calculate frequency and magnitude. Based on these frequency and magnitude valuse these blocks are lexicographically sorted and then we calculate the euclidean distance between these sorted blocks which have similar frequency. Finally these forged blocks are represented in the simulation.

IV. SIMULATION RESULTS

The simulation is done in python idle are any python software as the code is written in python and we use the modules OpenCV and NumPy to do operations on image processing

Fig1 Forged image

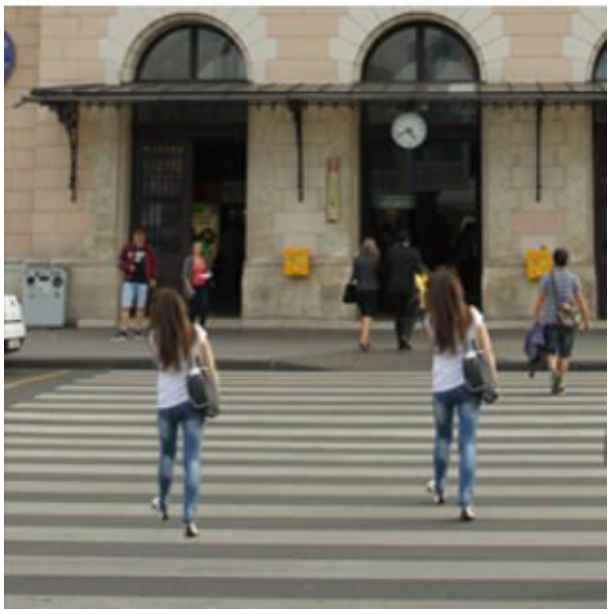

Fig 2: Gray scale image

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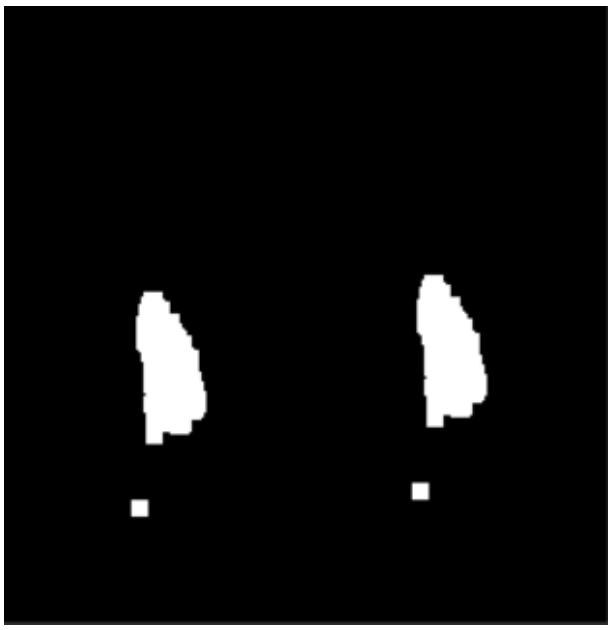

Fig3 : Predicted result

V. CONCLUSION AND FUTURE SCOPE

The simulation result shown above for the proposed algorithm performs better with more accuracy and less time to detect a copy move forgery in digital images. As the proposed algorithm is not able to distinguish between original block and forged block we can improve this algorithm to find which block is original and which is forged block and we can also try to perform this for very low quality images with accurate results.

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